

USING CONSERVATION TENDERS FOR
WATER QUALITY IMPROVEMENTS IN THE
BURDEKIN DRY TROPICS REGION

**Identifying scale and scope issues in establishing
conservation tenders**

MID TERM REPORT

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1. Introduction

The aim of this project is to contribute theoretical and policy context to the issues involved in setting the parameters and framework conditions of conservation tenders.

Specifically, the project pursues a combination of objectives:

- identify the design issues in running a broad-scale tender mechanism, which includes different agricultural industries/production systems and sub-catchments,
- assess the transaction costs involved in broad-scale as compared to focused conservation tenders,
- identify the efficiency differences between broad-scale as compared to focused conservation tenders, and
- identify a set of criteria to establish the scale at which conservation tenders should be designed in terms of heterogeneity relating to geographical, conservation issues and production systems.

The key concepts under investigation can be summarized as scale and scope issues:

- Scale relates to the size of the tender, where larger scale designs tend to involve higher levels of funding and an increased geographical area.
- Scope relates to the coverage of different types of environmental issues and/or different industries, with broadly scoped tenders being more comprehensive and more complex than narrowly scoped ones.

Data to inform the investigation are being generated through a case study in the Burdekin Dry Tropics NRM region, thus adding additional objectives to the project:

- design and develop a conservation tender scheme, which supports the achievement of water quality objectives under the Burdekin Dry Tropics NRM plan; and
- inform the development of a diverse set of MBIs for implementation in the BDT region to support various regional environmental objectives.

2. Progress towards project objectives

The applied character of the study means that the design and implementation of an actual conservation tender constitutes the necessary condition for informing the theory objectives of the project. Thus, the case-study objectives initially take precedence, with the theoretical research objectives providing framework conditions for the MBI design and implementation. Negotiations with the Burdekin Dry Tropics NRM (BDTNRM) Group in relation to the conservation tender commenced immediately following the signing of the MBI contract.

- A suitable area and suitable industries have been identified within the BDTNRM region for conducting the conservation tender.
 - Initially, the Haughton River and Barratta Creek sub-catchments of the Lower Burdekin were identified as the area within the BDTNRM region most suited to running the tender because of the diversity of land uses: grazing, sugar cane and horticulture. The boundaries were clearly identifiable and it was also deemed that the financial scope of the trial, namely \$200k, was proportionate to the size of the investment area and the number of farms that might be expected to participate in the conservation tender.
 - Horticulture was subsequently excluded from the trial as there was a different set of incentives programs available for that industry.
→ The conservation tender will include cane growing and cattle grazing.
 - Negotiations with the BDTNRM Group and its regional stakeholders revealed potential conflict between the proposed conservation tender and a proposed extension-based grants program for cane growers. This was to be funded by the BDTNRM Group and provided by the Department of Primary Industries and Fisheries (DPI&F) and the Bureau of Sugar Experimental Stations (BSES). This had the potential to negatively impact on the conservation tender by effectively introducing a floor price into bids from cane growers. It also meant that technical field staff of the providing organisations would have to service two incentives, generating confusion in the minds of staff and—more importantly—landholders. The negotiated solution to this problem was the combination of the other proposal into the conservation tender. This generated a series of challenges and opportunities, including:
 - (1) available funding for conservation activities increased to approx \$600,000;
 - (2) the entire cane growing area in the Lower Burdekin needed to be included to match the scale proposed by the other proposal;
 - (3) the grazing area needed to be expanded to be relatively proportionate to the cane growing area—and the number of cane growers—in the tender

area.

(4) the area expansion, matched by additional monetary resources, enabled the investment area to be strategically split into a single industry area (cane only—eastern investment area) and combined industry area (cane & grazing—western investment area), which is thought to yield valuable comparative data between two otherwise identical tenders.

→ The conservation tender will include the entire cane growing area in the Lower Burdekin as well as grazing areas in the Haughton River, and Barratta, Landers and Stones Creek subcatchments.

→ The conservation tender will provide direct comparability between a single industry and multiple industry roll-out.

- Key aspects of the design and implementation of the tender have been negotiated.
 - The process for tender roll-out has been negotiated and clarified (Attachment 1). A suite of communication materials are under development, principally developed by the BDTNRM, to support the process.
 - The process of implementing the conservation tender has been finalised and timelines negotiated.
 - Capacity building has been undertaken with the BDTNRM to support the implementation of the conservation tender. Specifically, the recruitment and management of an ‘auction support officer’ has been facilitated by the research team.

Also, a number of meetings with collaborators have been undertaken to secure the availability of technical support staff from relevant organisations (DPI&F, BSES) and ensure they understand—and can communicate—the principles of the conservation tender. Regular meetings and conversations are conducted with the relevant project managers and the operations manager of BDTNRM.

 - Relevant capacity building has been undertaken and stakeholder communications are ongoing.
 - The MBI contract stipulates that the conservation tender will achieve water quality improvement in the BDTNRM area.

Multiple discussions and negotiations with stakeholders and experts revealed that the two industries (cane and grazing) generate different types of water pollution problems: the movement of nutrients and pesticides are the key issues relevant to cane lands, while sediment movement from soil erosion with associated nutrients are the prime issues for grazing land. Soil erosion is not an issue on cane land. For a combined tender, it is essential that all aspects can be integrated into a combined assessment process.

 - The bid assessment process will consider sediments from grazing together with nutrients and pesticides from cane lands in a combined water quality benefits metric. In the absence of scientific information to suggest

otherwise, the pollutants will be rated equally.

→ Bids will be rated on the basis of their relative contribution to the achievement of end-of-catchment targets for different pollutants.

- A list of potential actions to achieve water quality improvements has been identified, which include different actions for cane and grazing land which landholder may propose to undertake. Rather than being prescriptive what actions landholders can propose, a suite of criteria has been developed to guide their assessment. (Attachment 2).
- A water quality benefits metric forms the key method for assessing bids. It represents the manifestation of the criteria. It has proved challenging to consolidate the scant, often subjective and sometimes conflicting scientific information into a metric.
→ The metric is under development.
- Timing of the process and roll-out of the conservation tender is linked to a series of communication processes in the catchment, including shed meetings to be conducted by BSES and DPI&F for cane growers during October. A separate process is underway for identifying and engaging graziers. A communications and public relations strategy is currently under development.
→ Various parallel processes are underway to support the implementation of the tender and maximise participation by landholders.
- Actions to improve water quality may impact on other environmental outcomes, that are important to the BDTNRM. For example, some actions may have biodiversity benefits (e.g. wetlands restoration); others may be detrimental for biodiversity (e.g. establishment of a monoculture pasture). It was identified that inclusion of other environmental dimensions would further increase the scope and significantly impact the complexity of an already highly complex tender design. For this reason, biodiversity assessment will not be directly included in the metric. Instead, projects involving environmental losses will be flagged for additional negotiation with landholders and potential exclusion from funding.
→ The metric will not include environmental dimensions that are not directly related to water quality.

- Experimental workshops

- The experimental workshops are aimed at collecting additional information about a range of scope and scale issues from landholders who participated in the live auction. It is anticipated that two industry specific workshops

will be conducted in late January 2008, after the auction process has been completed. This will avoid any confusion with the 'real' auction trial.

- A range of data collection techniques will be applied, including the use of questionnaire surveys and the application of a hypothetical auction "game" that has been tested and applied with cane growers and graziers in other regions.
 - The results will provide information about the:
 - mean and spread of relative bid values across industries to help determine cost efficiencies in terms of scale;
 - Mean and spread of relative bid values across different Best Management Packages industries to help determine cost efficiencies in terms of scope;
 - Participants' perceptions about auctions of differing scope and scale including:
 - a. The impact of their perceived likelihood of success (and participation)
 - b. The impact on their transaction cost
 - c. Issues of complexity and information
 - d. Issues of equity and industry representation.
- Participant evaluation survey
 - Once the auction has been completed a questionnaire survey will be sent to graziers and canegrowers in the region to evaluate the opinions and attitudes of a broader range of stakeholders.
 - Agent-based modelling

The purpose of the agent-based modelling (ABM) is to complement the field trials and experimental workshops by undertaking auction market simulations to assess the robustness of observed outcomes and to extend the results from the other two approaches. The ABM simulations involve the construction of an artificial auction market that incorporates bidding software agents representing landholders and an agent representing the procuring agency. Key advantages of the approach include the low cost of conducting simulations and, more important, the ease with which the auction setting can be enriched by allowing for learning and heterogeneity. The agent-based models will be structured using data from the field trials and experimental workshops. The simulations will provide information about:

- the robustness of observed auction outcomes to auction repetition and bidder learning
- the sensitivity of auction outcomes to variations in auction settings (e.g. varying competition levels, degrees of bidder heterogeneity, scale of auction, etc.), thus extending our learning to domain not covered in the field trials and experimental workshops
- the relative performance of payment rules that could be used as alternatives to discriminatory pricing

3. Progress towards programme objectives

The early stages of the project have largely been completed. These include:

- Identifying the theoretical issues underlying the problems to be addressed (Report 1),
- Identifying the key characteristics of the case study area and summarising the practical issues involved in the case study (Report 2),
- Designing the actual conservation tender and the key components of the metric underlying the bid assessment process.

The issues to be addressed in the project can be summarised in terms of defining the tradeoff between efficiency gains and transaction costs that occur when the scale and scope of conservation tenders are adjusted. These issues are relevant to all governments and agencies implementing conservation tenders (price-based auctions) when they are choosing the actions to purchase (scope) and the extent of the market to cover (scale).

It is clearly too early in the project to draw definitive conclusions in relation to the programme objectives, which are listed in the introduction. Neither the tender, nor the experimental workshops have been conducted. However, some early thoughts are emerging on two theoretical issues.

- Identify the design issues in running a broad-scale tender mechanism, which includes different agricultural industries/production systems and sub-catchments
 - Comparability of the environmental issues associated with the different industries/production systems is important. It becomes increasingly difficult to design the bid assessment process (metric) and have transparency of project results as the scope of a conservation tender increases. This has been demonstrated in this project where the inclusion of grazing and cane industries has increased the scope of water mitigation issues (sediments as well as nutrient and chemical movement), making it more difficult to assess environmental benefits. These problems would be compounded if additional benefits, such as biodiversity impacts, also had to be assessed.
 - Comparability across sub-catchments is important. Having a cohesive region for the implementation of a tender is important in political and communication terms. In this project it would have been theoretically possible to choose very discrete geographic areas for the cattle and cane industries. In the practical application though, it became important to define a contiguous area (the lower Burdekin) that would make intuitive sense to the industries involved. This also helped to minimize issues with the benefit assessment process. For example, the project area only involves catchments below the Burdekin Dam, avoiding the need to further distinguish environmental impacts.

- Assess the transaction costs involved in broad-scale as compared to focused conservation tenders. The transaction costs include a variety of design, administration, institutional and negotiation costs associated with the performance of a conservation tender.
 - Additional transaction costs are evident in the broad-scale approach:
 - (1) More extensive negotiations are required, involving more stakeholder groups. The increase in transaction costs appears to relate more to the increase in scope than the increase in scale. This is because the number of stakeholder groups involved increases as the scope expands, and the bid assessment process becomes more complex as different industries and different environmental impacts are involved.
 - (2) There are a larger number of potential conflicts with other incentives or industry programs that need to be identified and resolved. For example, there are a number of water quality and best management practice programs in the cane industry that have to be considered in the design of a tender.
 - (3) It becomes more difficult to ensure that the assessment process and skill sets are coordinated. For example, technical officers with different sets of industry knowledge will be required to undertake farm visits in the assessment phase of the rollout, and coordination will be required to ensure consistency.
 - (4) The metric design stage becomes substantially more complex and time consuming as the scope and scale of a conservation tender increases.
 - (5) The auction design process becomes more complex because different participant groups are involved, with varying types of engagement and participation drivers.
 - (6) Additional factors have to be included in the metric to take account of variations between industries and participant groups, as well as the nature of the actions involved. For example, in this case study an element of the bid assessment process will involve consideration of how well actions can be verified.

4. Implications

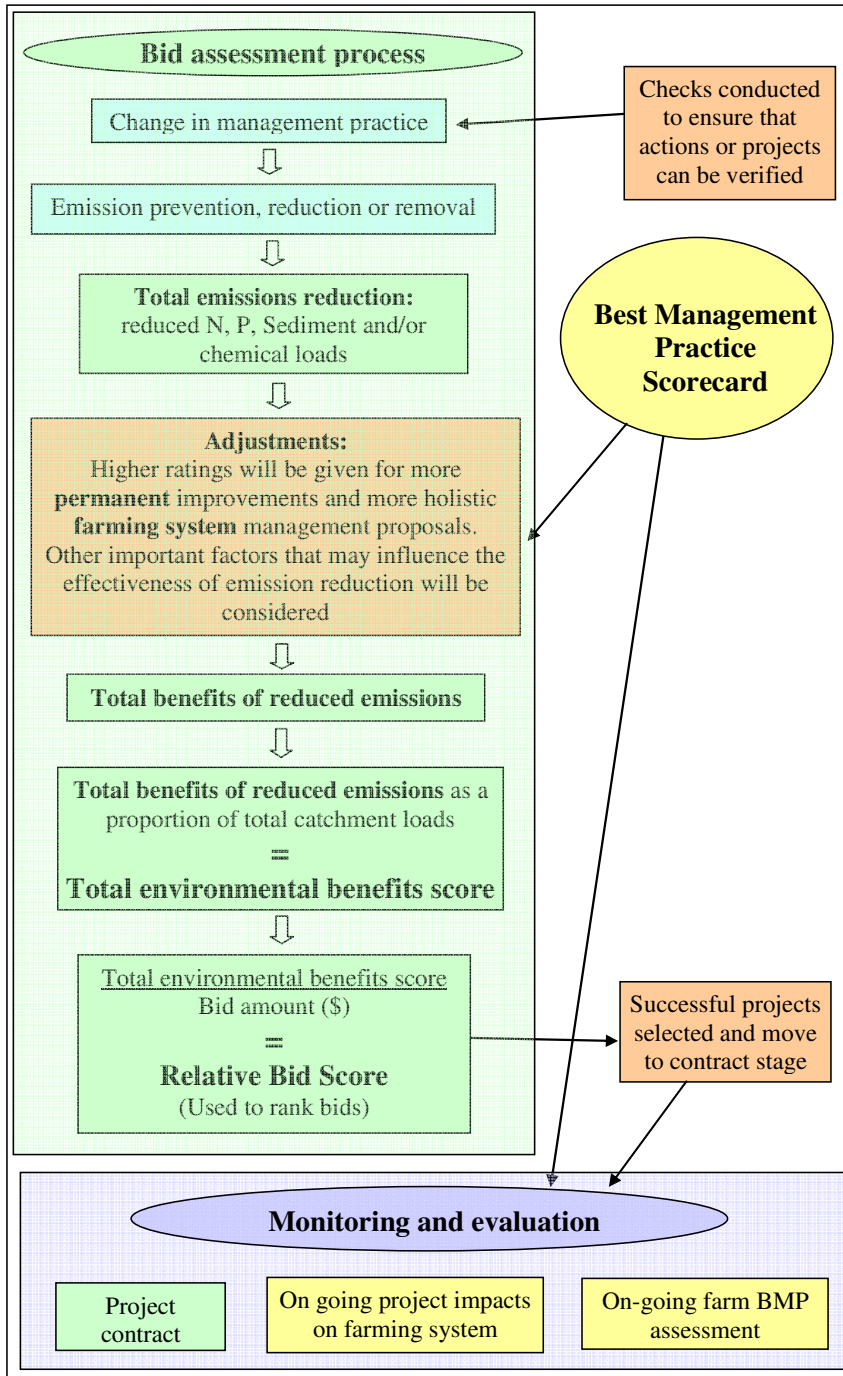
The outcomes of this project will help government agencies and NRM groups to identify the tradeoffs involved in scoping conservation tenders at different levels. The design of every conservation tender involves consideration of the scope and scale at which it will be applied, but to date those choices have largely been made on an ad-hoc and informal basis. The focus of this project is to make that initial framing stage more considered and transparent, and to develop an assessment process that allows better consideration of the likely tradeoffs between efficiency gains and transaction costs.

The project remains on track to be completed on time and on budget. There have been some industry and internal factors which have delayed some interim milestones. The expansion of the project scope has added a number of negotiation and design complexities, making it difficult to progress the tender in the field before September 2007. As well, the wet winter has delayed the cane harvest in the Burdekin, together with associated shed meetings, by around one month. It has been determined that submission of bids will now close on the 4th January 2008. The experimental workshops and finalisation of the modelling stages will follow in February and March.

Early indications are that the project will yield a series of practical and theoretical learnings which relate directly to the project objectives.

5. Attachments

Attachment 1: Process of bid assessment



Attachment 2: Design principles for bid assessment

Design principle	Explanations
Environmental outcomes	<p>Proposals are going to be assessed against the types and extent of estimated improvement in water quality they achieve. The metric will estimate the reduction of farm emissions in the key areas of</p> <ul style="list-style-type: none"> * sediments * nutrients (nitrogen, phosphorus) * chemicals (pesticides, herbicides, fungicides, etc) <p>Emission reductions of the various pollutants will be compared on the basis of their relative contribution of improvements to regional (Lower Burdekin) water quality targets.</p>
Total emissions	<p>For the purpose of this market based incentive the avenue of emission is not relevant. While sediment can only be lost through lateral flows, nutrients may be lost through lateral flows (surface water), leaching (ground water) or denitrification (atmosphere). Bids will be assessed on the predictions for total emission reduction and its contribution to achieving regional water quality targets.</p>
Value	<p>Proposals from landholders will stipulate a bid amount, i.e. the amount of money that the bidder would like to receive from BDTNRM to facilitate implementation of the proposed activity/infrastructure. Bids will be rated on the basis of \$/unit of water quality improvement, as calculated from total emission reduction.</p>
Verification	<p>Proposals need to be verifiable. Verification can include photographic evidence, invoices and farm/paddock records. To demonstrate improvement it is essential that the prior situation can be demonstrated, e.g. through at least two years of fertilizer purchase invoices. Verification provides confidence to the participating landholder as well as the BDTNRM that contract conditions have been met.</p>
Permanency	<p>Proposals which offer lasting improvements will rate higher than temporary changes. For example, the construction of sediment traps and the establishment and fencing of riparian filter strips will generate benefits in years to come while a one-year reduction in fertilizer application yields water quality benefits in that year only.</p>
Farming systems	<p>Holistic approaches to water quality improvements can include bundles of activities, including purchase of a new sophisticated fertilizer spreader, reduction in fertilizer application and improved planning and record keeping. Changes in farming systems which are likely to reduce the initial production of pollutants will received a 'systems bonus' over sporadic and non-systemic measures or mechanisms that simply intercept the path of pollutants off farm.</p>