A tender for improving water quality – what's left to learn from using tenders?

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Key Points

- There were many lessons learnt from a water quality tender pilot that engaged private commercial and lifestyle landholder in Victoria, Australia
- Principles for design of incentive programs include having clear objectives, undertaking market research, ensuring minimum standards for works, measuring progress, and ensuring incentive amounts reflect the contribution to objectives. These apply whether it is the more traditional cost-share approach or a market based instrument (MBI) such as a tender
- Deciding between cost-share and tender approaches to allocate incentive funding is contingent on a large number of potential participants, variability in action number type and costs, as well as a significant budget allocation (>$200K)

Abstract

Tenders have been used in a variety of environment grants programs, including some waterway health projects. While reflections on these experiences have been mixed, there is little information in the public domain that provides practical advice on the question of when you would use a tender versus a more traditional cost-share grant approach. This paper uses the experiences and evaluation of a water quality tender run by Melbourne Water to address this question. A tender technique was used to engage private landholders in taking actions on their land that would improve water quality in the Stringybark Creek Catchment, northeast of Melbourne, Victoria.

Testing the use of a tender was a recommendation from an evaluation of the long running cost-share River Health Incentives Program, and was also suggested by an expert panel convened to advise on future directions for the program. The tender was developed and delivered in 2014-15 and an evaluation of its cost-effectiveness and the impacts on landholder knowledge and skills has recently been completed. When compared to a conventional cost-share grant, on most measures the tender was found to have been less cost-effective. But a closer look at the evaluation revealed some interesting details.

In exploring the results from the pilot project and the evaluation, a set of economic, environmental and social characteristics were identified to guide practitioners in considering whether tenders or cost-share models are appropriate. This work also identified the steps that should precede the task of even considering which tool to use.

Keywords

Market mechanisms, tenders, water quality, catchment management, landholder engagement, capacity building

Introduction

Melbourne Water has a strong history of working with private landholders to deliver a variety of on ground works that are aimed at improving water quality and aquatic and riparian biodiversity. Where these programs use grants, they generally use a traditional cost-share model. In cost-share grants landholders are paid a set amount for each type of work, such as revegetation or fencing, which represents part of the cost of the given works. The approach is driven by the theory that those who benefit from an action (like fencing a waterway) should pay. Since, in theory, these actions typically deliver a mix of benefits – some to the landholder and some to the public – the costs of the actions should therefore be shared. The mechanism is also used as a way to increase participant ownership of works, based on the assumption that having made a contribution to the cost, the participants are more likely to maintain them.

Evaluations tend to show that these programs are popular among participating landholders. However, the following three key weaknesses of cost-share approaches are also well documented:

Not considering the benefits of actions in determining payments – cost-share approaches determine payments based on an estimate of the costs of actions without considering the benefits of those actions. For example, while the same action in different locations may yield very different benefits, the cost-share approach does not recognize this difference because the payment is based on the action, not the benefit.

Performance measures and targets that focus too narrowly on activities (to the detriment of long-term goals) – for example, evaluations of riparian programs have identified cases where achieving the target level of an activity (e.g. participation numbers or length of waterway re-vegetated) became the single measure of success rather than considering how best to deliver the water quality and biodiversity objectives.

Cost-share grants are based on an estimate of the cost of a given action. They do not take into account the fact that these costs vary widely from one landholder to the next. For example, some landholders may have the skills to complete their own fencing while others may need to hire a contractor. Ultimately, this means that the fixed grant amount will be too little for some potential participants, but in fact may be more than is required for others.

Cost-share approaches are not peculiar to riparian programs, but have been in widespread use across natural resource management (NRM) for many years. In the last decade economic research in NRM examined these weaknesses and identified that market-based mechanisms or instruments (MBIs), particularly tenders, have a role to play in improving efficiency and effectiveness of public funding of NRM. MBIs have now been widely adopted in some areas of NRM with promising results.

Market-based instruments

Applying market-based instruments, in particular tenders, to NRM has progressed from being somewhat novel (Klemperer, 2002; Windle and Rolfe, 2005), to being standard procedure for some programs and organisations. In essence the tender is an alternative way to allocate grant funding with some characteristics that set them apart from more traditional NRM grant programs:

- They require the participant to identify the actions they will take

- They require the participant to nominate the amount of money they would need to take the given action(s)

- The actions that all prospective participants will deliver are objectively measured and scored

- The purchaser decides whether to accept the offer from the landholder by comparing it to other similar work, and selecting the best value for money offers

Since their earliest use in native vegetation conservation in the early 2000s, tenders have been refined enormously and each version of a 'tender' is unique to the location, goal, organisation and market. That is, there is no 'standard' model of a tender (nor should there be). For some catchment management organisations, tenders have become one of the stable of approaches routinely used, particularly in native vegetation conservation work.

This is not the case for waterway health programs. A recent review of riparian cost sharing approaches in use in Victoria found that tenders were being used by five of the ten Catchment Management Authorities (CMA) in the state in either river or wetland projects, but that there was a trend away from them. In fact, no CMA that has used River Tender, one of the tender models used in Victoria, has chosen to continue using this approach (Dickson, M. et al., 2015).

Until the pilot project being discussed here, Melbourne Water had very little experience using a tender in a waterways program. In this context, Melbourne Water committed to a pilot project that would use a tender approach in the Stringybark Creek catchment.

Objectives of the tender

The primary objective of the tender was to improve water quality in the Stringybark Creek by reducing diffuse source nitrogen (TN), phosphorus (TP) and sediment (TSS) loads from rural properties in the catchment (RMCG, 2013). Stringybark Creek, a tributary of the Yarra River in the Dandenong Ranges northeast of Melbourne, is a mixed-use catchment featuring fruit and vegetable growing, livestock grazing and lifestyle properties. The secondary objectives were to test the tender as an alternative approach to allocation of grant funding to rural landholders for water quality outcomes, to increase the level of knowledge and understanding among Melbourne Water staff and to identify when tender approaches would be suitable for waterway and rural land programs.

The tender itself

Melbourne Water aimed to use the tender to work in partnership with landholders to improve water quality in the Stringybark Creek. This meant working with landholders to prevent soil and nutrients from moving into local waterways. It involved helping landholders (through funding and information provision) to take actions like fencing waterways, preventing soil erosion or any other actions that will manage soil and water movement from their land.

For the tender, bidders were required to nominate the amount of money they needed to be paid in order to complete a set of actions (that they select) that will contribute to water quality improvement. Melbourne Water then selected the bids that made the largest contribution to their goals for the least amount of money.

The tender design

The detailed design of the tender was informed by analysing the market, that is, the landholders that might participate in the tender. Understanding the characteristics of these landholders was critical to the final design of the tender. For example, it revealed that that there were over 580 properties of more than two hectares and this represented 91% of the area of the catchment. This information and insights from other tenders were combined to define key characteristics of the tender:

Bidding rules – the tender was set as a single round, sealed bid and discriminatory price (i.e. each successful bidder would be paid the amount they bid).

Information sessions for prospective participants – since the potential bidders ranged from commercial farmers to small lifestyle property owners, there was concern that landholders may have little experience

with this type of program. To reduce the chances of ill-informed bids being submitted, participants were required to attend an information session to be eligible to participate in the program. These one hour information sessions included a 'practice tender' to familiarise people with the process as well as information on the types of work that would produce water quality benefits.

Benefit scoring – Melbourne Water already had a water quality metric that estimated the impacts that a given action would have on nitrogen (TN), phosphorus (TP) and suspended sediments (TSS). The water quality metric was able to score both on and off stream actions. Though biodiversity benefits were likely to flow from the actions, and this was an objective of the program, the metric was not designed to score those benefits, so for the purposes of this pilot project, only water quality impacts were scored.

Assistance with bid preparation – once a landholder had decided to prepare a bid, a Melbourne Water staff member would provide guidance and technical advice on the actions being considered. This advice was focused on ensuring the landholder understood what would be required for each of the actions they were considering. This involved providing information about the minimum standards for that work as well as advice on contractors that might be engaged to deliver more technical actions. The ultimate objective of this assistance was to ensure the landholder had a thorough understanding of their bid and the commitment that would flow from its acceptance.

Eligible actions – In principle, any activity that could result in a water quality improvement could be included in a landholder's bid or proposal. Landholders were provided with information and advice on common water quality actions like farm track construction or improvement, management of riparian areas and other areas prone to erosion, sediment and nutrient treatment systems, and exclusion of stock from waterways, drainage lines or other water sensitive areas (could include fencing, off-stream watering point, creating shade and shelter).

Results of the tender

The final results of the tender are shown in Figure 1 and Table 1. Figure 1 shows the key stages of the tender and the levels of participation that were estimated (based on other tenders) during the planning phase. It also shows the actual levels of participation in each stage. The most notable observation from this data is that the overall levels of participation were less than the target levels, which created a concern that the numbers may not be sufficient to ensure good competition among bidders.

The data shown in Table 1 summarises the final bids and those that were successful. This data combined with Figures 1 and 2 suggests that the market was reasonably competitive, despite the number of participants being relatively low.

Figure 2 shows the raw price for each bid. This plot is a useful way to test that the bidding and scoring process were not skewed. That is, it shows that the successful and unsuccessful bids fell across the range of bid prices. If the unsuccessful bids were clustered at the higher price this could indicate a problem with the tender design.

Figure 2, traditionally referred to as the bid curve, shows the price per unit of environmental benefit (EB) for each bid. This plot shows how the value for money changes across the bids ($ per EB) and provides valuable information for the decision on which bids to accept and which to reject. As is often the case, bid curves tend to have step-wise changes in the value for money of bids. In this case, the first eleven bids (up to bid number 15) are relatively similar value for money, and there is a stepped increase to the next bid (number 11). A second step change occurs between bid 18 and bid 37.

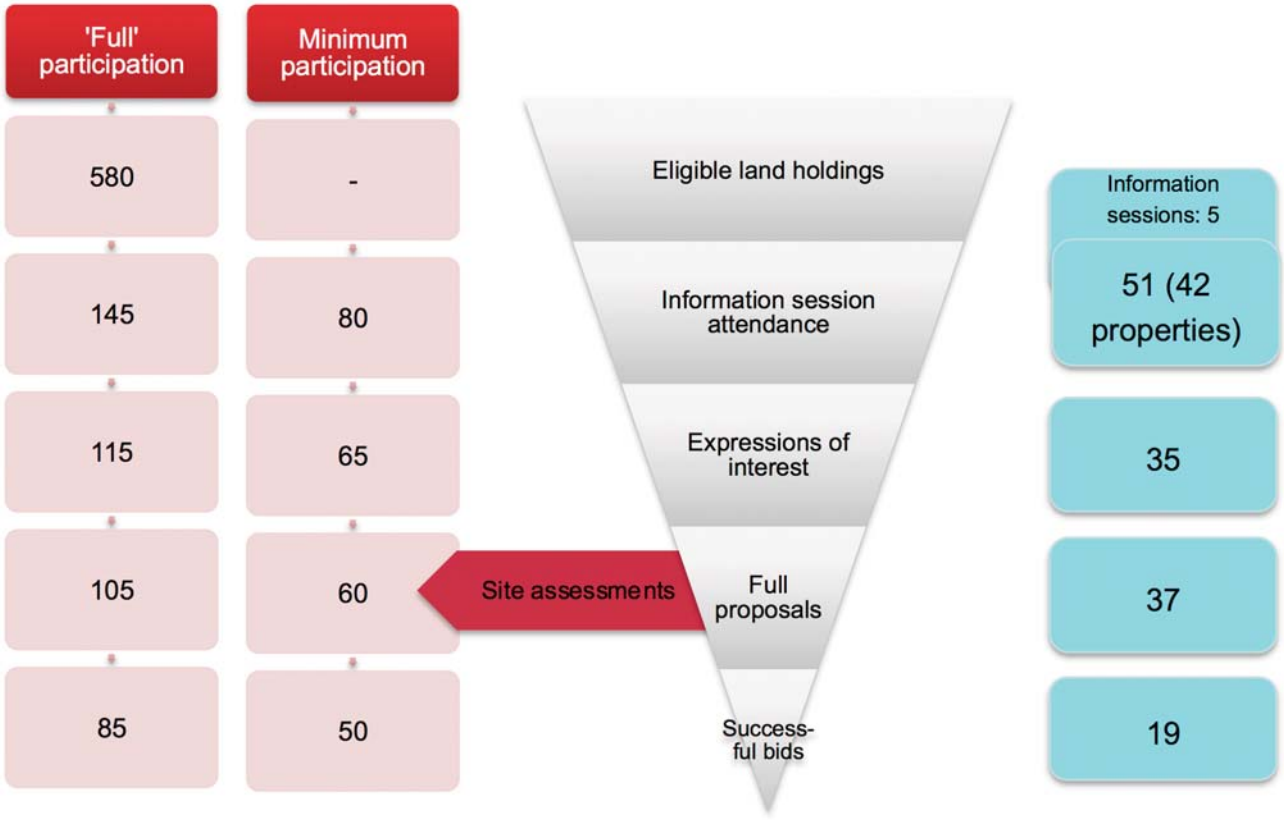

Figure 1. The tender process with anticipated (red) and actual (blue boxes) participation at each stage

Table 1. Summary of results of the tender

Landholders attending information sessions:	51 (42 properties)
Expressions of interest submitted:	35 EOIs (83% of information session participants)
Bids:	37 bids (24 properties)
Results:	19 successful (Figure 3), 18 unsuccessful
Characteristics of the successful bids:	
Total Environmental Benefit (EB):	Represented 99% of total EB available from all bids
Total cost of successful bids:	56% of total bid cost
Bid range:	$500-$52,862
Price paid:	$0.43/EB - $8.23/EB (next bid was $13.44/EB)

Selecting the successful bids

The bid curve provided critical information for discussions of where to place the cut-off point for the tender. The cut-off point identifies the last successful bid, in this case Bid #18 (Figure 3). It is critical to note that the

decision on where to place the cut-off point for this tender was not based purely on the bid curve and a threshold for value for money. The bid curve provided a critical input to the decision but other factors weighed heavily on the final choice. They were:

- The available budget

- The change in value for money at the step changes on the curve, and the point at which value for money was considered to be too low

- The bid price for the first unsuccessful bid (in this case number 37). For instance, if this bid was very low, it may still be reasonable to accept it

- The proportion of bidders that would be successful and unsuccessful at the different cut-off points being considered. A very low success rate (e.g. less than 50%) could cause participants to feel that they had wasted their time, which could lead to them being discouraged from future participation in this and other Melbourne Water programs

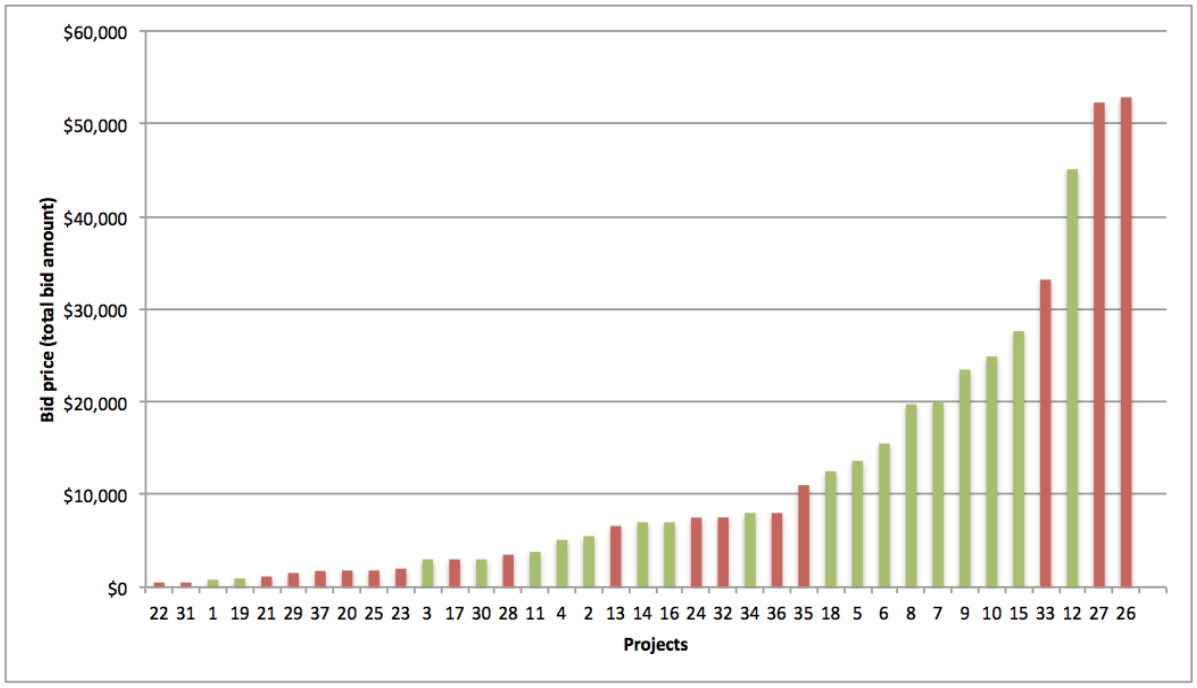

Figure 2 . Prices of all bid received. Bids in red were unsuccessful and green were successful

Cost effectiveness of the tender

The results of the tender were compared to a conventional cost-share approach in order to assess whether the tender could be considered to be a more cost-effective model. This assessment found that successful tenders cost an average of $1.88 per EB, while the same projects under a cost-share model would have cost $1.52 per EB (a difference of 24%).

While on this basis, the tender appears to be less cost-effective, this conclusion must be considered in the context of the comparison. To compare the approaches, the actions included in the successful bids were re-costed based on the cost-sharing rules. This assumes that the bidders would have participated under a cost-share model and there is evidence that this is very unlikely.

As mentioned earlier in the description of the rationale for using a tender, some landholders decline to participate in cost-share grants because the funding offered is not sufficient. The evaluation of this tender revealed that some 77% of participants had not previously been involved in a Melbourne Water program. It also showed that approximately half of the participants were commercial farms, which is a much higher rate of participation than is normally observed for Melbourne Water programs in this area.

Other factors that may have influenced the cost-effectiveness of the tender are:

Market size – although the tender does appear to have functioned as a competitive market, the total number of participants was relatively small. A larger catchment and numbers of bidders may have resulted in greater competition and a wider range of bid prices

Risk premium on bids – given that the tender was a new approach, and the majority of participants had not been involved in other Melbourne Water programs, they may have increased their bids as a contingency measure.

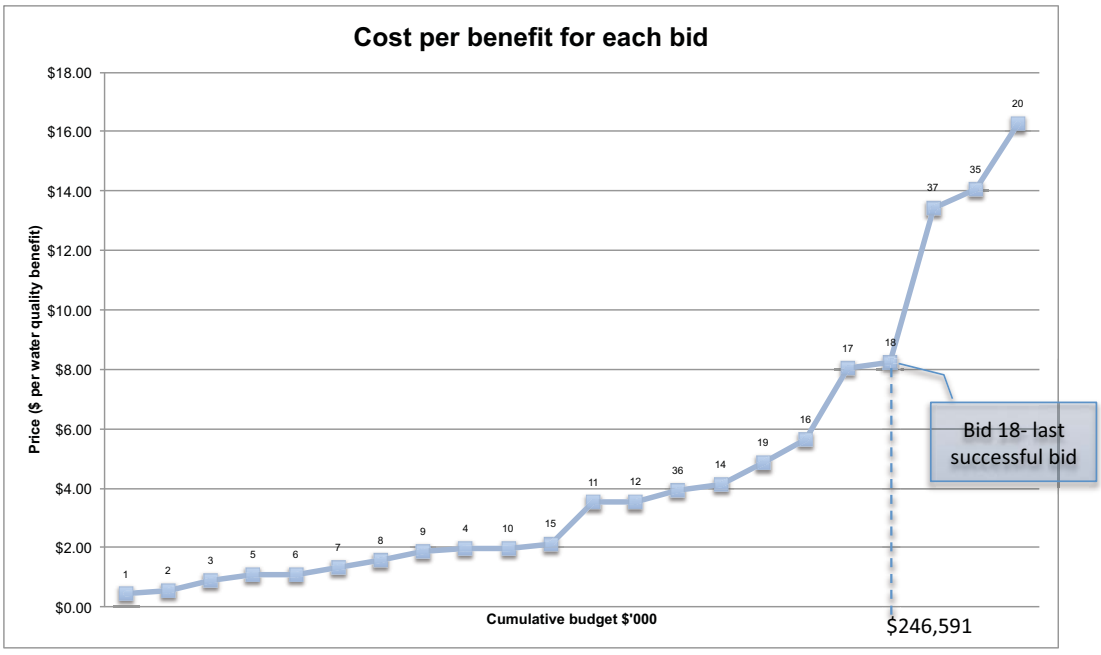

Figure 3. Bid curve for the Stringybark Creek tender (not all unsuccessful bids shown)

Other benefits of the tender

While it may be difficult to judge the relative cost-effectiveness of the tender, there are several benefits that are very clear:

Analysis of the successful bids showed that the approach generated a large quantity of pollution abatement (TN, TP and TSS) over a short timeframe, compared to what had been achieved under a cost-share arrangement. This is shown by the fact that the tender generated 37 bids for a wide variety of work, from a wide variety of landholders (Figure 4) over the 3 months the tender ran, compared to historical rates of 6-8 participants per annum

The bids reveal the true costs of landholder's actions, but more importantly the price of the water quality benefits gained through the tender

The water quality metric allowed the program to select the most cost-effective options to improve water quality from among the options offered by the participating landholders. This is further demonstrated by the fact that the 19 successful bids represented 99 per cent of the total cumulative environmental benefits available from the pool of bids

Over three quarters of the participating landholders had previously not participated in Melbourne Water programs and their feedback on their experience (whether successful or unsuccessful) was very positive

> *"Old programs through Melbourne Water were less flexible with set backs [for fences], this provided the opportunity to be involved for me – it was too rigid, that's why I wasn't involved [in the past]."* – Survey respondent

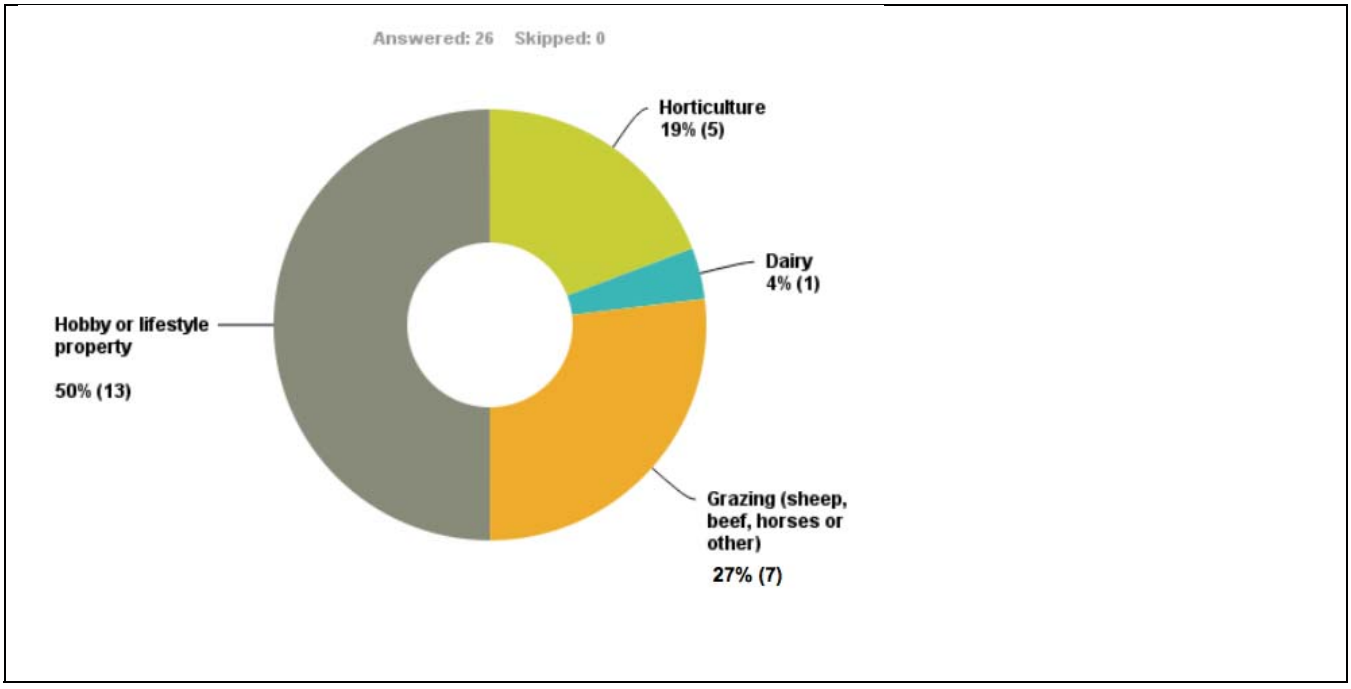

Figure 4. Participants in the tender

Conclusions – what's left to learn from tenders?

This pilot project (and evaluation) has revealed a number of lessons that can form principles that could improve all incentive programs, whether they use a tender mechanism or some other approach. These principles are show in Table 2.

Table 2. Principles for design of incentive programs

Principle	Comment
Objectives must be specific and measurable	Objectives must be based on specific measurable contributions to the goals of the program. These should be primarily defined by ecological targets (based on modelling), rather than budget or participation-based targets. For example, improve macroinvertebrate populations by reducing nitrogen loads to Port Phillip Bay by 1,000 tonnes.
Undertake market scoping and research	Specific market scoping and research should inform design of all incentive programs. This includes understanding the type of land uses, potential actions, the number of potential and likely participants and what actions are available to address the identified objective. This scoping and research should include: - Catchment context (e.g. location, land tenure) - Property number and size range analysis - Performance of similar programs in the area - Land use analysis - Agricultural use data (e.g. gross value of agricultural production, number of businesses, industry concentration, business turnover range) - Demographics (e.g. age, population density, occupation) - Eligible actions - Landholder drivers and barriers (e.g. commercial, lifestyle) - Existing networks (e.g. Landcare groups, community groups)
Ensure minimum standards for works	Minimum standards aim to ensure on-ground works deliver the intended outcome being sought. These can include best practice guidelines, industry standards and/or engineering design drawings. Landholders should not be paid if works are not completed to the minimum standard. This can be achieved through staged payments and periodic audits.
Pre-define measures of progress towards objectives (metrics)	Metrics should be used to transparently measure progress toward the stated objective. Use of a metric enables identification of the most cost-effective actions thereby efficiently allocating public funds (cost per environmental benefit). The metric also enables collation and aggregation of the outputs of individual projects for reporting and transparency purposes.
Ensure incentive amounts reflect contribution to objectives	This principle represents the continued shift in focus from outputs to outcomes. Paying incentives to private landholders should be based on measures of the contribution to benefits (as generated by a metric) such as water quality improvement, rather than the amount of actions (or outputs) such as length of riparian fencing.

Deciding between tenders and cost-share

The following decision support information has been developed as a result of this pilot project and reviews of other literature (Comerford and Binney, 2004; NECMA, 2008; Tennant and Lockie, 2013). It sets out key characteristics that should be considered when selecting between tenders and cost-share incentive approaches (Table 3). This analysis highlights the critical characteristics that will determine that a tender could be used. They are:

- Large number of potential participants to ensure market thickness (depth)

- Among participants there must be variability. That is, different types of actions are possible, the number of actions a participant can take varies, the cost of those actions varies for different participants, and the contribution those actions make to the project objectives varies

- The available budget must be significant (e.g. greater than $200,000)

- Similarly, in order to use a cost-share approach, it is critical that the costs of the eligible actions are known so that the cost share offered is adequate to attract participants

Table 3. Characteristics that differentiate tenders and cost-share approaches

Characteristic	Tender	Cost-share
Number of participants	**Critical** – must have large number to ensure competition	**Not critical** – can be efficient with small number of participants
Variability	**Critical –** to ensure bids produce different levels of benefit at different costs (bids)	**Not critical –** can be efficient with only small number of actions involved
Budget	**Critical -** must be substantial (e.g. greater than $200K)	**Less critical –** can be efficient with small incentives budgets
Time	**Important** – well suited when action is urgent and/or time is limited	**Less important** – suitable when time is not a limiting factor
History of engagement	**Important** – well suited if previous participation has been inadequate (e.g. missing a key segment of target audience)	**Less important –** suitable if previous response has been adequate and can continue as is
Thresholds/targets or incremental change	**Important –** a fixed target or threshold can be designed into the tender to ensure cost effective achievement	**Less important** – suitable if incremental continuous improvement is adequate
Cost of actions (single)	**Not required** – well suited where costs are unknown or vary widely across participants. Tender will identify those who can deliver actions for least cost.	**Required –** critical because relies on good estimates of costs to set realistic cost share levels (i.e. to avoid over/under paying)
Costs of combined actions	**Not required** – well suited where combining actions makes estimating costs difficult (participants assess costs themselves)	**Required** – as for single actions (above) but costing combined actions can become very difficult because of interactions.

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