USING CONSERVATION TENDERS FOR WATER QUALITY IMPROVEMENTS IN THE BURDEKIN RESEARCH REPORTS

Results from experimental workshops

RESEARCH REPORT No 4.

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Executive summary

In this report, results from two experimental workshops, conducted with sugarcane growers who had participated in the Burdekin Water Quality Tender, are reported. The workshops were held in March 2008 and attracted a total of 39 participants which represented 61% of the tender participants.

The main objective of the workshops was to elicit additional information from sugarcane growers who had participated in the tender trial. In particular, the influence of changes in scope and scale were investigated in relation to potential impacts on participation rates and the competitiveness of the bid proposals.

The workshops were divided into three parts. The first part involved participants engaging in an experimental tender. The aim of the exercise was to create a pool of additional bids which could then be assessed against the bids in the trial tender. This would provide information about the relative impact of increasing the scale of the tender by introducing more competition into the bidding process. The second part of the workshop focused on the impacts that scope and scale changes may have on participation and bid competitiveness. The last part of the workshop required participants to complete a questionnaire survey which provided information on participants' attitudes and opinions about conservation tenders. This information could be used to determine some of the factors that may influence participation in the tender and drive price determination.

The key findings from the different sections of the workshop are outlined below.

PART 1. Comparing the bids from the experimental and trial tenders

Key Finding 3.1: Introducing more competition into the bidding from the same participants (encouraging multiple bids) will increase cost efficiencies.

Key Finding 3.2: Including 32 additional bids from workshop participants into the Water Quality tender would result in a 41% increase in nitrogen emission reductions and a 43% reduction in the average cost per kg of nitrogen reduction. The increased competition would also generate a cost reduction of 33.4% for sediment emissions and 52% reduction in the cost of pesticide emissions.

Key Finding 3.3: The average cost of reducing a kilogram of nitrogen was lower than the cost of reducing a ton of sediment or a litre of pesticide. Increasing the purchase of nitrogen emissions resulted in a 15% reduction in reduced sediment emissions and a 16% reduction in reduced residual pesticide emissions.

PART 2. Impacts of scope and scale changes on participation

Key Finding 4.1: Changing the scope and/or scale of the tender will only have a potential influence on participation or bid price of just over half (58%) of landholders.

Key Finding 4.2: The size of the funding pool will influence participation rates. Landholders are more likely to be deterred by low funding pools than encouraged by larger pools.

Key Finding 4.3: Increasing the scope of a tender will have a negative impact on participation. Increasing the scope to include other primary producers within the same region is more acceptable than extending a sugarcane tender to other regions.

Key Finding 4.4: The greatest adverse impact on participation would be to increase the scope of the tender to include another sugarcane growing region. This could reduce participation by 30%.

Key Finding4.5: There is a tradeoff with increasing scope and/or scale between the impact on participation rates and the impact on bid prices. A more competitive environment will reduce participation but increase the competitiveness of bid prices.

Key Finding 4.6: Participants are more responsive to changes in scope and scale within their own industry as they have more understanding about their relative competitiveness.

Key Finding 4.7: Increasing the scope of the tender to all producers in the region is likely to provide the most efficient outcomes, as the impact on participation is relatively low, and outweighed by the benefits of increase in price competition.

Key Finding 4.8: Increasing the monitoring requirements will have a negative influence on participation rates for about a third of landholders, but will have a positive influence on about 10%.

Key Finding 4.9: Increasing the monitoring requirements will increase the transaction costs for landholders and this will translate though into higher bid prices. A low level monitoring requirement will induce 29% of respondents to increase their bid price by about 8%. A high monitoring standard will affect fewer people (24%), but the impact on price would be much greater with an average increase of 21%.

Part 3. Results from the questionnaire survey

Key Finding 5.1: Committing to some form of cost-share arrangement was very acceptable and in the trial tender, 95% of participants had agreed to meet some of the project costs themselves.

Key Finding 5.2: The majority of participants did not include the transaction costs incurred in developing a bid in their bid price. These cost become part of a de facto cost-share arrangement.

Key Finding 5.3: The average cost in terms of the time taken to develop a bid proposal was approximately $220. The potential cost of monitoring activities averaged approximately $640.

Key finding 5.4: Demographic and attitudinal variables did not appear to be related to bid construction, suggesting that bids are largely driven by farm characteristics and opportunity costs.

Key Finding 5.5: Initial interest in the tender was driven by views about the importance of natural resource management and the associated environmental benefits.

Key Finding 5.6: Demonstrating that sugarcane growers are being proactive in reducing environmental impacts was a universal driver behind the decision to submit a bid in the tender.

Key Finding 5.7: The incentive payment was more important for capital reinvestment than as an additional source of income.

Key Finding 5.8: Participating in the incentive scheme was also seen by the majority of respondents as an opportunity to improve production.

Key Finding 5.9: There is some contradiction in attitudes to land management. While the majority of respondents believed that investment in conservation practices is important for future profitability, participants in tender schemes also think it is only fair they get fully compensated for management changes that provide environmental benefits.

Key Finding 5.10: The structure of incentive schemes is well aligned with the attitudes of participants. Most people do not think it is important that all landholders be paid at the same rate for the same task.

Key Finding 5.11: Participating in the tender process did appear to act as a catalyst for some applicants to implement their projects, even if their applications are unsuccessful. This is more likely to be the case when applicants can financially afford to absorb the risk of their project being unsuccessful.

Key Finding 5.12: Most participants expected there to be both positive financial and production related impacts if their projects proved successful.

Key Finding 5.13: Participants' experience in the tender appears to have been quite positive with few negative issues raised. Most respondents (80%) expected to participate in another tender scheme given the opportunity.

1. Introduction

The Lower Burdekin Dry Tropics Water Quality Improvement Tender has been developed as a research project aimed at exploring issues of scope and scale in tender design (Rolfe et al. 2007). Key issues of interest are to determine how increasing the scale and scope of a tender may lead to efficiency gains as competition increases, but be offset by increases in transaction costs or changes in participation rates and bidding behaviour. Other goals of the project are to determine how factors such as geographic and industry variability may be incorporated into the design and assessment process, and how auction results may be predicted with agent-based modelling techniques. The scope of the project and details of the case study have been outlined in earlier research report (Appendix 2).

The primary source of data in the project has been the conduct of the Burdekin Water Quality Tender trial, with $600,000 allocated for on-ground funding. Additional data has been collected through experimental workshops, landholder surveys and desktop analysis. In this report the results of the experimental workshops are outlined. The main objective of the workshops was to elicit additional information from sugarcane growers who had participated in the tender trial. In particular, the influence of changes in scope and scale were investigated in relation to potential impacts on participation rates and the competitiveness of the bid proposals.

Designing conservation tenders is not a simple exercise and requires considered input from a range of specialists and stakeholders. As well, new models, methods and design elements need to be tested for potential flaws. A number of auction mechanisms that have appeared to be theoretically and normatively correct have failed in application (Klemperer 2002; Chakravati et al.2002), indicating the need to road test mechanisms with human interactions (Cason and Gangadharan 2004). Given the importance of auction design that is tailored to specific situations and the need to check theoretical predictions against interactions with individual participants, there has been developing interest in testing auction mechanisms with different types of experimental methods before full application (Shogren et al. 2000; Cason and Gangadharan 2005).

There are two broad forms of experimental procedures available to test the field applications of conservation auctions. The first are laboratory experiments, where the tradeoffs are tightly controlled and carefully defined to subjects. University students are typically involved as participants. The second are field or workshop experiments, where:

- actual or simulated farms are used;
- farmers are involved as participants;
- different mechanism design features may be tested; and
- a range of additional information may be elicited from participants.

Field experiments have more confounding variables involved, but provide more direct feedback on how landholders of interest would behave if different forms of conservation auctions were introduced (List and Shogren 1998; List and Lucking-Reiley 2002). This means there are advantages in testing certain aspects of conservation tender design with landholders, particularly in situations where:

- the attitudes and experiences of landholders are expected to be very important for the design and support of a tender process and so the selection of the most efficient mechanism should be done with landholders;
- there is asymmetric information about opportunity costs and relevant attributes and the involvement of landholders may help to better identify this information; and
- the involvement of landholders will help to familiarise and promote the use of conservation tenders within the region.

(Rolfe et al. 2004).

The experimental workshops outlined in this report were divided into three parts. The first part involved participants engaging in an experimental tender. The aim of the exercise was to create a pool of additional bids which could then be assessed against the bids in the trial tender. This would provide information about the relative impact of increasing the scale of the tender by introducing more competition into the bidding process. The second part of the workshop focused on the impacts that scope and scale changes may have on participation and bid competitiveness. The last part of the workshop required participants to complete a questionnaire survey which provided information on participants' attitudes and opinions about conservation tenders which could be used to determine some of the factors that may influence participation in the tender and drive price determination.

The report is structured in the following way. In the next section, a brief overview of the workshop format and participants' characteristics is outlined. In Section 3, the results of the experimental fertiliser reduction tender are presented. The results of the second and third parts of the workshops are presented in Sections 4 and 5 respectively and the results are discussed and summarised in the final section.

2. Workshop format

The tender trial was implemented in the latter part of 2007 and all bids were assessed in early 2008. A total of 87 bids (64 bidders) were received; nine from the grazing industry and 78 from the sugar industry. In the cane sector, 78 bids were received from 57 landholders (13 landholders had submitted multiple bids and two landholders submitted both cane and grazing bids). These bids were evaluated under four main categories:

- Recycle pits – 41 bids;
- Water management – 22 bids;
- Nutrient management – 10 bids; and
- Pesticide management – 5 bids.

The workshops were held with tender participants and were purposefully timed to occur after the bid assessment process had been completed but before the results had been announced. This meant that participants could be confident that:

- the exercises they completed in the workshops would have no influence on the tender outcomes; and
- the information they provided would not be influenced by the results of the tender bid and whether or not their bid had been successful.

Working with participants who had already submitted bids had advantages because they were already familiar with the tender process and the considerations involved in developing a tender application.

In the tender trial the majority of bids related to the construction, extension and/or upgrade of recycle pits. While these actions would result in the off-farm movement of nutrients, there was less focus in the bid proposals on reducing nutrient inputs. To expand the range of bid information in the different assessment categories, participants in the experimental tender (the first part of the workshop) were asked to develop proposals (as if in a real tender) aimed at better nutrient management and reducing fertiliser use. The results could then be compared to those in the tender trial and the influence of increased competition assessed. The results for the workshop tender would also provide valuable information about the potential costs of reducing fertiliser use in the region and the acceptability of doing so.

The second part of the workshops focused on participation and how it might be affected by:

- changes in scale (eg. changing the size of the tender);
- changes in scope (eg. changing the geographical area and/or the range of industries involved); and
- changes in transaction costs.

These factors are explored in terms of their impact on participation rates as well as bid competitiveness.

The third part of the workshop involved the completion of a questionnaire survey with the results providing information about:

- the considerations, drivers and transaction costs associated with the tender trial bid proposals;
- opinions driving participation in the tender; and
- the broader impacts of the tender.

2.1 Workshop participants

Two workshops were held in Ayr with sugarcane growers in March 2008. There had been insufficient response from cattle graziers in the tender to warrant a separate grazier-only workshop. However, a third of the landholders who had submitted a grazing bid had also submitted a sugarcane bid proposal. At least two participants with mixed farming enterprises were present at the workshops.

The workshops were purposefully scheduled so that the bids from the tender trial had already been assessed but before the results had been released. The scheduling of the workshops was fortuitous as it occurred at a time when there were fewer demands on sugarcane farm management, with the harvest season completed and before the main planting season begins. In addition, heavy flooding in the region meant that many growers were still unable to cultivate their farm blocks. This meant the workshops were well attended with 39 participants. Four of these had only submitted an

Expression of Interest (EOI) in the tender and 35 had submitted a bid, which accounted for 61% of the tender trial participants.

There was a cross section of growers attending the workshops with some representing very large enterprises and others with much smaller farms. Overall:

- Farm sizes ranged from 44ha to 2500ha with an average of 303ha;
- Tons of cane grown ranged from 3,800 tons to 220,000 tons with an average of 28,068 tons and a median of 13,000 tons. The average drops to 16,700 tons when two large producers are excluded;
- Experience in growing cane ranged from 2 years to 60 years, with an average of 24 years;
- 51% of participants had dependent children;
- 37% of participants expected to pass on their farm to the next generation, but half the participants remained unsure;
- Only half of those who did expect to pass their farm onto the next generation expected them to still be growing cane;
- The majority (69%) had some income from sources other than cane. The proportion ranged from 5% to 90% with an average of 34%;
- Nearly half the respondents stated that they balanced their focus on production and environmental benefits in their management decisions, with the other half split between a preference for production and environmental benefits;
- 64% of participants thought there would be environmental benefits if they reduced their fertiliser application rates;
- 62% of participants thought they could provide environmental improvements on their farm as well as improving production outcomes; and
- Nearly all the participants (91%) thought they were more likely to improve their management practices in the next 3 years if the government helped by providing some incentive payment.

These characteristics were later applied to the results of the two tenders to try and identify some of the drivers behind the determination of bid price. However, there was no consistent pattern of influence (See Section 5.1.2).

3. The experimental nutrient reduction tender

The first part of the workshop required participants to develop a bid proposal in an experimental tender where they were asked to reduce their fertiliser application rate. Nearly all the participants had recently developed a bid for the tender trial and so they were familiar with the process of developing a tender application. While the exercise was obviously hypothetical, participants were asked to make their bids as realistic as possible as the results would be used to expand the information gathered in the trial tender. It would be used to help design conservation tenders and help estimate the costs associated with eliciting environmental services from landholders in the region.

The use of experimental workshops is not new, and a general template used in relation to conservation tenders had previously been developed by the researchers (Rolfe et al. 2004; Rolfe and Windle 2006; Windle and Reeson 2007). However, two adjustments

were made to the earlier template. In previous workshops, participants were provided with hypothetical farm property maps and details. This meant a number of variables could be controlled, which made it easier to identify the drivers behind bid proposals. It was also considered less personal if hypothetical properties were used, although landholders were asked to develop their project proposals based on their own circumstances.

However, previous experimental workshops suggested that using hypothetical properties made the process overly stylised. Participants became too focused on the tender as an exercise rather than providing more realistic information relating to their own situation and set of circumstances.

In the Burdekin workshops, participants were not provided with model properties and were simply asked to develop their proposals according to their own particular circumstances. This proved to be a successful amendment and participants appeared to have less difficulty developing their proposals compared with sugarcane growers in the other workshops. When model farms are used, participants have to make a conversion from their own situation to the hypothetical one, a process which is avoided when they simply refer to their own farm circumstances.

The second adjustment to the workshop template was avoid the allocation of prizes for 'winning' proposals. This had previously been identified as providing perverse incentives, although the use of very small prizes may have merits in some situations (Windle and Reeson 2007). In addition, while some landholders in experimental workshops like to see the results of the tender exercise and the process of highlighting the "winners" in the tender, others find this more embarrassing. In the Burdekin workshops, the results of the experimental tender were not revealed in the workshop and participants were not provided with any prizes. However, they had been paid a sitting fee to attend.

Participants were asked to develop a bid proposal as if in a real tender and that the following conditions applied:

- **Assume the actions and contract will be for three years**. 40% of the payment will be made up front; 30% at the end of the second year and 30% on completion.
- **A minimum level of 10kg/N reduction in fertiliser use is required.** (This is equivalent to an annual reduction of 20 kg/ha of urea).

To simplify the process of calculating a bid, participants were:

- asked to provide details of the fertiliser type and application rates. This information was later converted to determine the quantity of nitrogen reduction based on the fertiliser type.
- provided with a worksheet to assist them in their cost calculations if required. These sheets focused on calculating the:
    - annual reduction in fertiliser costs plus any other cost savings;
    - potential annual production losses plus any other production costs; and
    - potential capital costs such as machinery and other equipment.

Details of the measures participants were proposing to implement in order to reduce their fertiliser use are presented in Appendix 1. Also included in the appendix is a short discussion about the complexity of fertiliser applications rates and the reasons why growers find it difficult to make further reductions.

3.1 Comparing the results of the experimental and trial tenders[1]

Thirty six bid proposals were fully completed in the workshops. Four of these were from participants who had submitted an EOI but not entered a bid in the trial tender. This left 32 proposals where sufficient information was available to assess the bids using the same metric that was applied in the trial tender. Two adjustments were made to the workshop bids to align them with trial tender bids:

- The workshop bids were calculated for a three year period and had to be reduced to a one year equivalent; and
- The maximum benefit of nutrient management bids in the trial tender was extended over a 2.5 year period and the benefits associated with workshop bids were extended over the same period (reduced from the three years outlined in the tender conditions).

The bids from the 32 workshop participants, which represented more than half (56%) of the trial participants, were then assessed and directly compared alongside the trial tender bids.

When the bids the bids from the workshop were first assessed with the metric and pooled with the trial tender bids, there were 16 which would have been successful. These bids were then rechecked with the results of Part 2 of the workshop exercises to determine how serious participants were and how likely they thought they were to enter the bid in a real tender. Two participants with successful workshop bids had indicated that they were not likely to submit their bids in a real tender and their bids were removed. This meant 14 (44%) of the workshop bids were successful in the revised assessment:

- There was no correlation between participants who had been successful in the trial and those with successful workshop bids;
- Five workshop participants had submitted a fertiliser bid in the trial,
    - four had successful trial bids;
    - three had successful workshop bids; and
    - two were successful in both.

Introducing the workshop bids into the assessment resulted in a number of changes. The budget limit was triggered at $604,979 in the trial and slightly higher at $609,881with the workshop bids. This increased the total area of impact from 10,017 ha to 10,539ha. There was a small increase in the number of successful bids and bidders:

- the number of successful bids increased from 33 to 38;
- the number of successful bidders increased from 28 to 31with:

[1] The results of the trial tender as at the 19th March are used for comparison. Subsequent modifications/adjustments were made to the bid assessment metric and the results reported here may differ from other reported versions.

- seven new landholders and
- four previously successful landholders dropping out.

The proportion of total project costs that participants indicated they were prepared to contribute was lower in the workshop (24%) compared with the trial (54%). It is possible that landholders partly use their proportional contribution to adjust their perceived bid competitiveness and because the competitive environment was not so realistic in the workshop they kept their contributions lower. If this was the case, it suggests that the competitiveness of the workshop bids could have been improved.

However, the most significant changes resulting from the inclusion of workshop bids were the efficiency gains. The workshop bids were generally quite competitive which meant that more cost effective bids could be accepted. Bids were measured and ranked in terms of their relative bid values which was based on the cost of the bid in relation to the amount of environmental benefit it would provide ($/environmental score). The lower the relative bid value, the more cost effective the bid. The difference in the relative bid values of the two tender scenarios is presented in Figures 3.2a and 3.2b. Figure 3.2a focuses only on the successful bids and illustrates that when the extra workshop bids were included, the number of more cost effective bids increases and the relative bid curve is lower and flatter. In Figure 3.2b, all the bids, apart from the last five outliers, are included.

Figure 3.2a Relative bid values of the successful bids in the two tender scenarios

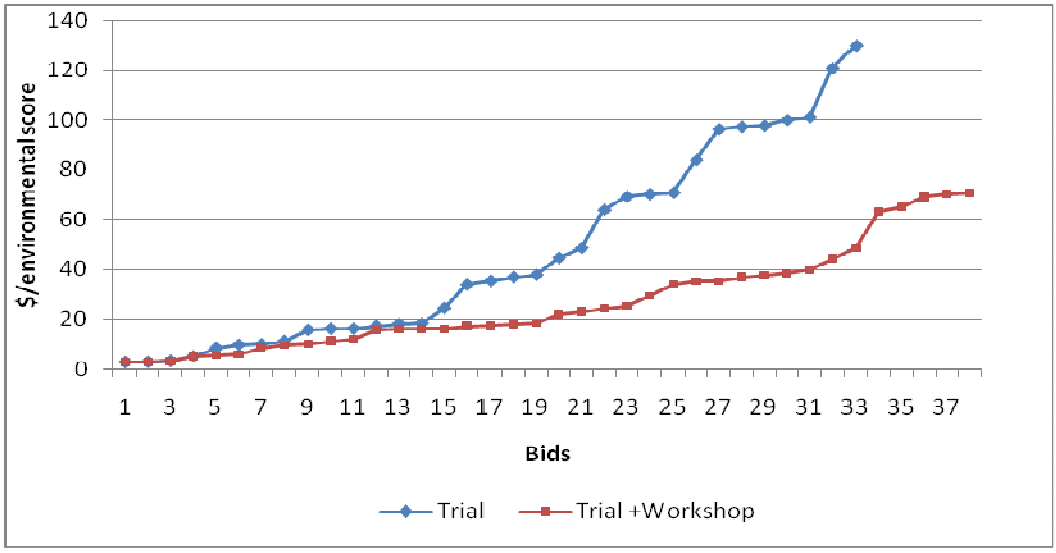
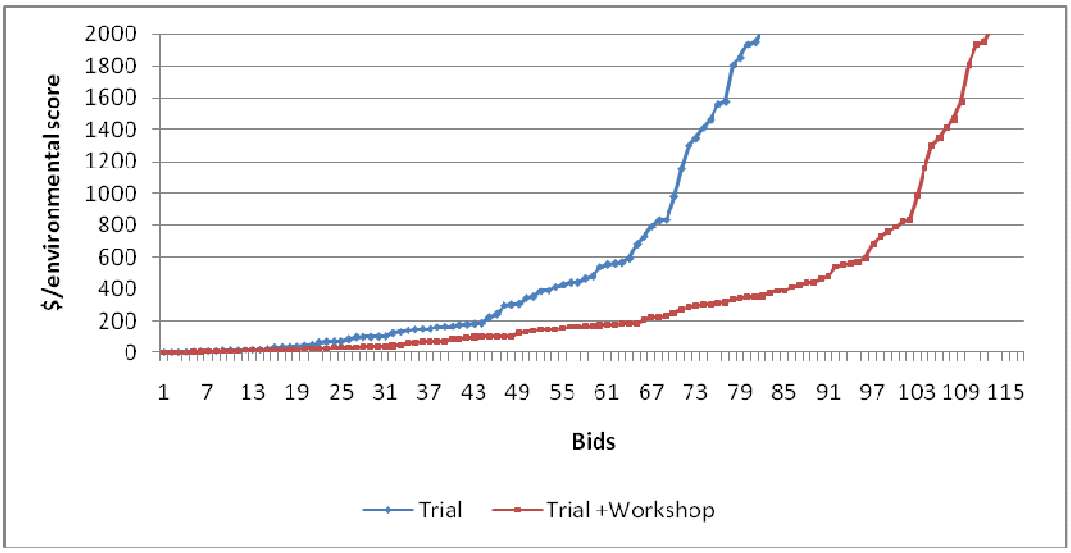


Figure 3.2b Relative bid values of all the bids in the two tender scenarios



Introducing more competition into the tender meant that the relative cost of purchasing outputs or emission reductions was reduced in each bid category. It also meant that the relative composition of outputs was changed. Summary details are presented in Table 3.1.

Table 3.1 Output differences between tender scenarios by bid category

Type of action	No of bids	Total cost	Area involved (ha)	Total change in emissions[1]	Avg cost per unit reduction[1]	Lowest to highest cost ratio
Grazing management: Emissions = tons sediment						
Trial	4	$43,875	2,947	492	$104.47	7.0
Workshop	3	$28,534	2,700	418	$69.58	3.6
Pesticide management: Emissions = kgs Atrazine, Diuron &2-4D						
Trial	5	$56,863	578	58	$4,294.02	25.8
Workshop	4	$45,863	578	48	$1,226.66	2.9
Recycle pit: Emissions = kg nitrogen						
Trial	9	$151,930	1,658	24,166	$7.79	13.8
Workshop	7	$132,930	953	23,068	$5.08	8.0
Water management: Emissions = kg nitrogen						
Trial	8	$281,500	3,656	66,436	$6.35	38.6
Workshop	6	$146,500	3,581	56,089	$4.05	28.9
Nutrient management: Emissions = kg nitrogen						
Trial	7	$70,811	1,178	18,143	$8.54	**7.7**
Workshop	18	$256,054	2,727	73,743	$4.10	12.8
Totals				**Nitrogen reduction**	**Avg cost/kg**	
Trial	33	$604,979	10,017	108,746kg	$7.53	
Workshop	38	$609,881	10,539	152,899kg	$4.31	

[1] Some projects in the trial tender had add-on components which resulted in additional nutrient and/or pesticide reductions. These are included in the relevant pesticide or nutrient category emission totals but are included in the specific bid category to assess the cost of emission reductions.

Grazing management

- The average cost of a reduction in sediment emissions fell from $104.47/ton to $69.58/ton, representing a cost reduction of 33.4%;
- The cost ratio between the cheapest and the most expensive bid accepted fell from 7.0 (the most expensive was seven times greater than the cheapest) to 3.6; and
- The amount of sediment emission reduction fell by 15% from 492 tons to 418 tons.

Pesticide management

- The average cost of a reduction in residual pesticide emissions fell from $4,294.02/ litre to $1,226.66/litre, representing a cost reduction of 71.4%;
- The cost ratio between the cheapest and the most expensive bid accepted fell from 25.8 to 2.9; and
- The amount of pesticide emission reduction fell by 16% from 58 litres to 48 litres.

Recycle pits (nitrogen emissions)

- The average cost of a reduction in nitrogen emissions fell from $7.79/kg to $5.08/kg, representing a cost reduction of 52.0%;
- The cost ratio between the cheapest and the most expensive bid accepted fell from 13.8 to 8.0; and
- The nitrogen emission reductions fell by 5% from 24,166kg to 23,068kg.

Water management (nitrogen emissions)

- The average cost of a reduction in nitrogen emissions fell from $6.35/kg to $4.05/kg, representing a cost reduction of 36.2%;
- The cost ratio between the cheapest and the most expensive bid accepted fell from 38.6 to 28.9; and
- The amount of nitrogen emission reduction fell by 16% from 66,436kg to 56,089kg.

Nutrient (nitrogen) management

- The average cost of a reduction in nitrogen emissions fell from $8.54/kg to $4.10/kg, representing a cost reduction of 52%;
- The cost ratio between the cheapest and the most expensive bid accepted increased from 7.7 to 12.8 (more low cost bids were included); and
- The amount of nitrogen emission reduction increased by 306% from 18,143kg to 73,743kg.

In summary, when the workshop bids are included with the actual tender, there would have been a 41% increase in the reduction of nitrogen emissions from 108,746kg to 152,899kg with the average cost of nitrogen emission reduction falling by 43% from $7.53/kg to $4.31/kg.

<u>Key Finding 3.1:</u> Introducing more competition into the bidding from the same participants (encouraging multiple bids) will increase cost efficiencies.

Key Finding 3.2: Including 32 additional bids from workshop participants would result in a 41% increase in nitrogen emission reductions and a 43% reduction in the average cost per kg of nitrogen reduction. There was a cost reduction of 33.4% for sediment emissions and 52% reduction in the cost of pesticide emissions.

Key Finding 3.3: The average cost of reducing a kilogram of nitrogen was lower than the cost of reducing a ton of sediment or a litre of pesticide. Increasing the purchase of nitrogen emissions would result in a 15% reduction in reduced sediment emissions and a 16% reduction in reduced residual pesticide emissions.

4. Impacts of scope and scale changes on participation

The second part of the workshop exercises focused on trying to estimate the influence that changes in scope and scale may have on participation in a tender scheme. Participants were presented with a number of different scenarios and asked to indicate the likelihood of their participating in the suggested scheme on a scale from 1 (very unlikely) to 10 (very likely). An initial scenario was used to determine a baseline from which any variation could be compared. The baseline scenario outlined a proposal with a funding pool of $400,000 (each year for three years) and was limited to Burdekin sugarcane growers. Other scenarios were then described to assess:

Changes in scale:

a) Increasing the funding pool to $600,000, and
b) Decreasing the funding pool to $200,000.

Changing the scope:

c) $400,000 funding but open to all primary producers, and
d) $400,000 funding but open to sugarcane growers in Mackay and Proserpine as well as the Burdekin.

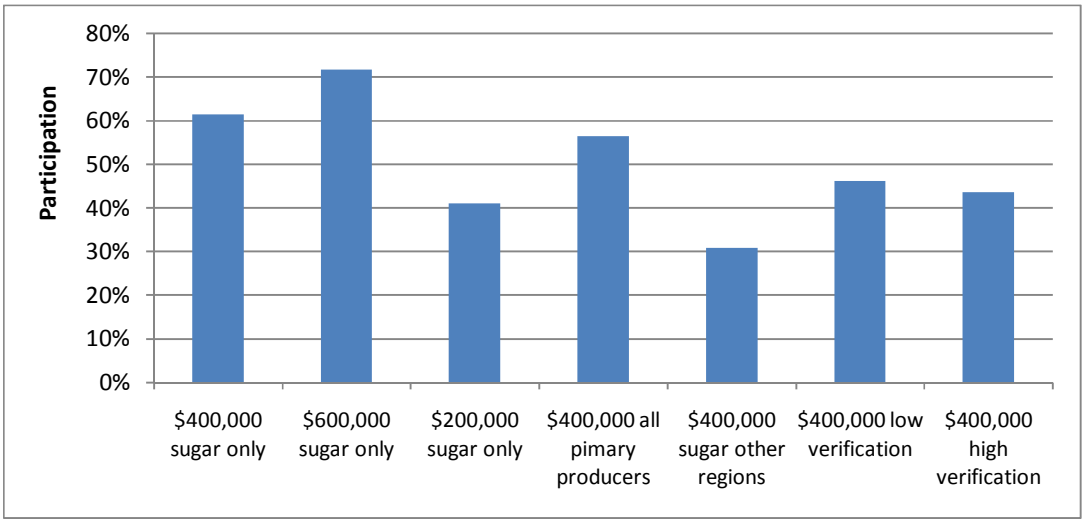
The influence of transaction costs in terms of verifying their actions:

e) $400,000 funding and a low level of verification with a requirement to undertake a higher level monitoring such as having to take water samples after each irrigation event, and
f) $400,000 funding and a high level of verification with a requirement to undertake a higher level monitoring such as having fertiliser purchases checked by an auditor.

To estimate the potential participation rates under the different scenarios any rating with a score of 5 of higher was considered a positive indication of participation. The results are presented in Figure 4.1

There was clear evidence that the scale of a scheme will have an impact on participation. Increasing the size of the funding pool will have a positive effect but there is a stronger negative effect of having a smaller budget allocation. When the funding pool was increased by 50% from $400,000 to $600,000, participation rates in the scheme increased by 10.3% from 61.5% to 71.8%. Conversely, when the scale was decreased by 50% to a funding pool of $200,000, participation rates dropped by twice as much (20.5%) from 61.5% to 41.0%.

Figure 4.1 Impacts of scope and scale on participation rates



Increasing the scope of the tender had a negative impact on participation, but increasing the scope to include other primary producers in their own region was more acceptable than including sugarcane growers from other regions (Figure 4.1). When the scheme was extended to other primary producers in the Burdekin region, there was a 5.1% drop in participation from 61.5% to 56.4%. The effect was greater when the scope of the tender was increased to include sugarcane growers in the Mackay and Proserpine districts, with the participation rate falling by 30.7% from 61.5% to 30.8%.

Increasing the transaction costs associated with more stringent verification procedures had some negative impact on participation, but not as much as a low funding pool or extending the scope to include other regions. There was also more variation in the opinions of workshop participants to this issue which is outlined in more detail below. Implemented a low level of verification and increasing the monitoring requirement to include the need for water sampling after irrigation events decreased participation rates by 15.3% from 61.5% to 46.2%. The high verification level and more intrusive monitoring requirement of having an auditor check fertiliser purchases, reduced the likelihood of participating by a further 2.6% to 43.6% (Figure 4.1).

While the results outlined above provide an indication of the overall response to changes in scope and scale, there were some notable differences between workshop participants. In particular:

- 16 participants (42%) retained their participation likelihood across scenarios and were not influenced by changes in scale or scope. Of these:
    - Nine (24%) would participate in all scenarios, and
    - Five (13%) would not participate in any of the scheme scenarios.

Of the remaining 22 participants

- *Scenario a* – 10 people (26%) would increase their participation likelihood,
- *Scenario b* – 17 people (45%) would reduce their participation likelihood ,

- *Scenario c* – 10 people (26%) would reduce their participation likelihood but it would increase for 3 people (8%),
- *Scenario d* – 17 people (45%) would reduce their participation likelihood,
- *Scenario e* – 13 people (34%) would decrease and 5 people (13%) would increase their likelihood of participating, and
- *Scenario f* – 13 people (34%) would decrease and 4 people (11%) would increase their likelihood of participating.

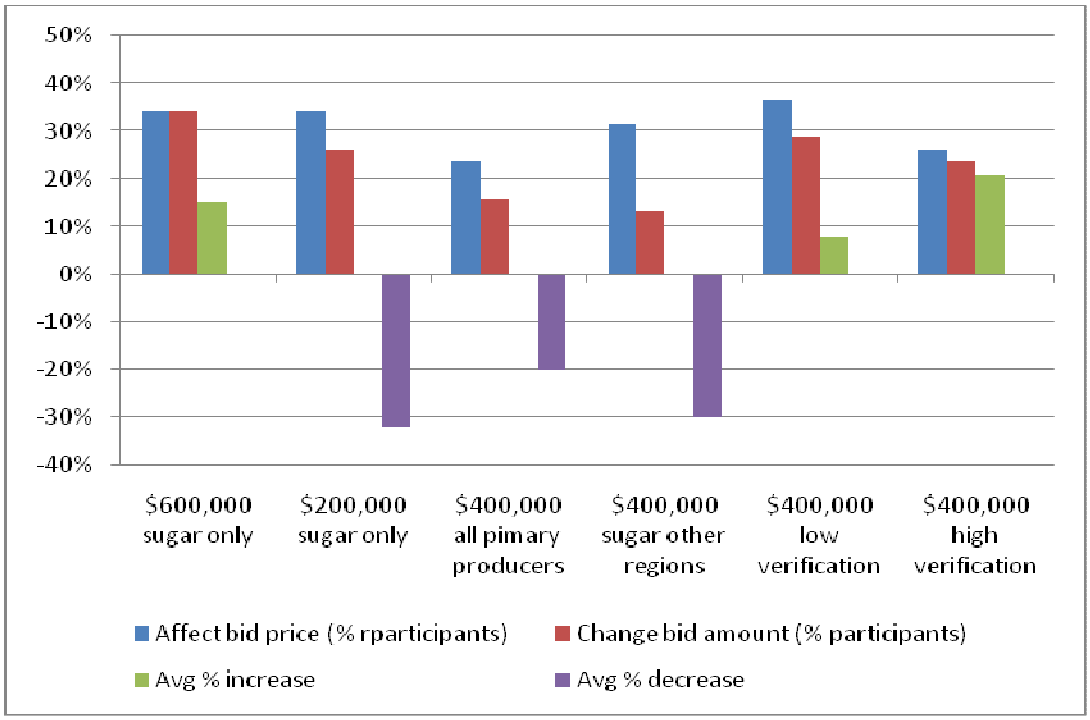
Some sugarcane growers, including some participants in the workshop, operate a mixed farming enterprise and would include themselves in the category of other primary producers in the region (eg. cattle graziers). This would likely account for the differences in opinion in scenario c. Less obvious are the differences in attitudes to the more stringent verification procedures. One explanation may be that these measures are seen to decrease the potential for the scheme to be abused and ensure the actions by all landholders will be carried out. Other people may already be implementing these measures and would see they have an advantage over others who are not. In other words, their transaction costs would be low which could give them a competitive advantage.

The extent to which the impact of scope and scale would flow through and affect the determination of bid price was explored in more detail.[2] Approximately one third of respondents indicated that the change in tender scenario would affect their overall bid price or project costs (Figure 4.2). Increasing scope to include all primary producers had the least impact, with only 24% suggesting it would affect their bid price. However, there was some variation in the extent to which participants would respond by altering their actual bid amount.

The scenario that induced the lowest number of participants to change their bid amount (13%) was the option to extend the tender to other regions, but still involve only sugarcane growers. Even though this was only a small group, their change was quite large with bids decreasing by an average of 30%. Clearly some participants considered the inclusion of sugarcane growers from other regions as increasing the competitive environment and to retain their chances of success, they would have to submit a more competitive bid.

Figure 4.2 The influence of scope and scale issues on bid prices

[2] It should be noted that in both the workshop tender exercise and the live tender, participants were asked to provide information about their total project costs and the amount they would contribute (encouraging a cost-share principle) as well as their actual bid amount. This meant that if participants were placing an additional premium on their bid price above the actual project costs (which the results suggest they were doing), it is not clear whether this was reflected in their total project costs or the proportion they were prepared to contribute. Similarly, when participants indicated they would change their bid prices in the scenarios relating to scope and scale changes, it is unclear if they were making adjustments to their total project costs and/ or the proportion they were prepared to contribute. However, from the perspective of the implementing agency, the distinction does not matter, only the impact on the final asking price.



The other option that increased the competitive of bids was to reduce the scale of the tender which induced a larger proportion of respondents to alter their bids (26%) by an average of 32% (Figure 4.2). Conversely, increasing the scale of the tender might increase the likelihood of landholders participating in the scheme, but all of them (34%) indicated they would increase their bid price by an average of 15%.

There was no such tradeoff between participation rates and the impact on bid price in relation to increasing the verification measures. This would both reduce the likelihood of participation and potentially increase bid prices to account for the additional transaction costs. The lower level monitoring scenario would induce 29% of participants to increase their bid price by an average of 8%. The higher level monitoring scenario would affect less people (24%), but the impact on price would be much greater with an average increase of 21%.

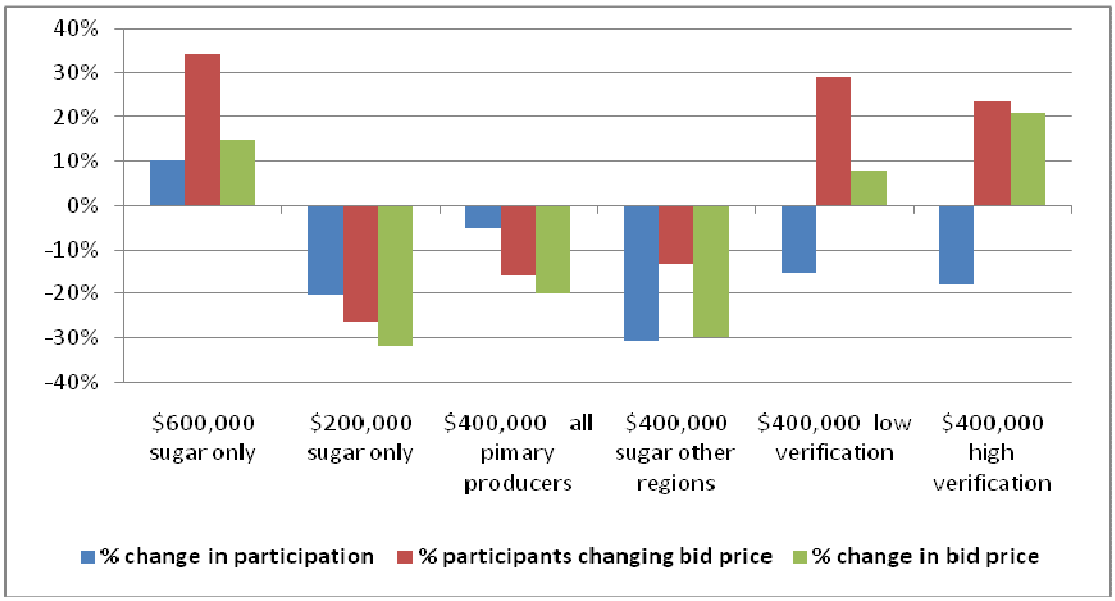
In summary, the tradeoffs between the impacts on participation and the impacts on actual bid amounts (compared with the baseline) are highlighted in Figure 4.3.

In general it would appear that:

- *Scenario a* – when the funding budget is increased, it will encourage gaming where participants increase their bid price as they are confident their chances of success will be improved. The impact of gaming is likely to be greater than the impact on participation rates.
- *Scenario b* – when the funding budget is decreased, both participation rates and bid prices will decrease. The impact on bid price is likely to be greater than the impact on participation rates.
- *Scenario c*– when all primary producers in the region were included in the tender, there is some decline in participation but the impact is outweighed by the increased competitiveness of the bids.

- *Scenario d* – when sugarcane growers from other regions are included, the impact of lower participation is likely to outweigh the impact on increased price competition. However, there will be some substantial competitive gains to be made.
- *Scenario e* – when a low level of monitoring measures are imposed, there will be a negative impact on participation and many participants will increase their bid prices, but by relatively small amounts.
- *Scenario f* – imposing a high level of monitoring measures will have a relatively small impact on participation compared to a low level standard, but will have a much more substantial impact on bid prices.

Figure 4.3 The tradeoffs between impacts on participation rates and bid prices



Key Finding 4.1: Changing the scope and/or scale of the tender will only have a potential influence on just over half (58%) of landholders.

Key Finding 4.2: The size of the funding pool will influence participation rates and landholders are more likely to be deterred by low funding pools than encouraged by larger pools.

Key Finding 4.3: Increasing the scope of a tender will have a negative impact on participation, but increasing the scope to include other primary producers within the same region is more acceptable than extending a sugarcane tender to other regions.

Key Finding 4.4: The greatest adverse impact on participation would be to increase the scope of the tender to include another sugarcane growing region. This could reduce participation by 30%.

Key Finding4.5: There is a tradeoff between the impact on participation rates and the impact on bid prices. A more competitive environment will reduce participation but increase the competitiveness of bid prices.

<u>Key Finding 4.6:</u> Participants are more responsive to changes in scope and scale within their own industry as they have more understanding about their relative competitiveness.

<u>Key Finding 4.7:</u> Increasing the scope of the tender to all producers in the region is likely to provide the most efficient results as the impact on participation is relatively low, and outweighed by the benefits of increase in price competition.

<u>Key Finding 4.8:</u> Increasing the monitoring requirements will have a negative influence on participation rates for about a third of landholders, but will have a positive influence on about 10%.

<u>Key Finding 4.9:</u> Increasing the monitoring requirements will increase the transaction costs for landholders and this will translate though into higher bid prices. A low level monitoring requirement will induce 29% of respondents to increase their bid price by about 8%. A high monitoring standard will affect fewer people (24%), but the impact on price would be much greater with an average increase of 21%.

5 Results from the questionnaire survey

In the last part of the workshop, participants were given a questionnaire survey to complete. The same survey had been used to evaluate competitive tenders in other parts of Queensland and the results would provide a useful basis for comparison as well as adding to the database of baseline tender evaluation surveys.

The results of the survey would also be useful in another comparative context. Respondents completed the survey before they knew if their bids had been successful or not. This meant their responses would provide a baseline or reference point on which to assess any changes in attitude that might occur after participants knew the results of the tender. A follow-up survey has since been conducted and the results are presented in a separate report.

In this section of the report, the results of the workshop survey are presented in terms of:

- The consideration and transaction cost involved in bid development
- Attitudes that might be influencing participation in the tender; and
- The broader impacts of the tender.

5.1 The considerations and transaction costs involved in bid development

The large majority of participants (87%) were either “very confident” or “reasonably confident” that the total cost outlined in the tender application represented the true costs of meeting their proposed obligation. However, it would appear that some participants were more precise in their calculating their bid price than others. Nearly half the respondents (47%) indicated that they made a detailed estimate of the costs involved while the other half (50%) made a more general estimate.

Most respondents were also aware that the selection process was competitive and 64% were either "very concerned" (23%) or "reasonably concerned" (41%) that their bid price would be competitive compared with other applications. However, 26% were "not very concerned" and 10% were "not sure how concerned". This meant the majority (74%) kept their bid price as low as possible to improve their chances of success, but a quarter of the participants (26%) did not.

Agreeing to some form of cost-share arrangement appears to be a very acceptable practice. All but two of the participants (95%) indicated that they had agreed to meet some of the project costs themselves. The two main reasons driving their contribution was to increase their chances of success and the fact that they would benefit from the project. Others had already incurred some of the project costs and also important was displaying a more responsible attitude as well as considering the broader range of community benefits.

> "I think it is important to show that I am willing to contribute to the project without appearing to expect a 100% handout. "
>
> "Because we can use the benefits to our local area and the lower costs of water to us in the long term."
>
> "There will be direct benefits to myself - ie. lower water costs by recycling. As member of the wider community I too will benefit from improved water quality."
>
> "To be fair to others"
>
> "I did not think I would be successful if I asked for the total cost."
>
> "Because I would be helping myself also."
>
> "I am willing to contribute where possible."

5.1.1 Transaction costs

Participants were asked to provide details about some of the transaction costs they occurred in developing their proposals and the potential cost of implementing verification and monitoring requirements if their project was successful. In general, these associated transaction costs were absorbed by the participants and not included in the total project budget. In effect they became another component in the cost-share arrangement.

The time it took participants to develop their bids ranged widely from one hour to 100 hours, with an average of 11 hours, which reduces to five hours when three of the more time consuming applications are discounted. The cost or value attached to their time ranged from $10 to $150 per hour, with an average of $42 which drops to $36 if two more costly estimates are discounted. This would equate to an overall average cost of the time taken to develop a bid, of $462, or $222 without the two outliers. However only five participants indicated that they included these costs in their total project budget, at an average cost of approximately $302.

Eight participants (20%) indicated that they incurred other costs in developing their bids, which mainly related to the need for consultants/ technical advice. These costs ranged from $200 to $600 with an average of $460. Only one person indicated that they include this cost in the total project budget.

The other project cost that participants were asked to consider was associated with the time they thought might be involved to verify and monitor their projects if successful.

Again there was quite a range from one to 150 hours with an average time of 22 hours, reducing to 16 hours when two outliers are removed. The overall average cost (without outliers) was $643. Only four participants included theses cost in their project budget at an average cost of $373. These were not the same participants who had included the cost of their time to develop the proposal.

5.1.2 Drivers of bid price and emission reductions

Several statistical tests were conducted to try and identify some of the drivers behind the determination of bid price and the level of emissions reduction in the bid proposals. A range of variables, including basic participant characteristics, outlined in Section 2.1, and the attitudinal variables that are presented in this section were included in the analysis.

Independent samples t-tests were conducted to identify if respondent characteristics or attitudes were significant predictors of bid levels in the water quality tender. A total of 52 demographic and attitudinal variables were included in the t-tests, with only one significant relationship identified against bid level (at the 5% level of significance) with the workshop winners. This may be partly a consequence of the limited data set. It also may indicate that the bid construction has been largely driven by farm characteristics and subsequent project and opportunity costs, rather than by differences between respondents.

Key Finding 5.1: Committing to some form of cost-share arrangement was very acceptable and in the trial tender, 95% of participants had agreed to meet some of the project costs themselves.

Key Finding 5.2: The majority of participants did not include the transaction costs incurred in developing a bid in their bid price. These cost become part of a de facto cost-share arrangement.

Key Finding 5.3: The average cost in terms of the time taken to develop a bid proposal was approximately $220. The potential cost of monitoring activities averaged approximately $640.

Key finding 5.4: Demographic and attitudinal variables did not appear to be related to bid construction, suggesting that bids are largely driven by farm characteristics and opportunity costs.

5.2 Opinions influencing participation in the tender

Participants were asked a range of questions to better understand the motivation that might be influencing landholders to participate in the tender.

In general participants were more likely to have been involved in other programs with the Burdekin Dry Tropics NRM group, compared with other government programs. Being a member of Landcare was not an obvious driver of participation.

- 37% had been involved in other programs with the Burdekin Dry Tropics NRM group in the last five years;
- 19% had been involved in any government programs in the last five years; and
- 8% had been an active member of Landcare or similar group in the last three years.

More specifically, the reasons behind motivations for people being initially interested in the tender related to the importance to looking after land and water resources (Table 5.1). More than 85% of participants thought that the following issues were important to them:

- The link between future farm viability and looking after the land and water resources (c);
- The importance of environmental benefits;
    - to the participant personally (b)
    - to the broader population (d)
    - in terms of the impact of water quality on the Great Barrier Reef (e); and
- The importance of rewarding people for good land management practices (f).

Table 5.1 Reasons for initially being interested in the tender (Q.5)

N=39 Scores ranged from 1=not important to 5=very important	**Mean score**	**Not important** (Rating 1+2)	**Important** (Rating 4+5)
a) The extra income would be useful	3.32	32%	47%
b) The environmental benefits of water quality are important to you	4.32	3%	89%
c) It's important for the future viability of your property to look after the land and the waterways	4.62	3%	95%
d) The environmental benefits of improved water quality are important for everyone in Australia	4.58	11%	89%
e) The environmental benefits of improved water quality are important for the Great Barrier Reef area	4.56	13%	87%
f) It is important to reward people for good land management practices	4.51	5%	85%

The extra income associated with the scheme was important to some people (47%) but not to others (32%). Another set of questions revealed that opinions were also mixed about the importance of the incentive payments as an additional income source as a driver behind the decision to submit a bid (Table 5.2-c). However, there was nearly unanimous agreement that payments would make an important contribution as a capital reinvestment in the farm infrastructure (Table 5.2-d). Nobody thought that the latter was not important. Participants were also unanimous about the importance of sugarcane growers being proactive in reducing environmental impacts (e).

Table 5.2 Reasons for deciding to submit a bid in the tender (Q6)

N=39 Scores ranged from 1=not important to 5=very important	**Mean score**	**Not important** (Rating 1+2)	**Important** (Rating 4+5)
a) The application process appeared to be reasonable	3.76	8%	65%
b) I was already thinking about making the changes	4.33	3%	85%
c) The payments would be useful as an additional income source	3.08	37%	45%
d) The payments would help pay for extra infrastructure costs	4.46	-	90%
e) It is important that cane growers are proactive in reducing environmental impacts	4.53	-	100%
f) It was an opportunity to improve production	4.00	8%	67%

The other important reason behind respondents' decision to submit a bid in the tender was that they already had projects in mind, which would have both environmental and production benefits.

- 85% of respondents were already thinking about making the changes (b) and
- 67% of respondents thought it was an opportunity to improve production (f).

More people were unsure about the importance of a reasonably simple the application process (a), although the majority were in agreement.

The extent to which participants in the tender may hold certain attitudes to rural land management and conservation were also explored in the survey and the results are presented in Table 5.3. The majority of respondents agreed that:

- Investment by landholders in conservation practices is important to ensure future profitability (f); and
- It is only fair that owners of rural land should be fully compensated for any changes they have to make to their management for environmental reasons (a).

However, attitudes were much more mixed about other issues.

- There was more agreement than disagreement that:
    - Compensation for changes in land management to provide ecosystem services should only be paid where landholders can show they are already using resources efficiently and sustainably (c); and
    - Penalties should be imposed on people who cause environmental damage (b).
- Opinions were split on whether there is little financial benefit from conserving natural resources such as water quality in our rivers and creeks (d).
- Opinions were mixed (with many unsure) about whether :
    - Landholders have many options to implement practices that are economically viable and protect the environment (e);

- Priority support should be given to landholders on properties in good condition (g); and
- Priority support should be given to landholders on properties in poor condition (h).

Table 5.3 Attitudes to rural land management and conservation (Q.27)

N=38 Scores ranged from 1=strongly agree to 5=strongly disagree	**Mean score**	**Agree** (Rating 1+2)	**Disagree** (Rating 4+5)
a). It is only fair that owners of rural land should be fully compensated for any changes they have to make to their management for environmental reasons.	1.97	71%	8%
b). Penalties should be imposed on people who cause environmental damage.	2.47	47%	16%
c). Compensation for changes in land management to provide ecosystem services should only be paid where landholders can show they are already using resources efficiently and sustainably.	2.45	58%	21%
d). There is little financial benefit from conserving natural resources such as water quality in our rivers and creeks.	3.11	38%	49%
e). Landholders have many options to implement practices that are economically viable and protect the environment.	2.89	32%	30%
f). Investment by landholders in conservation practices is important to ensure future profitability.	1.82	79%	5%
g). Priority support should be given to landholders on properties in good condition.	2.84	32%	29%
h). Priority support should be give to landholders on properties in poor condition.	3.38	22%	38%

The final area that was explored in terms of specific attitudes that participants in tender schemes are more likely to hold was their attitudes to the structure of incentive schemes. The results are presented in Table 5.4.

Table 5.4 Opinions about the structure of incentive schemes (Q.25)

N=38 Scores ranged from 1=not important to 5=very important	**Mean score**	**Not important (Rating 1+2)**	**Important (Rating 4+5)**
a) provide the most cost effective environmental outcomes for a limited budget	3.87	5%	71%
b) provide all landholders with the same payment for any given task	2.59	43%	16%
c) allow landholders to specify their costs and their management actions	3.89	11%	73%

Respondents were in broad agreement that it is important:

- to provide the most cost effective environmental outcomes for a limited budget (a); and
- to allow landholders to specify their costs and their management actions (c).

Most people (43%) agreed that it was not important that all landholders are provided with the same payment for any given task (b), and while relatively few people thought it was important, many were unsure.

Key Finding 5.5: Initial interest in the tender was driven by views about the importance of natural resource management and the associated environmental benefits.

Key Finding 5.6: Demonstrating that sugarcane growers are being proactive in reducing environmental impacts was a universal driver behind the decision to submit a bid in the tender.

Key Finding 5.7: The incentive payment was more important for capital reinvestment than as an additional source of income.

Key Finding 5.8: Participating in the incentive scheme was also seen by the majority of respondents as an opportunity to improve production.

Key Finding 5.9: There is some contradiction in attitudes to land management. While the majority of respondents believed that investment in conservation practices is important for future profitability, participants in tender schemes also think it is only fair they get fully compensated for management changes that provide environmental benefits.

Key Finding 5.10: The structure of incentive schemes is well aligned with the attitudes of participants. Most people do not think it is important that all landholders be paid at the same rate for the same task.

5.3 Broader impacts of the tender

The other issue that was explored in the questionnaire was the extent to which the trial tender had a broader impact. This was examined in terms of:

- experience with the tender scheme
- the catalytic role of the tender;
- the financial impacts;
- the environmental impacts;
- the wider influence on natural resource management; and
- participants' involvement in future schemes.

Participants were asked some questions about the operation of the tender to determine whether there were some aspects that might adversely impact on participation in future schemes. The results are presented in Table 5.5. Growers were critical of three aspects of the tender with the majority of the respondents indicating that:

- the total funding of the scheme was limited (g);

- the scoring system was unclear (c); and
- it was unclear about how to maximise their chances of success (d).

Half the respondents thought that:

- the monitoring requirements seemed reasonable (i) and
- they did not need more time between the property visit and the tender application deadline (h).

Opinions were mixed about:

- the need for more assistance with the application paperwork (a);
- the need for more assistance in calculating my bid price (b); and
- how informative the property visit had been (e).

Participants were less sure about whether they would have like the scheme to have focused on a wider range of management activities (f).

Table 5.5 Opinions about the tender application process (Q.14)

N=39 Scores ranged from 1=strongly agree to 5=strongly disagree	**Mean score**	**Agree 1+2**	**Disagree 4+5**
a) I would have liked more assistance with the application paperwork	2.87	41%	36%
b) I would have liked more assistance in calculating my bid price	2.84	45%	37%
c) The tender scoring system was unclear	2.11	71%	16%
d) I was unclear about how to maximise my chances of success	1.97	71%	13%
e) The property visit was informative	2.78	43%	24%
f) I would have liked the scheme to have focused on a wider range of management activities	2.87	26%	18%
g) I thought the total funding of the scheme was limited	1.74	82%	5%
h) I needed more time between the property visit and the tender application deadline	3.34	23%	49%
i) The monitoring requirements seemed reasonable	2.49	51%	8%
j) I learnt more about the environmental issues on my property	3.11	32%	37%

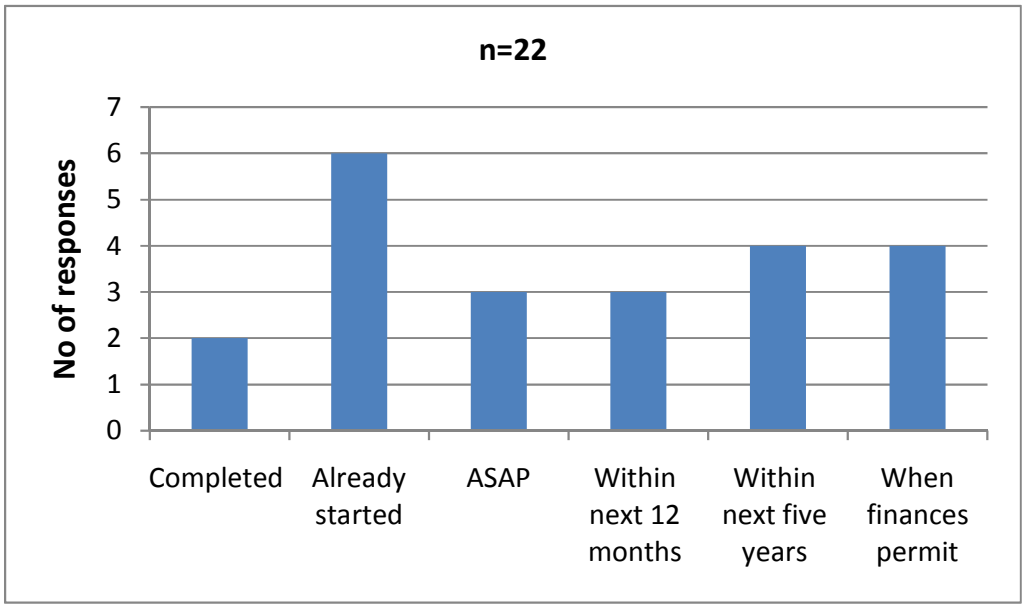
Results from previous tender evaluation surveys have suggested incentive schemes may play an important role as a catalyst to fast track projects that participants are intending or have in mind to implement. The incentive payment for successful projects will obviously enable some projects to be implemented more immediately. However, the tender may also act as a catalyst for unsuccessful applicants and the

process of developing and costing a project in some detail may lead to earlier implementation.

The results presented in Table 5.2-b indicate that the majority of participants were already thinking about making changes to their farming systems. In a follow-up question in the survey, respondents were asked if they thought they would still make the proposed changes even if their bid turned out to be unsuccessful. Over half the respondents (56%) thought they would; only seven people (18%) indicated that they would not, and 26% were unsure whether they would or not. Those who thought they would make the changes even if their bids were unsuccessful were then asked when they would make the changes (open question) with results presented in Figure 5.1. Some of the applicants had already started their projects and this highlighted one of the difficulties with the timing of the tender scheme. In some situations projects would need to be implemented before the wet season started and/or at a time that fitted with the cropping cycle and/or the farm management system. To provide participants with a greater degree of flexibility, all projects that were implemented after an EOI had been received were considered as eligible. Applicants who implemented their projects in advance would have to assess and bear the risk of an unsuccessful application.

While some respondents had already started their (potentially unsuccessful) projects, and some would start them as soon as possible of with in the next 12 months, a similar proportion thought they might start within the next five years or when finances permitted (Figure 5.1).

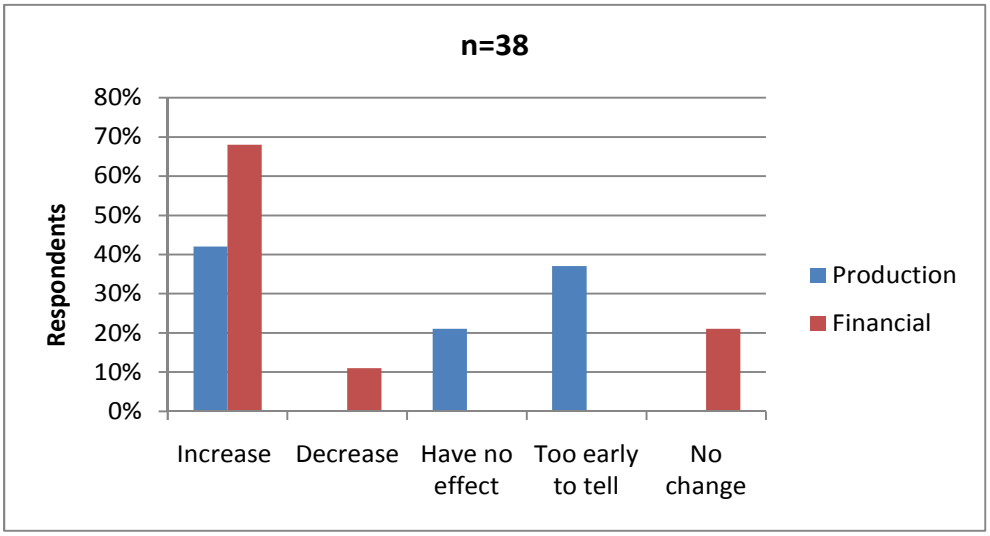
Figure 5.1 Timing of project implementation for potentially unsuccessful applications



Respondents were then asked to consider their expectations about the impacts of the scheme if their application proved successful. Over 40% of respondents indicated that they expected that production on their properties would increase if their projects were successful and while nobody thought there would be any negative impact, many thought it was too early to tell (Figure 5.2). The potential increases respondents

recorded ranged from 3% to 50%, with an average of 11% (most increases were between 5% and 10%).

Figure 5.2 Expectations about potential production and financial impacts



More people expected to be financially worse off if their application was successful, but the majority (68%) thought they would be financially better off (Figure 5.2). In this case, increases ranged from 4% to 25% with an average of 10%. No amounts were recorded for the decreases.

Nearly all respondents (90%) expected to see some environmental improvements from the introduction of their projects and only six people (15%) could foresee any potential management problems arising from the project.

Just under half the respondents (46%) expected their involvement in the water quality tender would change the way they managed other parts of their property, principally in terms of better management of water and fertiliser inputs and the broader adoption of best management practices across their whole property.

The final issue relating to the broader benefits of the tender scheme focused on natural resource management (NRM). The majority of respondents agreed with a series of statements about broad NRM issues (Table 5.6), but there was a higher level of disagreement that:

- The scheme will lead to reduced levels of conflict between landholders and the government (a); and
- The scheme will improve the likelihood of achieving environmental outcomes (e).

Table 5.6 Opinions about the potential impacts of the tender on natural resource management (Q.26)

N=38 Scores ranged from 1=strongly agree to 5=strongly disagree	**Mean score**	**Agree 1+2**	**Disagree 4+5**
a). The scheme will lead to reduced levels of conflict between landholders and the government.	2.38	65%	22%
b). The scheme will lead to improved levels of adoption and take-up of environmental programs.	2.30	70%	13%
c). The scheme provides more flexibility than other incentive programs in dealing with environmental conservation issues.	2.41	62%	13%
d).The scheme means environmental management actions can to be tailored to local knowledge.	2.13	66%	8%
e). The scheme will improve the likelihood of achieving environmental outcomes.	2.30	70%	19%

Seventy four per cent of respondents thought they would be more likely to get involved with other projects run by the Burdekin Dry Tropics

More generally, the experience of being able to specify their costs and management actions in the tender trial appears to have been well received by most participants. Most respondents (69%) thought that now preferred this type of flexible scheme, although 29% indicated that they still preferred the more tradition grant scheme where there is a set level of funding for specified tasks. Further confirmation of the acceptability of the tender process, comes from the indication that 80% of respondents expected to submit an application in the next tender, if one becomes available; 15% were unsure and only two people (5%) indicated that they would not participate in another scheme.

Key Finding 5.11: Participating in the tender process did appear to act as a catalyst for some applicants to implement their projects, even if their applications are unsuccessful. This is more likely to be the case when applicants can financially afford to absorb the risk of their project being unsuccessful.

Key Finding 5.12: Most participants expected there to be both positive financial and production related impacts if their projects proved successful.

Key Finding 5.13: Participants' experience in the tender appears to have been quite positive with few negative issues raised. Most respondents (80%) expected to participate in another tender scheme given the opportunity.

6. Discussion and summary

The results of the workshops provide some useful insights that will help inform the design of future conservation tenders. Here, the results are summarised in key groups.

Sourcing efficient bids

The bids submitted by participants in the workshops were very competitive compared to the bids in the trial tender. At least 44% of the workshop bids would have been successful when included in the trial tender assessment. This could mean that workshop participants reacted to the experimental environment and presented artificially low bids. However, the following evidence suggests the opposite may have been true and if anything workshop bids were higher than they may have been in reality.

- Participants were informed that the results from the workshops would be used, in part, to determine the potential costs of reducing fertiliser application rates. If anything, this would provide an incentive for them to inflate their cost estimates.
- The descriptions provided by participants about how were going to achieve a reduction in fertiliser use were both reasonable and realistic.
- Participants were provided with a bid calculation sheet to assist them with their cost calculation (if required). The calculation sheet specifically focused on the additional costs associated with potential production losses and many participants included this as a cost in their bid calculation. However, in the questionnaire survey, most respondents indicated that they did not expect their projects in the tender trial to result in production losses, and presumably did not include this as a cost in their bid price calculation. This would imply the workshop cost estimates may have overemphasised the potential production losses and increased cost estimates.

The results suggest that landholders did not always submit their most cost effective proposals into the actual water quality tender. There are several possible reasons for this, including:

- Limited understanding about relative environmental benefits of different actions;
- A focus on preferred actions that would generate production gains;
- Limited communication about scheme objectives in the farm visits.

The competitiveness of the new set of nutrient management actions meant that when they were included in the trial tender assessment the cost efficiencies of the tender were notably improved with a 43% reduction in the average cost per kilogram of nitrogen emission reduction. The costs of sediment and pesticide emission reductions were reduced by 33% and 52% respectively (because more expensive proposals dropped out of the funded group).

The results indicate that as the scope of potential activities increases, a key challenge is to ensure landholders submit the more cost-effective bids. This can be done by encouraging landholders to submit multiple bids across different management actions, or by ensuring higher levels of information and understanding exist about which areas to target.

Scale and scale
Scope and scale elements were explored in more detail in the workshops in relation to the potential impacts on both participation rates and the competitiveness of bid submitted. The results indicated that scope and scale changes would only have a potential impact on just over half (58%) of landholders. Where respondents do react to changes, there are offsetting influences on bid competitiveness and participation rates.

Scale
It is possible that increasing the scale of the tender

may act in one of two ways. Participation rates may drop as participants consider the increase in size will attract more entrants which may reduce their chances of success. On the other hand, increasing the scale may increase participation rates because if the funding pool is increased, participants may think this will increase their chances of success. The results presented in Figure 4.1 indicate that the second option is likely to prevail as the likelihood of participating increased as the funding pool was increased. However there was a tradeoff in terms of bid competitiveness. The results presented in table 4.3 indicate that:

- increasing the scale of a tender (increasing the funding pool) would increase participation by 10%, but 30% of participants would increase their bid price in response; and
- decreasing the scale of the tender would reduce participation rates by 20%, but 26% would decrease their bid price.

This finding supports the suggestion outlined above that encouraging participants to enter multiple bids in a tender may result in more cost efficiencies than trying to increase the pool of competitors.

Scope
Many sugarcane growers in the Burdekin have experience with growing cattle and/or other crops and are obviously more comfortable about competing with other primary producers in their own region compared to competing with other sugarcane growers in different regions.

- Increasing the scope of the tender to include all primary producers in the area would reduce participation rates by 5%, but 16% would also reduce their bid price.
- Increasing the scope of the tender to include sugarcane growers in other geographical areas would decrease participation rates by 31%, but only 13% would drop their bid price.

Expanding the geographical scope will have a greater adverse impact on participation rates compared with the option of expanding the scope to include other agricultural industries. There was little difference between the impacts of the two scenarios on bid price. These results would suggest that the optimal level of geographical scope would be to implement a tender within one geographical region.

Transaction costs

Increasing the scope of the tender is likely to increase the transaction costs as more bid details may need to be collected and it is likely that more effort will be required in the monitoring activities. Results presented in Figure 4.3 suggest that increasing the transaction costs that are likely to be incurred as the scope of a tender expands will adversely impact on participation rates and increase bid prices as would be expected. There was not a great difference in the relative impact of a low versus high level of monitoring. However, the amount of increase in bid price was much higher for a high verification level.

Attitudes and feedback

The questionnaire survey revealed some useful information about the tender. Most participants were looking for both production as well as environmental gains from their projects and while it was still too early to tell, nobody was certain that their project would have a detrimental impact on production (Figure 5.2). This meant that many people realised their projects would have a private benefit, which in turn had an influence on the high incidence of participants (95%) agreeing to meet some of the project costs themselves. The majority of participants also absorbed the associated transaction costs involved in their projects as a de facto form of cost sharing.

- The average cost in terms of the time taken to develop a bid proposal was approximately $220.
- One fifth of participants incurred some cost in terms of technical or expert advice developing their bids at an average cost $460.
- The potential cost of monitoring activities averaged approximately $640. Only four participants included this in the

Participants were motivated to participate in the scheme because of the wider environmental benefits both to themselves and for the wider community. In particular, all participants thought it was important that sugarcane growers are proactive in reducing the environmental impacts associated with the industry. It appeared most likely that the actual incentive payment would be used for capital reinvestment in farm infrastructure, which may result in further environmental benefits not accounted for in the tender.

In general, participants experience in the tender was quite positive and 80% were prepared to participate in another tender.

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Appendix 1: Proposals to reduce fertiliser use in the experimental tender

Most participants appeared to give the experimental tender thoughtful consideration and provided realistic explanations and budget estimates. Thirty six applications were fully completed and assessed. The descriptions of how they would reduce their fertiliser rates included the following:

- 10 people (28%) simply stated they would reduce application rates;
- More than half proposals (53%) involved the introduction of a legume crop, some as a fallow green manure but mainly as an alternative commercial crop;
- 17% involved the fine tuning of fertiliser applications by using soil testing and applying variable fertiliser rates;
- 14% of participants suggested they would change their fertiliser type (most commonly to introduce a liquid fertiliser) and/or include a soil ameliorant such as gypsum; and
- 14% would change their fertiliser placement, most commonly to introduce stool splitting.

There was considerable range in the fertiliser reductions offered in the proposals:

- In plant cane, there was a range in reductions from zero to 240 kgN/ha, with an average of 50kg N/ha; and
- In cane ratoons, there was a range in reductions from zero to 222 kgN/ha, with an average of 48kg N/ha.

These were relative high reductions, particularly in comparison with the Mackay and Proserpine workshops (held in June 2007) mentioned above. In those workshops, sugarcane growers had to undertake a similar exercise to reduce their fertiliser application rates. While their cane production and average fertiliser rates are lower than those in the Burdekin, growers were only prepared to reduce fertiliser rates by an average of 15-20kgN/ha. However, in the Mackay and Proserpine workshops, growers were focused on simply reducing the fertiliser rates, and there was much more focus in the Burdekin workshops on introducing alternative legume crops into the farming system.

The complexity of fertiliser use

It is generally acknowledged that while fertiliser application rates in the sugarcane industry have been reduced in recent years, many sugarcane growers still tend to apply higher fertiliser rates than those recommended by the industry. However, there is no clear understanding of why this is the case. As sugarcane prices have fallen and the cost of fertiliser has increased (particularly in the last year), the cost-price squeeze is reducing the viability of many growers. It makes no financial sense for growers to be using more fertiliser than industry standards suggest are required.

Workshop participants were probed about this issue in the questionnaire survey and clearly they are responsive to the rising cost of fertiliser. The majority of respondents had reduced their fertiliser use in the last 12 months in response to the sharp rise in prices.

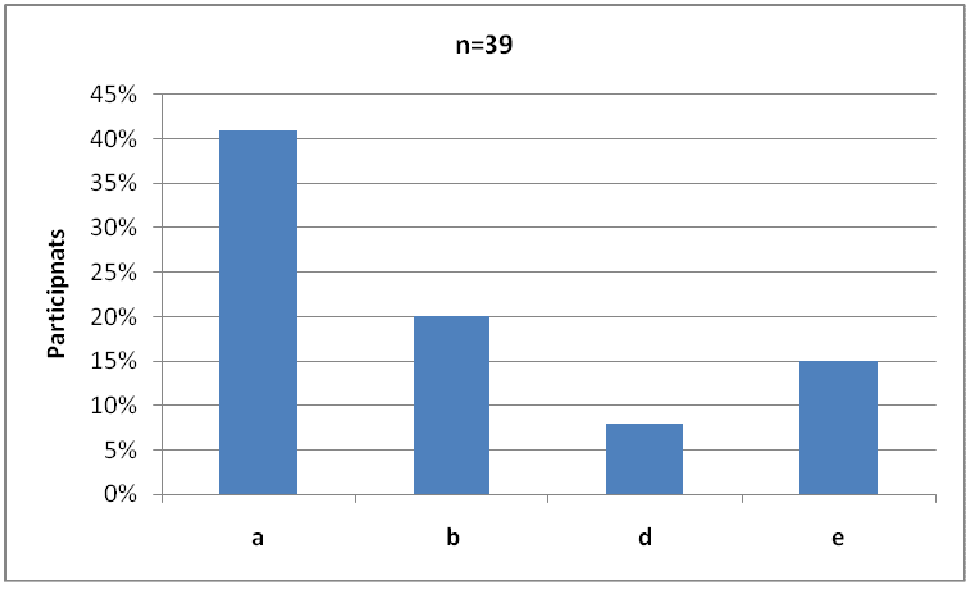
- 57% had reduced their application rates in plant cane, and
- 67% had reduced their application rates in cane ratoons.
- The average reduction for both plant and ratoons was 12%.

Participants were also asked to identify the main reason they thought it was difficult to reduce fertiliser application rates more than they have already done so in recent years. They were provided with the following options:

(a) It is risky to reduce fertiliser in case production is affected;
(b) Any reduction in fertiliser application rates would definitely reduce production;
(c) It would be time consuming to undertake soil testing and nutrient budgeting to estimate crop requirements more accurately;
(d) It would require machinery alteration or purchase before fertiliser applications could be reduced further; and
(e) It would require a change in farm operations (e.g. introducing break crops) before fertiliser applications could be reduced further.

The results are presented in Figure A.1. The majority of participants (61%) indicated that the main reason why they thought it was difficult to reduce fertiliser application rates was because of the adverse impact on production (options *a* and *b*). However, the perceived risk of production losses had a stronger influence than knowledge of actual production losses. Machinery changes and making changes to farm operation were mentioned less frequently (options *d* and *e*). Only one participant indicated that time constraints (option *c*) was the main issue.

Figure A.1 Reasons why it is difficult to reduce fertiliser application rates



The bid proposals submitted in the workshop tender provide further insight into the issue. One of the more notable features of the bid proposals was the range of fertiliser types that participants were applying. Only nine participants (24%) indicated they were currently using the same fertiliser type across their farm on both the plant and ratoon crops and two of those were going to change types in their bid proposal. While the use of urea on ratoon crops was common there was broader range of type/s used in plant cane.

- 62% applied more than one fertiliser type on their plant cane and 13% applied more than one type on their ratoons;
- The nitrogen content in the different fertiliser types applied ranged from 0.115% (Delta) to 0.46% (Urea); and
- 35% of participants changed the type and/or mix of fertilisers in their project proposal.

The complexity in the combination of fertilisers applied by growers indicates that they are making quite complex decisions when determining their application rates and are more responsive the nutrient requirements of their crops than is generally acknowledged. This suggests that the adoption a standard application in terms of kgN/ha for different soil types does not account for the variation across growers in their use of a combination of different fertiliser types.

In summary, it appears that most growers were aiming for production and environmental gains and the most common method to reduce fertiliser application rates was to introduce an alternative legume crop into their farming systems.

The majority of sugarcane growers in the workshop were using a combination of fertiliser types on their farms and their decisions about fertiliser application rates were more complex than adhering to a simple kgN/ha standard. While the industry might recommend lower fertiliser application rates and claim that it would not affect production, many growers believe lower rates will have an adverse impact on their production.

Appendix 2: Previous research reports in this series

Rolfe, J., Greiner, R., Windle, J. and Hailu, A. 2007 *Identifying scale and scope issues in establishing conservation tenders*, Using Conservation Tenders for Water Quality Improvements in the Burdekin Research Report 1, Central Queensland University, Rockhampton.

Rolfe, J., Muller, C., Greiner, R. and Windle, J. 2007 *Overview of the Burdekin Case Study*, Using Conservation Tenders for Water Quality Improvements in the Burdekin Research Report 2, Central Queensland University, Rockhampton.

Rolfe, J., Windle, J., Muller, C. and Greiner, R. 2007 *Designing a metric for conservation tenders at different levels of scope and scale*, Using Conservation Tenders for Water Quality Improvements in the Burdekin Research Report 3, Central Queensland University, Rockhampton.