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CONSERVATION AUCTIONS IN MANITOBA: A SUMMARY OF A SERIES OF WORKSHOPS

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Research Project Number: **RP-01-2010**

Project Report
June 2010

Canada

UNIVERSITY OF ALBERTA
DEPARTMENT OF RESOURCE ECONOMICS
AND ENVIRONMENTAL SOCIOLOGY

Growing Forward

Acknowledgements

This project was funded by the Canada and Manitoba Governments under Growing Forward, a federal-provincial-territorial initiative.

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CRP	Conservation Reserve Program
EBI	Environmental Benefits Index
EG&S	Environmental Goods and Services
MCD	Maximize Coverage-Discriminatory payment treatment
MCU	Maximize Coverage-Uniform payment treatment
MPD	Maximize Phosphorus abatement-Discriminatory payment treatment
MPU	Maximize Phosphorus abatement-Uniform payment treatment
NGO	Non-Government Organization

Executive Summary

Currently, the effect of human impact on the environment is becoming increasingly apparent. The encroachment of human activity has inevitably resulted in the loss or impairment of ecological goods and services (EG&S) around the globe as well as in our own backyard. EG&S include features such as wildlife habitat, biodiversity, soil renewal, or nutrient cycling. The loss of such features has become a sobering reality for Manitobans in the face of the eutrophication of Lake Winnipeg as a result of practices contributing to nutrient loading into the lake. Since EG&S are very important to Manitobans, efforts are being made to explore different vehicles to encourage their provision. In order to address some of the environmental issues transpiring in Manitoba, there has been discussion on the usefulness of Market Based Instruments (MBIs). In the past, a number of programs focused on the environment in agriculture have been put forward and administered, however these have not been overly successful in incenting producers or providing significant levels of EG&S. This report will provide a summary of a series of workshops developed to bring awareness to stakeholders on an MBI known as a conservation auction (which may also be referred to as reverse auction, procurement auction, or tender).

The purpose of this series of workshops was to create awareness of the conservation auction process and how it applies to the provision of EG&S by producers in Manitoba; moreover it was an opportunity to receive feedback on the applicability of auctions in Manitoba.

The objectives for this series of workshops are as follows:

- Determine the opinions of relevant stakeholders in regards to the relevance of auctions in Manitoba
- Investigate auction design features such as payment type, competition, and communication
- Conduct an economic analysis of the results of the auction simulations provided in the workshops for educational purposes

EG&S are the positive environmental benefits arising from healthy ecosystems. They are fundamentally complex and have no associated market value, which makes it difficult to develop relevant policy. Environmental programs typically use fixed payment or cost sharing agreements to procure EG&S but they have been found to be unsuccessful partly because of inadequate levels of compensation. An alternative approach is to use MBIs to deliver EG&S programs.

MBIs are policy instruments that use market forces, prices, or other economic variables to change behaviour. They can either create a market, where no market is currently operating, or improve a market if there is market failure. These tools utilize trading mechanisms, direct payments, price signals, or auctions to capture value that may have been overlooked under the present policy scheme. This is a key feature that makes MBIs appropriate to use in the context of EG&S since their value is unknown. Therefore, through the use of MBIs we can gain more knowledge and understanding of the costs and benefits of EG&S. In the case of EG&S procurement, conservation auctions are a viable option as a method to purchase EG&S from producers in a cost effective way.

Auction mechanisms use market forces in the face of information asymmetry[1] and act as a price discovery system for EG&S. With competition as the driving force, participants are induced to reveal their compliance costs through the bidding process (Latacz-Lohmann & Schilizzi 2005). This is because participants must face tradeoffs related to the probability of their bid being accepted and their resulting payoff. Thus participants are revealing some of their own cost information while receiving a payment adequate to cover their costs.

Conservation auctions are a unique type of procurement auction where participants place bids for providing EG&S. Like a conventional procurement auction, participants submit bids indicating the price they are willing to accept/willing to sell their good or service for. The bids are then ordered from lowest to highest (can be either $/unit or whole price). Unlike conventional procurement auctions, typically, multiple winners are selected from lowest to highest until either a budget is exhausted or a unit target is met.

Auction design is an important factor in maintaining economic efficiency in conservation auctions. Since conventional auction theory cannot be used to guide design, auction experiments in an economic laboratory have been utilized to test different designs to understand their efficiency capability as well as their ability to act as a cost discovery tool (Lohmann & Schilizzi 2005). Important design measures to consider are: the method of payment; use of target versus budget constraints; is information revealed or hidden; the use of a reservation price or target; and bid evaluation systems.

In total 13 workshops were completed between the dates of March 8, 2010 and March 19, 2010. Originally 15 sessions were scheduled; however due to limited attendance participants from two sessions were rescheduled to other sessions. Four treatments were used during the series of workshops; two payment structures (discriminatory (D) and uniform(U)) and two bid ranking structures (maximize coverage (MC) (or acres) and maximize kg phosphorus abatement (MP)): 4 MCU, 3 MCD, 3 MPU, and 3 MPD.

Light economic analysis of the auction simulation results was conducted. As these workshops were being used more as an information tool to stakeholders, the results of the auctions most likely do not reflect real behaviour; therefore caution and scrutiny should be used when interpreting the results. Despite discrepancies, lessons may still be learned from the results.

Profit maximizing, or rent seeking, behaviour was apparent in almost all auction simulations. This is mostly attributed to the low rate of competition in some rounds. Where there was low competition the cost effectiveness of the auction would ultimately decrease and could not be used as a cost discovery mechanism. It was difficult to see any major differences between the two payment methods, however on two occasions the uniform payment yielded negative rent, in other words people were bidding below their costs on average.

At the conclusion of each auction simulation, participants were asked to fill out a questionnaire asking for their opinions on the workshop itself, as well as more detailed questions pertaining to environmental programming in Manitoba and opinions about the conservation auction mechanism. Overall, there was a positive response to the

[1] Where two parties both hold private information that is not known to the other party, in this case the parties are government and producers.

mechanism. There was a distinct divide between producers and other groups (e.g. government, NGOs, and academia) according to the recorded responses.

In the discussion that followed each workshop, similar concerns were brought to the table regardless of demographics. These encompassed how the auction would be implemented down to details about administration and monitoring; producer concerns related to the estimation of costs, fairness to the producer, the competitive nature of the auction, and contract lengths; as well as discussions about environmental programming in general that were not specifically related to the conservation auction process.

Taking time to think through auction design will also be necessary in order to have an auction that caters to the public and producers, and will be cost effective. While it may be too soon to be discussing details surrounding the implementation or design of an auction in Manitoba, more thought may be required on related issues such as development of an Environmental Benefits Index (EBI) and associated extension program.

These workshops were developed to allow stakeholders to become aware of the conservation auction, and learn more about the process and why they are implemented around the world. It was also a platform of discussion amongst stakeholders to gauge how acceptable an auction would be in Manitoba to procure EG&S from producers: a lot of information and ideas were shared from all sides of the story. Overall, it was a very positive experience for those involved and a positive reaction to the auction process was encountered. However, some still remain apprehensive and skeptical of the mechanism in terms of its application in Manitoba.

JEL Codes: D44, Q20, Q57

Keywords: Market based instruments, Conservation auction, Tender, Wetland restoration

1 Introduction

Currently, the effect of human impact on the environment is becoming increasingly apparent. The encroachment of human activity has inevitably resulted in the loss or impairment of Ecological Goods and Services (EG&S) around and globe as well as in our own backyard. This has become a sobering reality for Manitobans in the face of the eutrophication of Lake Winnipeg as a result of practices contributing to the degree of nutrient loading into the lake. Since EG&S are very important to Manitobans, efforts are being made to explore different vehicles to encourage their provision. This report will provide a summary of a series of workshops developed to bring awareness to stakeholders of a Market Based Instrument (MBI) known as a conservation auction (also known as reverse auction, procurement auction, or tender).

1.2 Background Information

EG&S are the positive environmental benefits arising from the ecological functions of healthy ecosystems. EG&S can be identified as goods (e.g. food, fuel, water, air, habitat, biodiversity), services (e.g. nutrient cycling, water purification, soil renewal), and use value (e.g. recreation and aesthetic beauty). EG&S are fundamentally complex systems with layers of linkages specific to the physical conditions around. Another complexity is that there is no direct value attached to EG&S; therefore you cannot directly estimate the value or the cost of EG&S. This makes it difficult for policy makers to create relevant policy or programs related to EG&S: since they A) do not know the benefits from providing EG&S and B) do not know the costs of providing EG&S, it is difficult to know the extent resources should be used on EG&S.

A majority of environmental programs in agriculture are based on fixed payments or cost sharing agreements as incentives for voluntary actions to engage in environmentally friendly practices (e.g. ALUS, National Farm Stewardship Payments, MHHC conservation easement). A shortcoming of these types of programs is that they might not be offering an adequate level of incentive to those producers who could potentially provide a large amount of EG&S because they might have high costs associated with the EG&S. Conversely, the payment could also induce those who have already committed to conservation activities (therefore not gaining any more EG&S), or induce producers who provide low levels of EG&S from unproductive, low-cost land. If there was more information available about the price of EG&S in agriculture, an equilibrium price could easily be reached for each individual; unfortunately we are in a world of information asymmetry[2] and information is not easily shared between parties. While there may not be price tags on habitat or biodiversity, market forces can still be used as a way to overcome this difficulty with the use of MBIs.

MBIs are policy instruments that use market forces, prices, or other economic variables to change behaviour. They can either create a market, where no market is

[2] Information asymmetry is when individual parties hold information specific to them and is not known to the other party.

currently operating, or improve a market if there is market failure. These tools utilize trading mechanisms, direct payments, price signals, or auctions to capture value that may have been overlooked under the present policy scheme. This is a key feature that makes MBIs appropriate to use in the context of EG&S since their value is unknown. Therefore, through the use of MBIs we can gain more knowledge and understanding of the costs and benefits of EG&S. Some examples of MBIs are tradable permit frameworks, taxation for polluters, and conservation auctions. While all of these instruments are useful, the context of use is very important to consider when choosing a tool. In the case of EG&S procurement, conservation auctions are a viable option to purchase EG&S from producers in a cost effective way.

Conservation auction mechanisms use market forces in the face of information asymmetry and act as a price discovery system for EG&S. With competition as the driving force, participants are induced to reveal their compliance costs through the bidding process (Latacz-Lohmann & Schilizzi 2005). This is because participants must face tradeoffs related to the probability of their bid being accepted and their resulting payoff. Thus participants are revealing some of their own cost information while receiving a payment adequate to cover their costs.

Conservation auctions have been increasing in popularity recently as a way to procure EG&S in the agricultural landscape. The United States have used auctions for the delivery of payments for conservation activities in the Conservation Reserve Program (CRP) (Reichelderfer & Boggess 1998). They have also been used in water management policy in the United States to distribute irrigation permits (Cummings et al. 2004; Hartwell & Aylward 2007). They have been used widely in Australia to increase the level of biodiversity in agriculture (Stoneham et al. 2003; Latacz-Lohmann & Schilizzi 2005). They have also been applied in Europe as a mechanism to distribute payments and acquire EG&S from producers (Groth 2005).

While there is documented use of the conservation auction framework around the world, there has been little experience in Canada with respect to the use of auctions for EG&S. However, as people become more familiar with the concept, it is being applied in certain areas in Canada. Recently an auction was held in Saskatchewan with the cooperation of the Assiniboine Watershed Stewardship Association, Ducks Unlimited Canada, and the Saskatchewan Watershed Authority to restore wetlands to increase duck production (and indirectly other EG&S). The auction held was found to be successful in selecting producers to restore wetlands at an average cost of approximately $1000/acre, which is comparable to empirical studies on the cost of wetland restoration to producers (AWSA 2009). The auction framework was also utilized in the national hog transition program in 2009, where producers were issued payments to set aside their hog production for a minimum of 3 years (CPC 2009).

1.3 Conservation Auction Theory

Auction theory in the context of EG&S procurement is a relatively new field of study, and the overall body of literature is somewhat limited and inconclusive. However, traditional auction theory provides a well established point to draw conclusions and insight into the realm of EG&S auctions.

Conservation auctions are a unique type of procurement auction[3] where participants place bids to provide EG&S. Like conventional procurement auctions, participants submit bids indicating the price they are willing to accept/willing to sell their good or service for. The bids are then ordered from lowest to highest (can be either $/unit or whole price). Unlike conventional procurement auctions, typically multiple winners are selected from lowest to highest bid until either a fixed budget is exhausted or an EG&S unit target is met. There are also a number of other unique features of conservation auctions that set them apart from conventional theory and assumptions[4].

Conservation auctions typically deal with the trading of multiple items whereas auctions are usually based on the sale of one single item/contract. In conservation auctions the participants may be able to submit multiple units of EG&S and the agency holding the auction will be accepting multiple units of EG&S. While the effect of multi-item auction is not well known studies have shown that under certain conditions efficient outcomes can be achieved, however it may lead to acts of collusion and rent[5] seeking depending on the payment method chosen[6] (Klemperer 1999).

Bidders are heterogeneous entities in the provision of EG&S. In other words each farmer will have different underlying conditions on their land (e.g. soil quality, water availability) which contribute to heterogeneous costs as well as heterogeneous levels of EG&S quality. Heterogeneous costs will also be influenced by additional costs in the construction or implementation of bids. Farmers may experience additional opportunity costs from efforts required in assessing their land as well as in the auction process. This could contribute to low participation rates in existing procurement auctions and could also augment bid determination. This is also a reason why fixed payment scheme achieve limited success.

Farmers are also more likely to be risk averse rather than risk neutral, which is not an assumption under conventional theory. This is a widely held assumption for farmers and is used for multiple areas of research (Unterschulz pers.comm). Latacz-Lohmann and Van der Hamsvoort (1997) found in a bidding simulation that risk aversion, and high uncertainty regarding reserve price, can affect bidding behaviour away from the optimal strategy and subsequently lead to inefficient outcomes.

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[3] A procurement auction (or conservation auction) is a type of auction where there are multiple sellers and one central buyer; the opposite of a conventional auction where there are multiple buyers and one central seller.

[4] See Appendix for assumptions

[5] Rent is a term used in economics to refer to profit above covering costs.

[6] Payment methods will be discussed in the following section

Lastly, payments may not necessarily be a function of bids only. Payments may be influenced by factors such as the payment method chosen, the level of competition among bidders, or the presence of collusive behaviour.

Despite the fundamental differences, the conservation auction can be used as a cost discovery tool, working under similar principles as the conventional auction. Bidders will still make tradeoffs between the probability of winning and making a profit in the face of competition. However, auction theory cannot act as a guide as to how to design or evaluate conservation auctions.

1.4 Auction Design

Auction design is an important factor in maintaining economic efficiency in conservation auctions. Since conventional auction theory cannot be used to guide design, auction experiments in an economic laboratory have been utilized to test different designs to understand their efficiency capability as well as their ability to act as a cost discovery tool (Lohmann & Schilizzi 2005). Important design measures to consider are: the method of payment method; use of target versus budget constraints; is information revealed or hidden; the use of a reservation price or target; and bid evaluation systems.

1.4.1 Payment Method

In a reverse auction, there are different methods in which payments may be distributed to winners. The most common methods are discriminatory, uniform 1st price, and uniform 2nd price (or Vickrey auction). Each method has its own pros and cons in relation to their effectiveness in preventing information rent seeking[7], producing a cost effective auction and acting as a cost discovery mechanism. This is largely based on how bidding behaviour is affected by the payment methods. The pricing rule is an integral design key in conservation auctions because the format dictates how contract payments are determined based on bids (Latacz-Lohmann & Schilizzi 2005) and directly contributes to the effectiveness of the auction.

Under discriminatory pricing, a successful bidder in an auction will receive a payment equal to the submitted bid price. This type of pricing limits the amount of uncertainty bidders would face as their respective bids would both determine their chance of winning and the price they would receive if successful (Lohmann & Schilizzi 2005). This provides an opportunity for participants to seek rent (payments above costs) in anticipation of getting the highest possible payment. The literature indicates that the optimal strategy for participants is to overbid under discriminatory pricing in order to receive a large payment and acquire a net gain. This is especially true for those who can provide EG&S at relatively low cost [8]; knowing that it is relatively inexpensive for them to provide a service, they may misrepresent their costs and bid as if they were a high cost landowner in order to have net gain from their payment and still remain competitive

[7] Profit that is gained when bidders hold private information about their costs or EG&S
[8] This can be as a result of either low costs, or very high EG&S potential on their land.

among other bidders. High cost participants are more likely to bid close to their costs knowing that the highest acceptable bid is probably not much more than their own costs.

Under a uniform pricing framework all successful bidders are paid the same price (full or unit price). In this case, the bid submitted determines the chance of winning, but does not determine the level of payment (Lohmann & Schilizzi 2005). Knowing this, the dominant strategy for participants is to place a bid equal to their own costs because the magnitude of the bid does not affect the payment that will be received - it will only affect the probability of winning. In this payment format winners will tend to receive a payment greater than their costs, eliminating the need to shade their bid in order to have a net gain from the auction. Therefore, the dominant strategy is to place a bid equal to costs in order to maximize the probability of winning.

The price received under the uniform price format may be determined one of two ways: 1st price, where the price is determined by the last accepted winner; or 2nd price, where price is determined by the first rejected participant. Cason & Gangadharan (2004; 2005) explain that the second price method may be more effective because when first price is being used, the last person to win will not receive a payment greater than their costs while other winners will. It is possible that the participant on the margin will tend to overbid and thus raise the universal market price making the overall auction more expensive and less efficient. Whereas using the second price method, all winners would receive a payment greater than their costs, thus reducing the incentive to place a bid greater than costs in order to obtain profit.

There is debate as to which pricing rule is the most effective in an auction. In the literature there are two streams of evaluation of pricing rule effectiveness: 1) cost effectiveness (meaning minimizing the total cost of the auction and maximizing benefits procured from a fixed auction budget (i.e. budget spent per unit of EG&S)) and 2) ability to act as a cost discovery mechanism. The ability for the pricing rule to provide incentives for participants to bid their own costs is an important issue in an auction. Without the proper incentive, there may be strategic behaviour in order to maximize information rent by misrepresenting costs. In the event there is an abundance of cost shading, winners in the auction may not be appropriately chosen ultimately leading to a decrease in cost effectiveness.

Discriminatory pricing has been found to possess characteristics which support better cost effectiveness than the uniform pricing method. Cason & Gangadharan have illustrated in their studies (2004; 2005) that discriminatory pricing leads to lower overall costs of conducting an auction than uniform pricing. The reason behind this is that under uniform pricing each winner will always receive a payment greater than their costs, and will therefore inflate program costs.

The comparison of discriminatory and uniform payments in terms of cost effectiveness is dependent on the extent of rent seeking under a discriminatory framework. Since uniform payments will always pay more than the submitted bid, the optimal solution is to submit a bid equal to costs, but the overall monetary outlay will be greater than the summation of costs. If there is relatively low amounts of rent seeking in the discriminatory case, the payment per individual would be lower than with uniform payments; therefore more units of EG&S could be purchased because more bids could be accepted. If there is a relatively high amount of rent seeking under discriminatory

payments, then a higher proportion of the budget will be paid to fewer individuals thus reducing cost effectiveness.

An important feature of a procurement auction is its ability to reveal the costs of participating individuals in order to combat the effect of asymmetric information. Theoretically speaking, uniform pricing would perform better at revealing the cost curve than discriminatory pricing based on the optimal bidding behaviour in each method. As was previously illustrated, bidders are more likely to shade their bids above their costs in order to maximize a potential profit; this of course results in a skewed revealed cost function. This has also been supported empirically using auction experiments (Cason & Gangadharan 2004; 2005).

More research is required to understand the behaviour under each payment type, especially taking into consideration other factors such as learning, competition, and demographics. The decision on payment type must also take into account the individuals who are participating in the auction. If participants do not agree with the payment type chosen, there may be low levels of participation; or if there is a lack of understanding individuals may feel "cheated" by a poor result in the auction. Therefore, no matter what payment type is chosen, extension with relevant stakeholders is important so that there is a level of understanding of the mechanism.

1.4.2 Budget and Target Constraints

Conservation auctions can be run under one of two constraints: a budget constraint or a target (objective) constraint. Under a budget constraint winning bids are selected until a fixed budget is exhausted. The amount of EG&S acquired under such an auction is only known after the auction. A target based auction implies that there is a pre-determined, fixed amount of EG&S (or other objective) to be gained from the auction process. In this case, the resulting budget is only known after the auction has been completed. Latacz-Lohmann & Schilizzi (2005) state that there is no reason to believe that one is better than the other, although, they also note that a budget constraint may create an environment which psychologically disciplines bidders to place bids closer to their costs.

Very little research has been conducted in this area, since budgetary constraints are typically more important for governments and other funding agencies who support conservation auctions. However, with results-based management becoming more prevalent it is important to understand the effects of imposing an environmental target as a policy goal before establishing a budget. Latacz-Lohmann & Schilizzi (2005) found that in terms of cost efficiency there was no significant difference between the two constraint types, however this has not been verified in the literature. Ultimately it depends on the policy goals in place and how stringent a budget is. If limited budgets are a reality, a budget based auction would be suggested since the level of funding available for a project is known. If a specific environmental target is set, it would be preferable to have more money available since the end cost of the program is unknown.

1.4.3 Reserve Prices and Targets

In the context of conservation auctions, a reserve price is the maximum amount to be paid for a unit of the good being traded (Latacz-Lohmann & Schilizzi 2005). The reserve price serves as an alternative budget constraint if the auction environment is susceptible to factors which would decrease economic efficiency or cost effectiveness.

Latacz-Lohmann & Schilizzi (2005) identify two reasons to consider the use of a reserve price in an auction:

- The implementation of a reserve price contributes to the risk that a bidder may lose from bidding too high. This will increase bidder competition enabling the agency to gain from information rent that would have otherwise been transferred to the winning participants. It also eliminates the possibility of submitting unrealistically high (bogus) bids.
- The reserve price may also act as a price signal of the agency's (or society's) maximum willingness to pay for conservation services, thus somewhat representing the demand side of the conservation market.

A reserve price would be appropriate if there is low competition among bidders; the possibility of collusive behaviour; to reduce the effects of bidder learning; to place a limit on the auctions winners' gains from trade (i.e. information rent); as well as spreading one budget across multiple auction rounds and ensuring their equivalency to maintain economic efficiency(Latacz-Lohmann & Schilizzi 2005). A reserve price is less important where auctions have a strict budget constraint, which is said to have an implicit reservation price.

A reserve quantity is the maximum allowable bid accepted in reference to the amount of EG&S submitted (Latacz-Lohmann & Schilizzi 2005). A reserve quantity is useful in situations where one (or very few) bids represent a large fraction of the objective being considered in the auction. A reserve quantity is implemented to ensure fairness and equity among participants rather than improving cost-effectiveness or economic efficiency (Latacz-Lohmann & Schilizzi 2005). For example, in the auction for Landscape Recovery in Western Australia, a bid which constituted a large fraction of the total area under the auction was rejected despite having a competitive $/ha cost in order to spread the budget among more participants (Latacz-Lohmann & Schilizzi 2005).

In the event a reserve price or quantity is used in an auction, it may be announced or unannounced prior to the outset of the auction – much like a budget or target may be announced or left concealed prior to the auction. Although there was no literature available for review which explicitly investigated this question, lessons may be drawn from the practical use of auctions. With evidence from the CRP, announcing a reserve price may send signals to producers to submit bids roughly equal to that price; this effect would become more prevalent under repeated auctions (Reichelderfer & Boggess 1998).

It is also anticipated that the effect of a reserve price may have different effects on bidder behaviour and cost-effectiveness under different pricing methods (i.e. discriminatory v. uniform pricing) and how the reserve price is incorporated into the rules of the auction. However, no literature has been found to support this theory.

1.4.4 Information Provision

The level of information available to participants in the reverse auction can have implications on the auction outcome. Depending on the level of information, participants may be able to use it to their advantage to extract information rent. This leads to higher budgetary outlay, as well as the revelation of an augmented cost structure. Therefore, careful consideration is required when determining what information to provide to participants. Information has been broken down into two categories: budget and reserve prices, and goods and services attributes. The effect of learning and how it is influenced by information provision will also be discussed in this subsection.

Budgets and Reserve Prices

Revealing information related to budgets and/or reserve prices is not advised. It can immediately send signals to bidders as to the price the program authority is willing to pay for EG&S. This could serve to exacerbate rent seeking behaviour on the part of bidders. This was observed in the CRP and documented by Reichelderfer and Boggess, (1988).

Goods and Services Attributes

In the auction, administrators may choose to reveal to participants the amount of environmental assets they provide, and thus decrease the level of information asymmetry, or to keep it concealed. There are both advantages and disadvantages to revealing and concealing this type of information. Cason & Gangadharan (2004) identify that revealing information could lead to advantages such as an increase in "…perceived fairness and transparency in the auction…" (p.1212) as well as inform landowners about desired actions and thus encourages long-term investment into conservation practices. However, revealing environmental information can encourage rent seeking and thus reduce economic efficiency.

Chan et al. (2003) reasons that the optimal information policy depends on who holds the information about the EG&S on private land: landowners versus the program authority. Landowners are more likely to have private information pertaining to the environmental impact of their production (e.g. potential effects on particular tracts of land and or species (Latacz-Lohmann & Schilizzi 2005)). However, the program authority may have access to more detailed information of the ecological/environmental significance of their land and characteristics and how they match with policy goals and objectives (Latacz-Lohmann & Schilizzi 2005).[9]

If landowners hold detailed private information about the level of EG&S that could be provided by their actions, Chan et al. (2003) recommends that the scoring rules and relative weights (e.g. an Environmental Benefits Index (EBI)[10]) should be announced if quality can be accurately verified after the auction. Under this framework, landowners are able to bundle their attributes to best suit the program and increase their probability of

[9] As per the assumption of information asymmetry between program authority and landowners

[10] An EBI is a scoring framework based on weighting EG&S (e.g. wildlife habitat, water quality improvements, carbon sequestration, etc) supplied in a project to meet an environmental goal. It is employed under the CRP to score submitted projects.

being selected. However, this could lead to over-paying for quality as landowners may exploit their information advantage and shade their bid above their costs (Chan et al. 2003; Latacz-Lohmann & Schilizzi 2005). In the case where quality cannot be verified, there may be the problem of adverse selection and price competition over quality competition and subsequently the purchase of low quality EG&S (Chan et al. 2003).

If the program authority has more information pertaining to the level of EG&S potential on bidders' land, they have one of two choices: to reveal or not to reveal. If full information is revealed to landowners, there is incentive for bidders to extract information rent, especially for those who have desirable levels of EG&S (Chan et al. 2003). If they only reveal the information related to the EBI it must be symmetrical among bidders. Bidders will then make predictions about the preferred EG&S qualities relative to their predictions of their own EG&S potential. Chan et al. (2003) stipulates that in this situation bidders will avoid price competition in order to maximize their profit potential.

When the program authority does not reveal its private information about the EG&S, bidders will have to make their own assessment of their environmental quality and how it will meet the preferences of the authority. Because of this, bidding becomes more like guesswork due to the uncertainty of their EG&S provision, in addition to their cost considerations (Chan et al. 2003). This increased uncertainty will encourage participants to bid closer to their costs (lower than their bids in the previous scenarios) for all levels of EG&S in order to increase the chance of winning in the auction (Chan et al. 2003). This reflects the situation described where there is information asymmetry between parties.

Cason & Gangadharan (2004) tested the effect of information on bidding behaviour using laboratory auction experiments and manipulated the amount of information provided to participants as the primary treatment variable (i.e. in one treatment the environmental benefits information was revealed, and in the other treatment it was not). Their results revealed that when information was withheld from bidders, the bids were based upon their opportunity costs (Latacz-Lohmann & Schilizzi 2005). However under the provision of environmental benefits information, bidders were more likely to misrepresent their costs, especially those with high levels of benefits. The budget spent was higher, and the amount of environmental units purchased was lower; thus a reduction in auction efficiency was realized with the information revelation. This may be because with high benefits participants know that they would be prioritized in the auction, and therefore behave strategically to get the highest profit possible.

There may also be long run advantages to revealing information. According to Stoneham et al. (2003), full disclosure of environmental asset information to participants sends signals to participants as to the priorities for the program authority. This provides participants with an opportunity and incentive to invest in conservation activities, and/or bundle specific assets or activities in order to increase their probability of being selected in the auction.

Since the level of information to provide is a decision made before the auction process, the program authority must first weigh its different policy objectives and goals. There should also be some consideration as to who would hold the most amounts of significant information regarding EG&S.

1.4.5 Learning

Another aspect of information provision is that which is learned over time by participants. After each auction round, bidders acquire some information based on the auction outcomes. Depending on their auction outcome, the bidder may choose to exploit this information by adjusting their bid accordingly to further their success in the auction and/or to increase the level of rent extraction.

The level of learning is contingent on the amount of information announced after each auction round. Any information provided could be used to send signals to bidders and aid in bid adjustment to improve their gains from trade or accelerate the rate of learning. Essentially the same behaviour as described above concerning information given before the auction would result; i.e. promotion of rent seeking.

Hailu et al. (2003) used agent based modeling[11] to assess the effect of 30 repeated auctions on learning and auction efficiency. They stated that while learning may be evident in an auction, the level of competition may be able to combat the effect and thus maintain auction efficiency. In the model, a learning algorithm which enforces a direction on bid adjustment based on previous auction outcomes was imposed[12]. They found that auction efficiency does in fact erode over repeated auction rounds when learning is accounted for.

Hailu et al. (2003) explains that when learning occurs, participants with previously successful bids or feedback exploit this information by experimenting with bid mark-ups. Through the process of learning and adjustment of bids, the accepted bidders mark their bids up to where they equate the first unsuccessful bid. This results in decreasing environmental benefits being procured per budgetary outlay over each auction round.

Latacz-Lohmann & Schilizzi (2007) also encountered learning in an auction experiment using human subjects. The result of learning over three auction periods was also a decrease in auction efficiency due to increasing rates of rent extraction. Learning was also documented in the CRP program, which resulted in individuals just inside of acceptance increasing their bids to equate the cut-off bid price (Reichelderfer and Boggess, 1988).

In order to prevent this characteristic of repeated auctions, Hailu et al. (2003) suggests altering the rules (e.g. imposing reserve price, adjusting reserve price) of the auctions slightly between rounds or after a certain number of rounds in order to maintain a sense of information asymmetry between the bidders and the auctioneer. This will limit the amount for time infra-marginal bids to converge to the margin or reserve price.

However, the only documentation for learning in the literature has been in reference to discriminatory price auctions. This payment method encourages rent seeking

[11] An agent based model is a computer based model simulating the actions and interactions of individuals or collectives and assessing the effects on the system as a whole

[12] Learning algorithm developed by Roth & Erev and Erev & Roth; it is widely accepted in psychology literature (Hailu & Schilizzi). The learning rule is as follows (as written in Hailu & Schilizzi):

1) If an agent wins a contract in the previous auction, it will maintain the same bid or increment it by 10%
2) If an agent loses in the previous auction, it will maintain the same bid or lower it by 10%
3) Bids do not go below own opportunity costs

in the first place, and repeated auctions create an environment where the rate of rent seeking can increase over time with few ramifications. Although not yet supported by literature, it is possible that uniform pricing would be more robust under repeated auction rounds. There is no incentive for the last individual selected to increase their bid to equate the first unsuccessful bid, since any increase in a bid could compromise the chance of winning an auction.

1.5 Other Considerations

While the design of the auction itself is very important to efficiency, there are other matters that affect auction efficiency that lie outside of the design. Acts of collusion or moral hazard (where an individual who is not subject to risk of being caught may behave differently than they would if they were fully subject to the risk of being caught) are social considerations that can greatly erode the efficiency of the auction. Like most individuals, producers are profit maximizing entities and are willing to act in a way that does in fact maximize profit even in the auction framework.

Collusion in a conservation auction occurs when participants in an auction are able to communicate with each other, learn each other's valuation, speculate on the auctioneers' valuation, and subsequently fix the price that winners would receive to extract as much profit as possible. When a higher percentage of the budget is going towards giving profit, less EG&S can be purchased and ultimately the cost effectiveness of the auction is compromised.

Collusion is especially a concern for conservation auctions because the bidders are not monitored during the bid construction process and are therefore liable to consult with neighbours and other participants. The friendly relationship between neighbours also establishes a level of trust between participants. Trust can be an important factor in collusion to ensure that the other party will follow through with discussed obligations.

Unfortunately, little can be done to prevent social networking and collusion in the auction unless there is strict monitoring, which is not a desirable solution. However, methods to address rent seeking can be applied in order to reduce the negative effect of collusion on efficiency. Auction rules could be altered between auction sign-ups. This will limit the extent previous information can be used to collude for the next round. Reserve prices will also control for extremely high bids.

Moral hazard is the event when a party does not follow through with contracted obligations. In the case of conservation auctions, moral hazard would occur if a participant was accepted in the auction to provide EG&S, received a payment, and later decided not to follow through with the project and did not provide any EG&S. The motivation for moral hazard is that when no project is undertaken, the auction payment is 100% profit since no costs would be incurred.

To address moral hazard, one method is to provide a group contract to a given set of producers to provide EG&S and provide individual bonus payments if a group EG&S target is achieved; if the target is not achieved there will be no bonus payment. Therefore if a member of the group decides that they do not wish to continue with the project, the group has a smaller chance of achieving the target and receiving a bonus payment. Self-

regulation of the group would then be imposed because there is incentive to make sure everyone abides by their contract.

1.6 Auctions in Manitoba

In order to address some of the environmental issues transpiring in Manitoba, there has been some investigation of MBIs; conservation auctions are an option that is being explored. In response, a series of workshops were developed in order to provide awareness to relevant stakeholders (e.g. government, producers, non-government organizations, industry), and to acquire feedback on their suitability in Manitoba.

1.7 Purpose and Objectives

The purpose of the series of workshops held March 8 to March 19, 2010 was to create awareness of the conservation auction process and how it applies to the provision of EG&S by producers in Manitoba; moreover it was an opportunity to receive feedback on the applicability of auctions in Manitoba.

The objectives for this series of workshops are as follows:

- Determine the opinions of relevant stakeholders in regards to the relevance of auctions in Manitoba
- Investigate auction design features such as payment type, competition, and communication
- Conduct light economic analysis of the results of the auction simulations used in the workshops as education

2 Workshop Results - Overall Statistics

In total 13 workshops were completed between the dates of March 8, 2010 and March 19, 2010. Originally 15 sessions were scheduled; however due to limited attendance some sessions were combined. Seven of the 13 workshops were held in Winnipeg in the Animal Industry Building, five were in Brandon in the Agriculture Centre, and one was held in Portage la Prairie in the Provincial building. Those who were in attendance had varying occupations: government employees, members of non-government organizations (e.g. conservation districts, Ducks Unlimited Canada, Delta Waterfowl, Manitoba Habitat Heritage Corporation, etc), students, professors, and producers. An attempt was made to have each group homogenous in terms of occupation; however this was not always possible because of extenuating circumstances and scheduling. Originally, the auction simulations were designed to include 12 participants. However, again due to extenuating circumstances, sessions were not filled to the required 12, so adjustments were made. The number of participants varied from 6 to 12 (Table 1). As a result of the varying number of participants, an attempt was made to amend the available auction budget to reflect the same level of competition as in the case of 12 participants. Since the final numbers per session were usually finalized the day of, it was

difficult to accurately determine the budget while maintaining the integrity of the supply curve. Therefore, the original budget[13] based on 12 participants was used for most of the sessions (see Table 1).

Four treatments were used during the series of workshops based upon those conducted at the University of Alberta. They considered the payment structure, discriminatory and uniform; and ranking strategies, maximizing coverage (the number of wetland acres) bought in the auction or maximizing kg of phosphorus abated in the auction. Since environmental information, like phosphorus abatement, is not easily acquired; we would like to see if wetland acreage, a metric more readily available, could act as a substitute. Therefore the treatments were maximize coverage discriminatory (MCD), maximize coverage uniform (MCU), maximize phosphorus abated discriminatory (MPD), and maximize phosphorus abated uniform (MPU). Overall we had the following repititions: 4 MCU, 3 MCD, 3 MPU, and 3 MPD. An additional MCU treatment was run in order to fill the odd spot. It was also selected to appeal to the producer participants in that session. Otherwise, all other sessions were predetermined and did not relate to the type of group participating.

Table 1 Treatments log for Manitoba workshops from March 8, 2010 to March 19, 2010

Date	Location	Treatment*	Participants	Budget ($)
March 8-pm	Winnipeg	MCU_1	12	62,218.65
March 9-am	Winnipeg	MCD_1	9	62,218.65
March 9-pm	Winnipeg	MCD_2	9	62,218.65
March 10-am	Winnipeg	MCU_2	8	45,377.23
March 10-pm	Winnipeg	MPU_1	11	62,218.65
March 15-am	Winnipeg	MCD_3	8	29,860.80
March 15-pm	Winnipeg	MPU_2	7	44,772.15
March 16-am	Brandon	MCU_3	9	62,218.65
March 16-pm	Brandon	MPD_1	7	62,218.65
March 17 pm	Portage la Prairie	MPU_3	8	62,218.65
March 18-am	Brandon	MPD_2	6	62,218.65
March 18-pm	Brandon	MPD_3	6	62,218.65
March 19 am	Brandon	MCU_4	9	62,218.65

*MC – Maximize Coverage
MP – Maximize phosphorus abatement
U – Uniform payments
D – Discriminatory payments
- Repetition

Each auction simulation session consisted of 10 independent auction rounds in order to observe the evolution of bidding behavior over time. It has been found that real conservation auctions have been run more than once for the same set of goods (e.g. CRP has operational for over 20 years). Because of these repeated sign-ups there is potential for bidders to learn and subsequently extract more profit from the auction (as described in Section 1.4.5). Therefore it is important to understand how bids evolve with repeated signups.

[13] The budget for 12 participants was $62,218.65. This was calculated based on the former National Farm Stewardship Payment structure where 50% of wetland restoration costs would be covered. Costs were therefore summed for all 12 model farms and divided in half and to assume that this would be the amount of money the government would be willing to pay for wetland restoration.

3 Economic Analysis

As these workshops were being used primarily as a tool to provide awareness and receive feedback from stakeholders, the results of the auctions most likely do not reflect real behaviour; *therefore caution and scrutiny should be used when interpreting the results*. The following bullet points outline issues contributing to errors that occurred:

- Participants were allowed to communicate. Communication was mostly used as a tool to aide each other through the exercise. Collusive behaviour was often discussed, however it was only achieved once in one period.
- The incentive mechanism chosen may have been weak in inducing participants to place rational and serious bids. The incentive was a $50 gift card at a retail store or restaurant. Those who displayed rational choices were entered into a draw to win a gift card[14]. Incentives were provided for select participants (e.g. non-government employees), and it was apparent that the lack of incentives resulted in "playing a game". For those participants who were eligible, the incentive may not have been sufficient.
- Throughout the workshops many participants commented that the auctions lack realism and therefore may not have taken the simulations seriously.
- Inconsistent number of participants.
- Different budget for some sessions.

Despite the discrepancies listed above, lessons may still be learned from the results. Tables 2 and 3 display descriptive statistics from the simulation auctions. Table 2 shows the mean levels of the budget spent, summation of costs of winners, rent paid, number of farmers receiving a payment, and number of wetlands acres and kg of phosphorus abated. The mean is a general statistic of comparison across the entire 10 rounds of each session. It does not take into account the fluctuations that would occur over the rounds.

The average range of wetland acres achieved under the auction was from 17.00 to 38.77 acres and the average range of kg of P abated was between 170.80 to 228.80 kg P as seen in Table 2. The highest average level of wetland acres was acquired in MCU1 with 38.77 acres which equates to 220 kg P abated with a budget of $62,218.65. The highest average level of kg P abated was found in MCD1 treatment with 229 kg P which equated to 34.36 wetland acres also with a budget of $62,218.65. Generally, when the budget was higher (e.g. $62,218.65) more wetland acres and kg P abated were acquired than when the budget was lower.

The level of rent seeking, or payments made above costs, was dependant both on the available budget as well as the number of participants in the auction[15]. The highest average amount of rent seeking was found in MPU3 with $23,532.77 followed by MPD2 with $21,958.19. This translates to roughly 48% and 44% of the budget going towards rent as seen in Table 2. MPU3 being a uniform treatment, one may assume that there were higher market prices in this treatment than other treatments. In fact, in this session there was collusion to raise the market price among the participants in Round 6. MPD2

[14] Two gift cards were available in 2 sessions because of the cancellations
[15] Figures comparing budget and rent over all rounds are provided in the Appendix

had very limited competition with only 6 registered participants with the full $62,218.65 budget. In this case participants were able to learn from auction results in each round and push their bids up continuously until they were not accepted. However, in the second repetition with only 6 participants, the average level of rent seeking was not as high. This may be attributed to the type of participants in each group. The group in MPD2 consisted of NGOs and two producers, while MPD3 was comprised of government and three producers. Therefore, demographics may have an effect as well as individual characteristics.

In the sessions MCU1 and MCU4, there was a negative average level of rent seeking of $-5,603.91 and $-2,125.57 respectively. This indicates that some individuals were bidding below their costs and would subsequently receive a payment that was below their costs. There is no direct reason for this occurrence other than the individuals might not have understood the auction concept, or they were testing the auction mechanism. Also the MCU1 session was comprised of MAFRI employees who were not eligible for the gift card incentive, which may have contributed to the negative rent figure because participants were behaving as if playing a game as opposed to a real auction with financial consequences.

In Table 2 you can see the percentage of the budget spent in the auction. Since the auction is designed to not pay out above the fixed budget, the budget is never fully exhausted. Based on the results summarized, there does not appear to be a direct link between the budget spent and the % rent with the available budget or number of participants over the entire 10 rounds of each. There may be more specific effects when considering each round of each session.

Table 2 Summary of simulation auction budgets, the percent of budget spent and the percentage of the budget that went towards economic rent

Treatment	Participants	Budget ($)	% Budget Spent	% Rent
MCD1	9	62,218.65	85.08	8.62
MCD2	9	62,218.65	75.34	2.48
MCD3	8	29,860.80	66.92	4.53
MCU1	12	62,218.65	85.22	-10.57
MCU2	8	45,377.23	80.60	20.10
MCU3	9	62,218.65	84.76	12.67
MCU4	9	62,218.65	70.16	-4.87
MPD1	7	62,218.65	83.23	14.12
MPD2	6	62,218.65	80.14	44.04
MPD3	6	62,218.65	81.11	4.95
MPU1	11	62,218.65	89.55	21.56
MPU2	7	44,772.15	83.79	19.32
MPU3	8	62,218.65	79.40	47.64

From the data gathered, the revealed supply curves could be constructed for every session and round to see if the auction can be used as a cost discovery mechanism. The revealed supply curve also gives an indication of the overall cost effectiveness and success of the auction. Figures 1 and 2 represent two extreme cases of the effectiveness of auction results. Each figure compares the real supply curve with the revealed supply

curve from auction round 1, 5, and 10. By looking at the progression of the supply curve over the rounds we can observe the occurrence of learning or not. Figure 1 was from the results of MCD1 held on March 9, 2010; there were 9 participants and the budget was $62,218.65. As you can see in the figure the auction was fairly successful in revealing the real supply curve given that the curves are very close to each other. There is evidence of some rent seeking, but it is fairly minimal compared to other auctions. Figure 2 was from the results of MPD2 held on March 18, 2010; there were 6 participants and the budget was also $62,218.65. This figure represents the extreme case of rent seeking which is represented by the large gap between the real supply curve and the revealed curves. The revealed supply curve is also increasing over the rounds (e.g. revealed supply from round 10 is above the revealed supply from round 1) indicating that participants are raising their bids after each round. This gives clear evidence of learning on behalf of the participants: participants would raise their bids, and based on their acceptance or rejection the individual would adjust his or her bid accordingly to either increase and extract more rent, or decrease to be accepted.

Comparing these two figures can give light to the effect competition can have on the outcomes of an auction[16]. When there were 9 participants (Figure 1) the curves are fairly close, this indicates that there was little room for rent seeking most likely because increasing a bid would result in the rejection of an offer. With 6 participants (Figure 2) there was more room to increase bids and still be accepted. This is because there was relatively more money on the table with only 6 bidders instead if 9; i.e. less competition. As a result of less competition, more money is being paid to rent instead of purchasing EG&S, which can be seen in Tables 2 and 3. Therefore, it is not enough to have a high budget for the purchase of EG&S, there must also be an ample amount of competition to ensure that the budget is being spent wisely.

[16] Despite the scales being different (e.g. acres v. kg P) the two figures can still be compared on a relative basis in terms of supply curve revelation

Table 3 Descriptive statistics from auction simulations

Treatment	Participants	Budget ($)		Budget Spent ($)	Total Costs ($)	Total Rent ($)	# Bids Accepted	# Wetland Acres	# kg P
MCD1	9	62,218.65	Mean	52937.40	48373.73	4563.67	5.20	34.36	228.80
			Std. Deviation	3877.78	4038.96	3626.92	1.03	2.50	32.09
MCD2	9	62,218.65	Mean	46872.90	45710.85	1162.05	4.50	31.38	209.60
			Std. Deviation	11930.81	11263.89	5250.76	1.08	6.48	32.51
MCD3	8	29,860.80	Mean	19983.63	19077.86	905.76	1.60	14.42	97.60
			Std. Deviation	4557.72	5449.58	1985.34	0.52	3.63	32.26
MCU1	12	62,218.65	Mean	53022.34	58625.25	-5602.91	4.30	38.77	219.90
			Std. Deviation	6420.62	8178.01	7268.92	1.42	3.85	52.78
MCU2	8	45,377.23	Mean	36574.21	29222.27	7351.94	3.50	21.95	144.80
			Std. Deviation	5992.78	5253.00	1336.15	0.53	4.13	31.73
MCU3	9	62,218.65	Mean	52738.66	46057.68	6680.98	4.20	33.84	210.70
			Std. Deviation	7779.63	7870.69	6154.83	0.63	4.67	31.10
MCU4	9	62,218.65	Mean	43649.66	45775.24	-2125.57	3.20	31.58	181.80
			Std. Deviation	10952.98	14722.79	4974.05	0.63	7.60	27.45
MPD1	7	62,218.65	Mean	51787.22	44475.40	7311.81	4.80	29.81	221.10
			Std. Deviation	6304.47	8879.01	8621.11	0.63	5.74	30.08
MPD2	6	62,218.65	Mean	49861.40	27903.21	21958.19	3.70	20.22	137.60
			Std. Deviation	6764.56	2244.13	6176.79	0.48	1.59	16.42
MPD3	6	62,218.65	Mean	50467.07	47968.65	2498.42	3.50	30.62	170.80
			Std. Deviation	6981.97	16929.88	12106.02	0.85	9.12	30.01
MPU1	11	62,218.65	Mean	55716.16	43702.22	12013.94	6.70	29.02	234.70
			Std. Deviation	6854.46	4490.71	2716.97	0.48	3.08	27.80
MPU2	7	44,772.15	Mean	37513.42	30264.06	7249.37	2.90	20.35	165.70
			Std. Deviation	9232.47	6133.62	3455.62	0.32	5.32	32.70
MPU3	8	62,218.65	Mean	49400.68	25867.91	23532.77	4.10	17.00	131.80
			Std. Deviation	7096.58	3778.15	5030.70	0.74	3.14	18.24

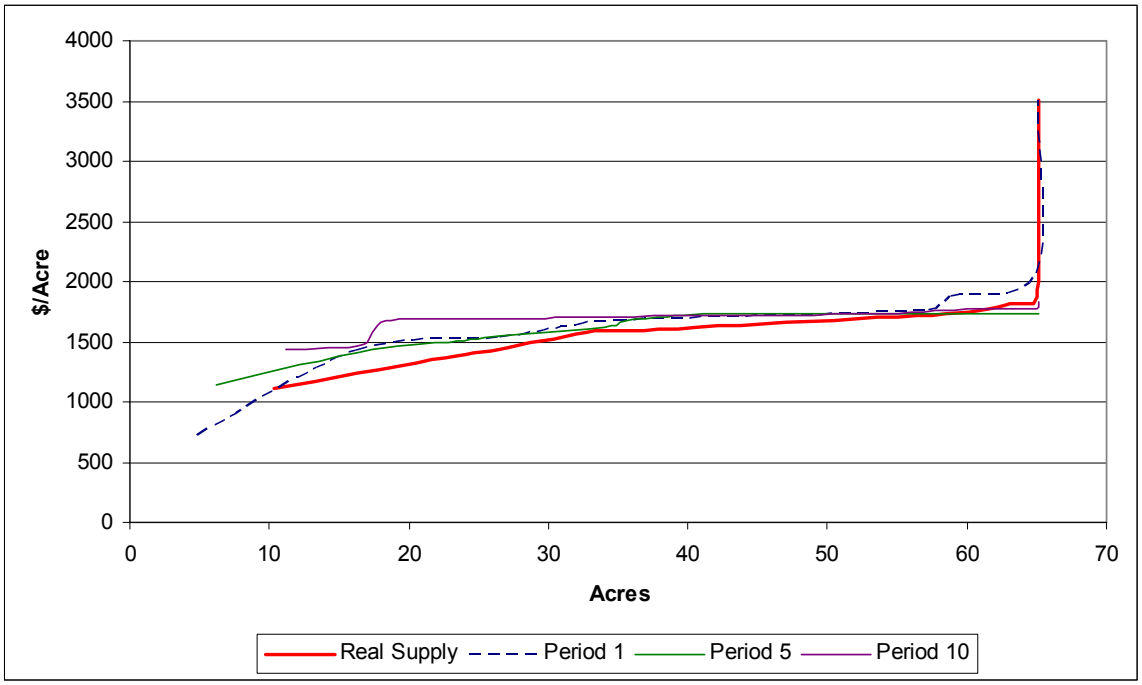

Figure 1 Real supply curve compared with revealed supply curves based on bidding in Round 1, 5, and 10 for March 9 (am), MCD1 with 9 participants and $62,218.65 budget

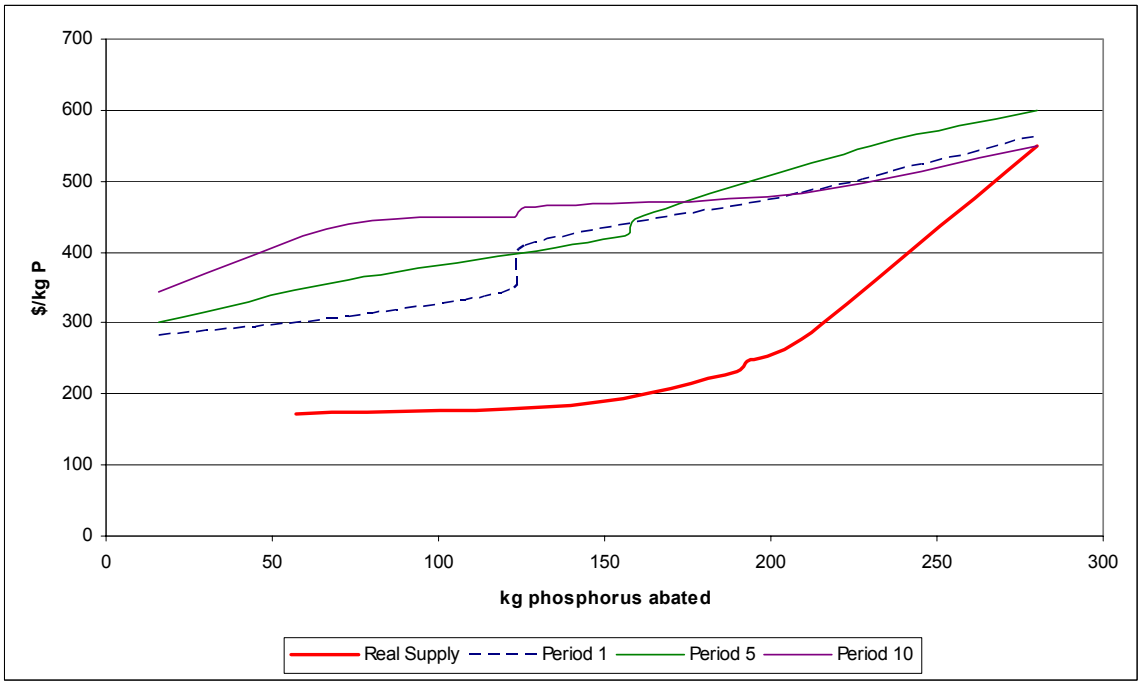

Figure 2 Real supply curve compared with revealed supply curves based on bidding in Round 1, 5, and 10 for March 18 (am), MP2 with 6 participants and $62,218.65 budget.

4 Survey Results

At the conclusion of every workshop, participants were asked to complete an anonymous survey regarding their opinion on the workshop itself, as well as on conservation auctions and their use in Manitoba for EG&S contracts. The survey has been provided in the Appendix. While the survey was provided to all participants, some questions were directed at producers because of their vital role in the provision of EG&S.

The responses were copied into an electronic spreadsheet and analyzed using SPSS 15.0 statistics software. Overall there were 108 responses to the survey. Not every question was provided with an answer, especially those questions with multiple components (e.g. Q 8b and Q 13a). There were 6 occupation types represented in the workshops: Government (Manitoba and federal), NGO, producers, professors, students, and industry (see Table 4). Some individuals, who were not producers, stated that they did have a farm operation. These individuals were not taken into account when quantifying producer responses since they do not farm full-time.

Table 4 Summary of workshop participant demographics

Gender	Occupation	Production Type	Count
Female	Government		22
		crop	1
	Industry		1
	NGO		4
		livestock	2
	Producer	livestock	1
	Professor		3
	Student		4
		livestock	1
Male	Government		22
		crop	2
		livestock	3
	Industry	livestock	1
	NGO		8
		livestock	2
		mixed	1
	Producer		2
		crop	4
		livestock	10
		mixed	8
	Professor		3
	Student		1

The first 6 questions of the survey assessed opinions of the workshops themselves. The majority of participants enjoyed participating in the workshops and felt that they learned something. However, some expressed that there was room for improvement in the future, especially to make the workshops more realistic. Some

suggested holding more workshops to work more with producers to increase extension efforts to educate on the auction process, as well as assist with cost determination.

The second portion of the survey, Q7-Q13, pertained to environmental programming in Manitoba.

Q.7 – Do you currently participate in an environmental program? Yes/No; If yes, what program are you a part of and why did you choose to participate?

The majority of producers who participated in the workshops currently participate in environmental programming, accounting for 88%. The types of programs are as follows: Environmental Farm Plan (EFP), Enhanced Environmental Farm Plan, Economic Partnership Agreement (EPA), Environmental Farm Action Program (EFAP), Beneficial Management Practices, conservation agreements, conservation agreements specifically with Manitoba Habitat Heritage Corporation (MHHC), and the Wetland Restoration Incentive Program (WRIP), or they were unsure. Environmental or conservation concerns were the primary reason for participating in these programs as well as being eligible for payments.

Q.8a – Would you participate in an auction for any practice if it was offered?

When asked if they would participate in an auction for any practice, 60% of producers questioned would participate, 32% would not participate, and 6% were unsure. The main reasons for participating were not listed (e.g. no response) however, many stated that they would participate as a learning experience (both in the auction process as well as a chance to evaluate costs), or because there is potential to earn a profit. The main reason for not participating was because the auction was not seen as a fair mechanism for producers; either it would encourage competition and put neighbour against neighbour or it would not benefit those who are conservationally minded but those who have had bad practices in the past and that are now being paid to clean up their act. The responses from the other occupation groups were not considered as this question was directed for the opinion of producers.

Q.8b – If you answered yes above [8a], would you participate in an auction for any of the following BMPs: Forage conversion, zero tillage, holding pond installation, wetland restoration, wetland conservation, and other?

The preferred practice to be used in the auction, among all participants who responded to this question, was wetland conservation with 45.3% of "Yes" votes (Table 5). This falls in line with the general sentiments of most participants in the workshops, that conservation activities should be considered first for any environmental program instead of restoration, or other "band-aid solutions". The next preferred practice was wetland restoration at 37.7%. The only practice that individuals seemed to be opposed to was zero tillage with 18% of respondents voting "No". Other practices that were recognized were afforestation, winter-site management, habitat protection, native prairie grassland restoration/conservation, riparian area management, forest land management, phytoremediation, grazing management, grassed runway, variable rate precision farming,

intercropping, and carbon sequestration. Two respondents also stated that they would participate in any practice.

Table 5 Summary of all responses from Q.8b, the preferred BMP practices to be delivered in an auction

Practice	Response	Count	Percent
Forage Conversion	No	9	8.5%
	Yes	36	34.0%
Zero Till	No	18	17.0%
	Yes	27	25.5%
Holding Pond Installation	No	10	9.4%
	Yes	36	34.0%
Wetland Restoration	No	7	6.6%
	Yes	40	37.7%
Wetland Conservation	No	3	2.8%
	Unsure	1	0.9%
	Yes	48	45.3%

Among producers, the preferred practice to deliver an auction for would be wetland conservation, with 48% (Table 6). This was followed by forage conversion and holding pond installation with 36% and wetland restoration with 32%. Like the overall statistics, the highest percentage of "No" votes was associated with zero tillage. This may be because this is already a common practice being implemented by producers or an indication that the practice of zero till may not have the same benefits as other practices. One person stated that they would require more information in order to make a decision. Wetland restoration is less preferred by producers than by the entire amalgamation of participants because there are fewer benefits and more costs of restoration to producers than to other groups. There is also a stigma around wetlands in agriculture. This has been a challenge for policy makers in Manitoba who realize that wetlands have the ability to provide much EG&S.

Table 6 Summary of producer responses from Q.8b, preferred BMP practices to be delivered in an auction

Practice	Response	Count	Percent
Forage conversion	No	1	4.0%
	Yes	9	36.0%
Zero Tillage	No	5	20.0%
	Yes	6	24.0%
Holding pond installation	Yes	9	36.0%
Wetland Restoration	No	2	8.0%
	Yes	8	32.0%
Wetland Conservation	No	1	4.0%
	Yes	12	48.0%

Q.9 – In general, would you know your costs (farm parameters) associated with any of the abovementioned practices [from 8b]?

A concern that was brought up in the workshops was that producers would not participate in an auction because they would not know their costs and therefore could not structure bids appropriately. However 80% of producers stated that they would know their costs for the BMPs that they had chosen in question 8b. Some participants stated on the questionnaire that it would depend on the particular practice being considered. This result is encouraging since there has been speculation if producers would in fact be able to estimate their costs.

Q.10 – Do you think that an auction would be an effective tool to deliver incentive programs in Manitoba to support agricultural producers in reducing identified environmental risks and improving the management of agricultural land?

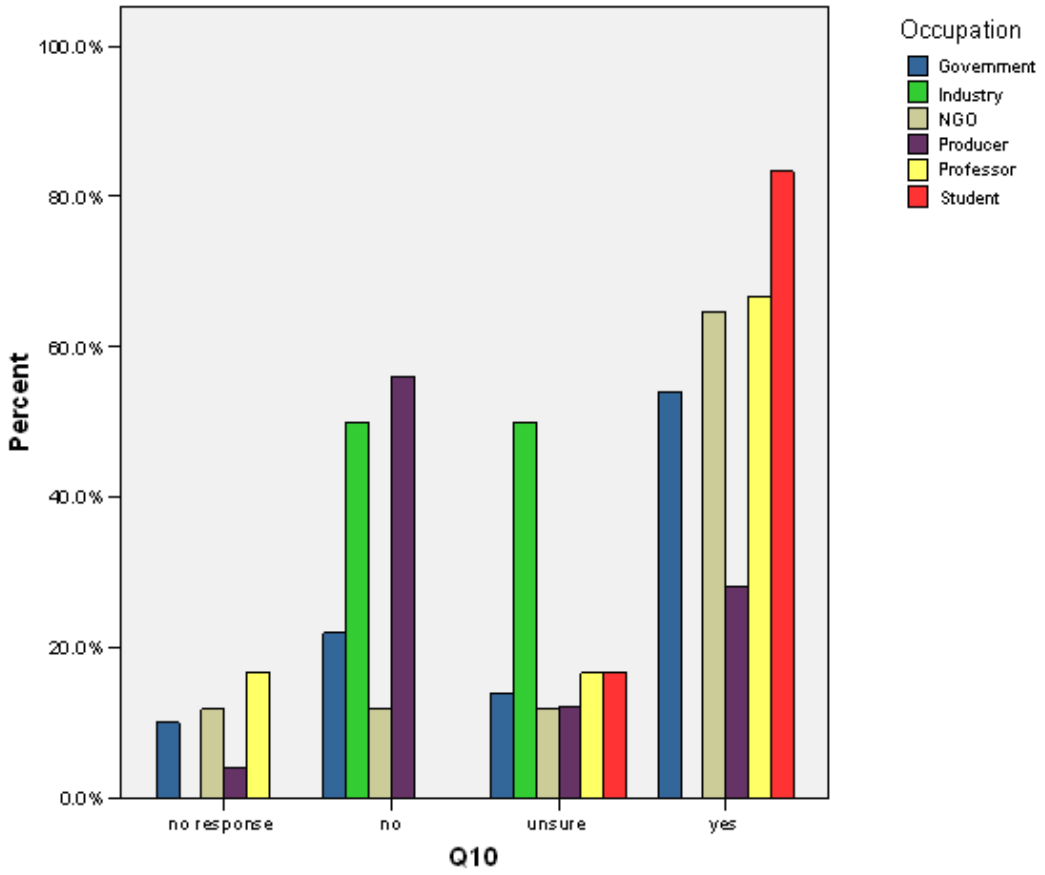

Figure 3 Breakdown of responses by occupation for Q.10 asking "Do you think that an auction would be an effective tool to deliver incentive programs in Manitoba to support agricultural producers in reducing identified environmental risks and improving the management of agricultural land?"

The statistics show that 50.9% of the respondents stated "Yes", it would be an effective tool; while 26.4% said "No" it would not be an effective tool; 14.2% were unsure; and 8.5% gave no response. Breaking down the responses by occupation type, there is a clear indication that only certain groups are in favour of the auction mechanism (Figure 3). Government, NGOs, students, and professors were all in favour of the mechanism by more than 50%. The reasons of being in favour of the program were that it would provide benefits to producers, it's cost effective, it can act as a cost discovery mechanism, and it would be a good mechanism with extension. Producers had a very high "No" response at 56%. A majority of the respondents felt that it would generally be a bad program for producers because it would be unfair, and they did not like the competitive nature of auctions. However, some did recognize that there was potential for monetary and environmental benefits arising from the auction. There was a 50:50 split between participants representing Industry, however there were only 2 respondents, therefore this result may not be a reliable representation.

Q.11 – Do you think that an auction would be an effective tool for providing incentives to induce more restoration of wetlands?

Question 10 was then re-worded to specifically address the applicability of the conservation auction tool with wetland restoration. There was a strong positive response with 62.3% of the votes indicating "Yes" for a wetland restoration auction (Figure 4). It is interesting that there were more "Yes" votes in the case of wetland restoration, since wetland restoration was generally not a preferable practice among the participants.

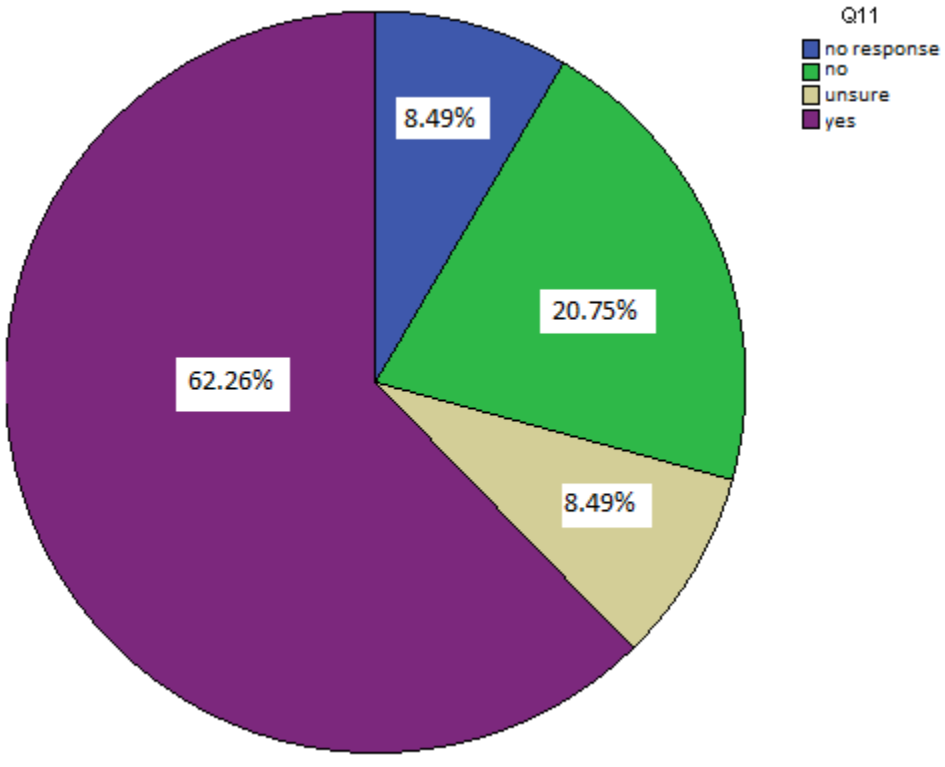

Figure 4 Breakdown of responses from all participants for Q.11 asking "Do you think that an auction would be an effective tool for providing incentives to induce more restoration of wetlands?"

Taking into consideration the breakdown of the responses by occupation, you can see that the increase in yes responses was actually from more producers where 56% of producers answered "Yes" (Figure 5). This is a very interesting finding considering that previous answers suggest that producers were A) not in favour of auctions, and B) not in favour of wetland restoration. This result may be an artifact of the workshop itself since the simulations were focused on wetland restoration. Generally most occupations were highly in favour of an auction for wetland restoration, especially students and professors with 83.3% and NGOs with 70.6% (Figure 5). Similar reasons for votes were expressed in this question as in Q.10 (e.g. auctions are unfair and competitive, but there is potential for the cost effective procurement of EG&S).

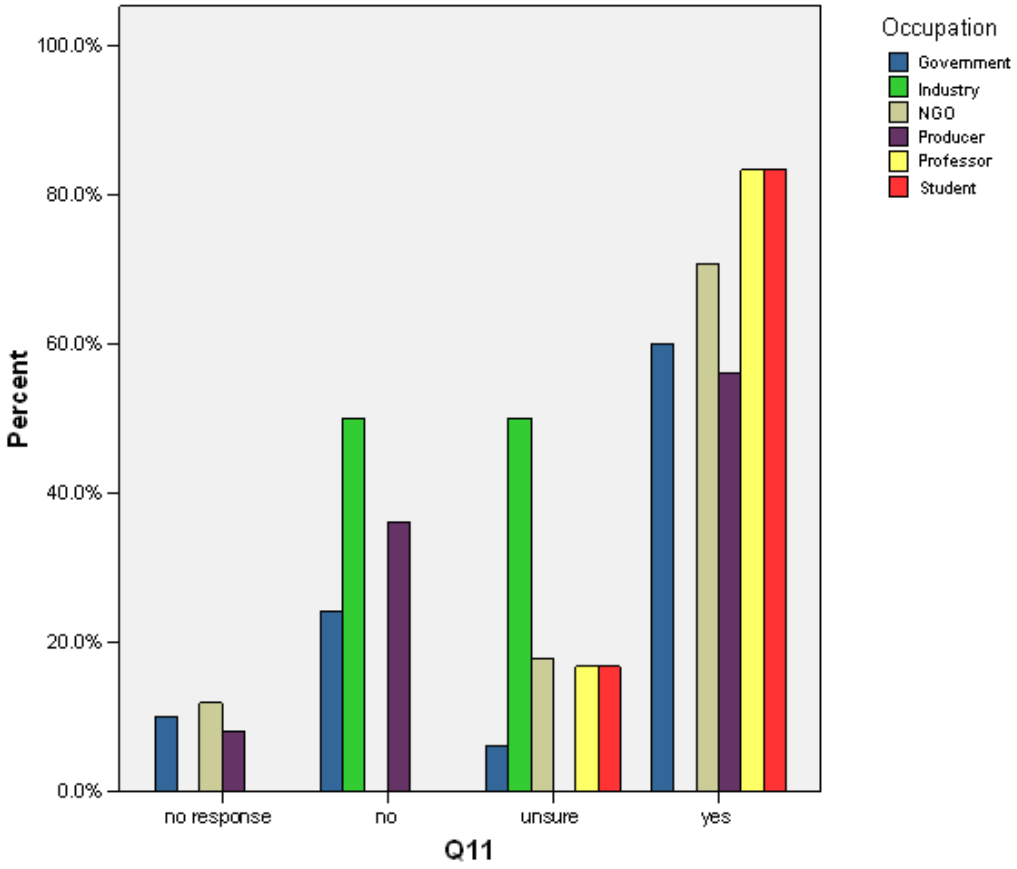

Figure 5 Breakdown of responses by occupation for Q.11.

Q.12 – Would you participate in an actual auction aimed at wetland restoration if it was offered?

This question was also specifically aimed at producers given that they are the demographic that would be providing wetlands through restoration projects on their land. Of the participants in the workshops, 60% indicated that they would not participate in an auction for wetland restoration mostly because they did not have suitable land for restoration projects or their land was not drained. The 36% who said that they would participate stated that it was for private (e.g. land already too wet for production, profit from payment) and environmental benefits. The remaining 4 % were unsure, and would require further information and questioned how restoration would affect their operation.

Q.13 – A) What contract length would you agree to if you were going to restore wetlands: annual, 5 years, 10 years, 20 years, permanent, other? B) What is the maximum contract length you would consider?

The responses from all participants are presented in Figure 6. Most people who completed this question preferred a 5 year contract for wetland restoration (with 38.7% voting "Yes"). Based on anecdotal observation of this question, 5 years is a close estimate with one crop rotation. It was also mentioned that beyond a 5 year time period it would become increasingly difficult to estimate costs and predict the market. Under a 5 year contract there is still some flexibility, whereas anything longer might impose regret if the markets swing in favour of the producer (e.g. relevant commodity markets). Ten years was the next preferred contract length with about 35%. Other contract lengths that could be agreed to were 3 or 4 years, which reflects a crop rotation.

Considering only producers responses, the preferred contract length was actually 10 years with 40% voting "Yes" (Figure 7). This may be an indication that a longer contract may provide more stability if the payment was adequate to cover that length of time. As would be expected, permanent contracts were strongly disliked by producers with 32% stating "No". However, some stated that a permanent conservation easement would have potential for some land that has permanent wetlands because it would be difficult and expensive to drain. Many stated in the survey as well as in discussion that the contract length would be dependent on the level of payment being offered.

It should be noted that this question had a lower response rate, or the question was not completed as expected so the statistics may not accurately reflect the opinions of the participants. It is felt that individuals would select the contract length that they would like (i.e. giving "Yes" votes) however, "No" votes were not always provided. It may be argued that a "No response" could be considered "No" but it may not be appropriate to make such assumptions here.

Part B of Q.13 was included to determine the maximum contract length that a participant would feel comfortable signing as opposed to the preferred contract length in part A. Again, the response rate was lower for this question; therefore the statistics may not accurately reflect the participants' opinions (Figure 8). Based on all of the participants, the maximum contract lengths preferred varied from 3 years to a permanent contract, the most common being 10 years followed by permanent. A majority of the permanent responses were from NGOs, indicating that they would prefer permanent

contracts in order to guarantee the longevity of restoration projects. However, 16% of producers indicated that they would also be willing to consider a permanent contract for wetland restoration.

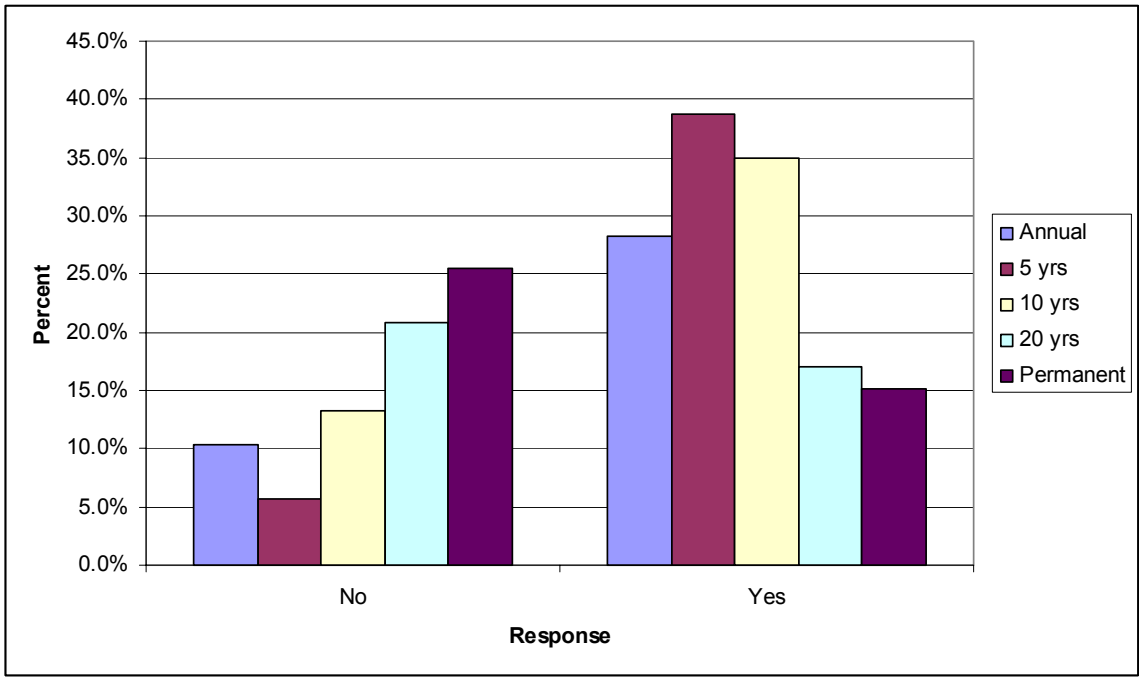

Figure 6 Breakdown of responses from all participants for Q.13a asking "What contract length would you agree to if you were going to restore wetlands?"

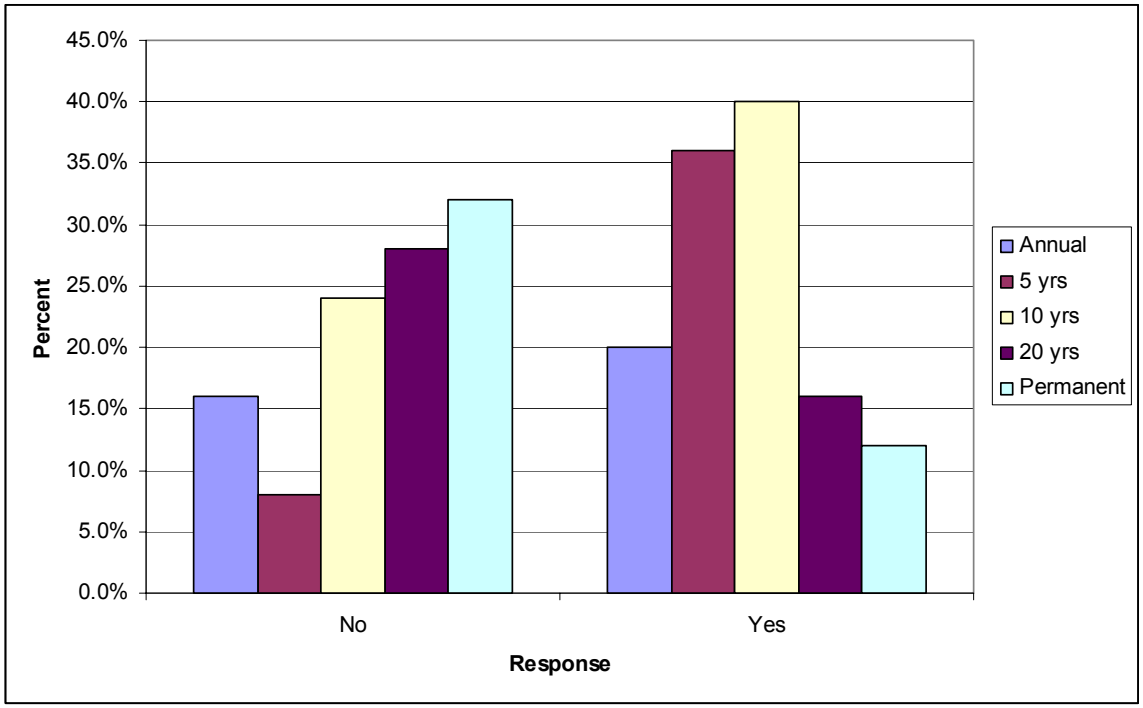

Figure 7 Breakdown from producers for Q.13a

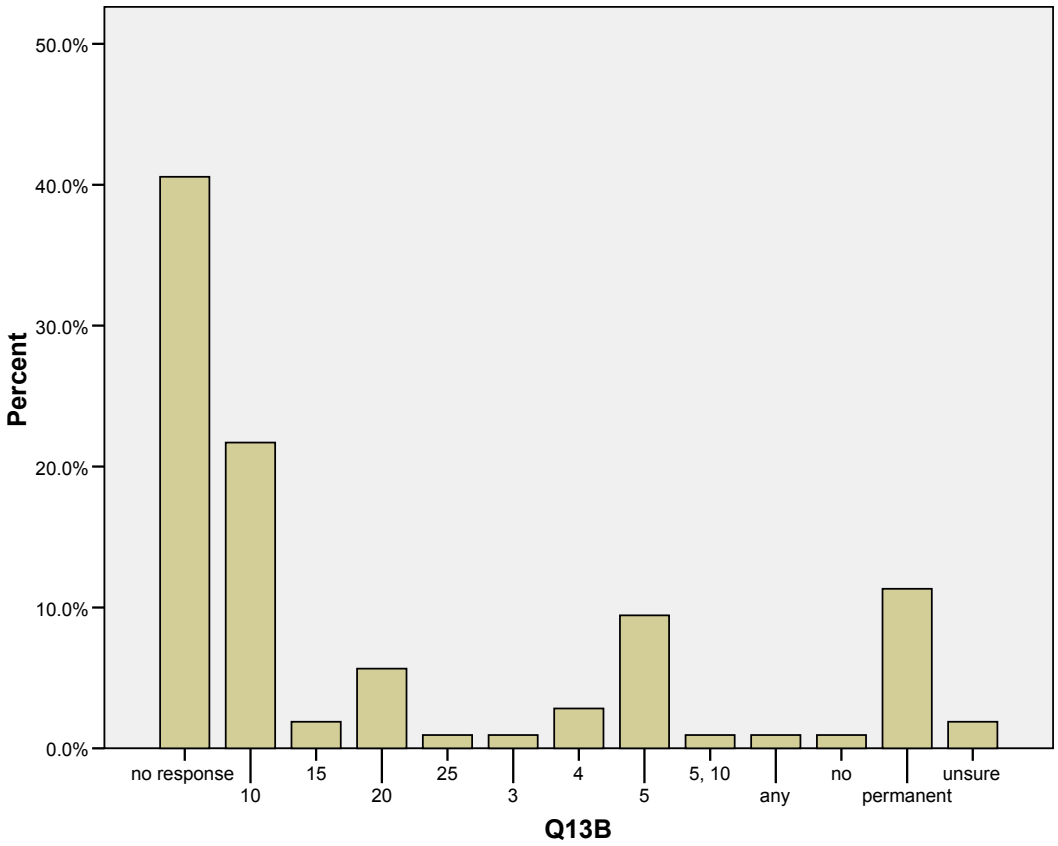

Figure 8 Breakdown of responses from all participants for Q.13b asking "What is the maximum contract length you would consider?"

The final 4 questions were designed to ask questions specifically about opinions of the auction mechanism and design, as the previous questions were based on environmental programming. This way we can have a better idea if the mechanism is appropriate for use in Manitoba. The participants were first primed with a description of the two payment types: "There are two different way to give out payments; *discriminatory* where you are paid what you bid, and *uniform* where everyone receives the same unit price (which is equal to the unit price of the first rejected bid [and] therefore is larger than your own unit price)".

Q.14 – Please circle the payment type that was used in the session you participated in today: Discriminatory, Uniform

This was included to know which payment type the participants had experienced in the workshop. This was announced during the workshop, as well as while the survey was being completed. Generally, individuals were more familiar with discriminatory pricing than uniform, because it is more related to conventional auctions. Typically those experiencing the uniform treatment would have a better grasp of the pricing mechanism as the auction session progressed.

Q.15 – Which payment type would you prefer to receive in a real auction? Why?

Figure 9 illustrates the relationship between what payment type the participants experienced (Q.14) and their subsequent choice of a preferred payment type. The bars indicate the percentage of people choosing the preferred type, uniform or discriminatory, given their experience in a workshop with one payment type. Based on the figure you can see that the experienced payment type does have a slight influence (but not significant) on the choice of the preferred method since there is no clear favoured payment type despite the experience. Participants slightly preferred the payment type they had experienced by about 2% for both uniform and discriminatory.

It is also believed that there may be an emotional aspect to this response. Given the observed discussion by certain individuals, it is possible that if a participant had a farm that was not cost-effective at providing EG&S (i.e. less likely to be accepted in the auction) they would attribute their "poor" performance to the payment type and deem it as unfair; therefore they would choose the other payment type by default.

The reasons for choosing a payment structure were grouped into 5 categories: cost effectiveness, fairness (for producers and/or public), price/profit, not fair (for producers and/or public), and heterogeneity (recognizing that producers are heterogeneous). Cost effectiveness refers to the ability to stretch a budget to purchase more units of EG&S. Fairness had two meanings depending on the pricing method it was being referred to. In the context of discriminatory, fair meant that producers would be paid appropriately according to their costs, instead of some farmers getting a large profit margin just because they are more cost effective. It was also easier to understand, as producers know their end payments. In the context of uniform, fairness meant that all producers were treated equally by being offered the same price, and that it "evens the playing field". Price/profit meant that there was an opportunity to make some extra money from the auction. Not fair also had different meanings depending on the payment type. Not fair under discriminatory meant that you are unable to win as often, while under uniform it referred to high cost producers being paid the same as low cost producers. Heterogeneity was more specific to discriminatory pricing in that it recognizes that producers are not all the same in terms of production or in their ability to provide EG&S.

The frequencies of responses are provided in Table 7. If discriminatory pricing was experienced, the most common reasons for preferring discriminatory were that it was fair and recognized the heterogeneity of producers, while the most common response for preferring uniform was also because it was fair (66.7% of the people choosing uniform had this response). If the uniform treatment was experienced in the workshop, the most common reason for preferring discriminatory was because of heterogeneity, fairness, and cost effectiveness. The most common reason for preferring the uniform payment method was because it was fair.

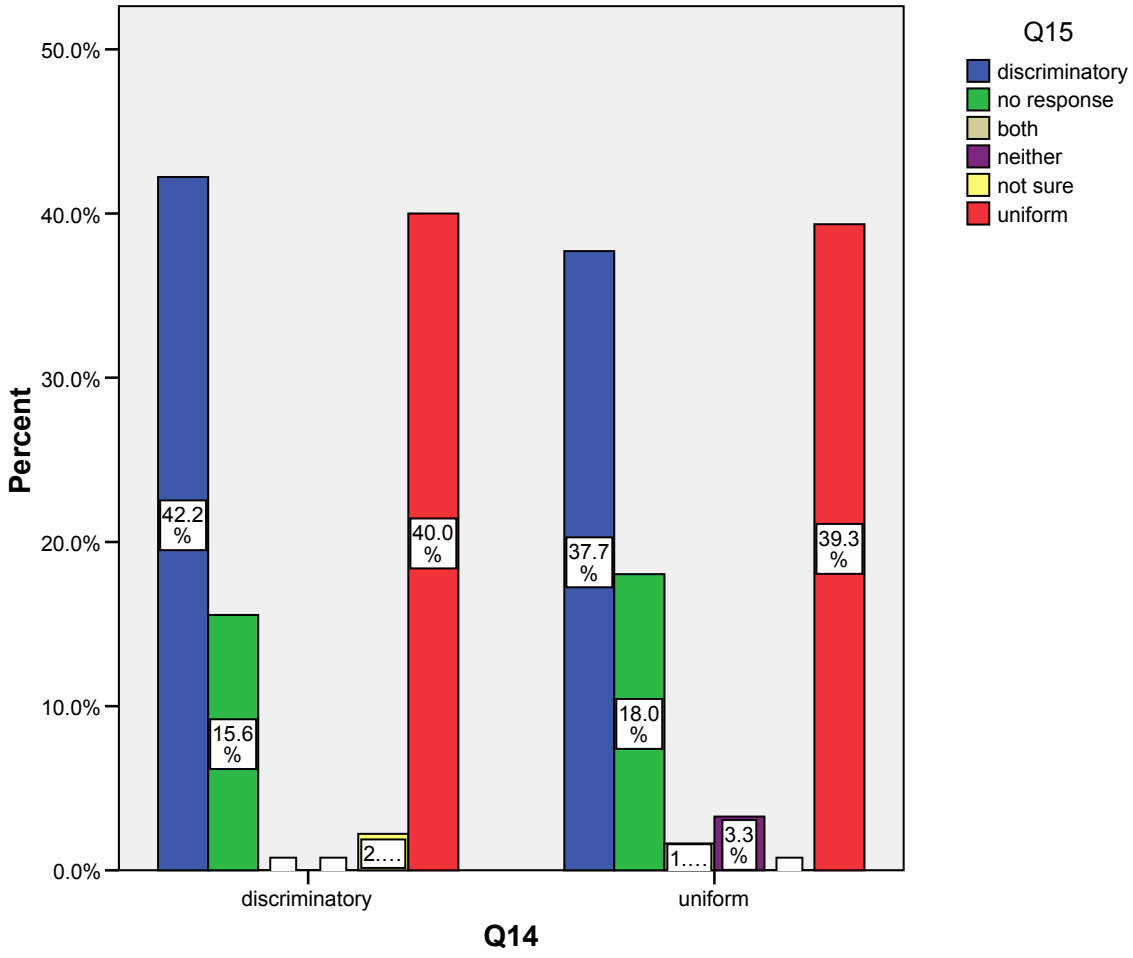

Figure 9 Breakdown of responses by occupation for Q.14 asking "Which payment type would you prefer to receive in a real auction?"

Table 7 Summary of the responses of all participants indicating their preferred payment type and reason given their experience in the workshop

Payment Type Experience	Preferred Payment Choice	Reason	Count	% of certain reason per experienced type
Discriminatory	No response	n/a	5	71.4%
		Heterogeneity	1	14.3%
		Price/profit	1	14.3%
	Discriminatory	No response	6	31.6%
		Cost Effective	2	10.5%
		Fair	5	26.3%
		Heterogeneity	4	21.1%
		Price/profit	2	10.5%
	Not sure	n/a	1	100.0%
	Uniform	No response	4	22.2%
		Fair	12	66.7%
		Price/profit	2	11.1%
Uniform	No response	n/a	11	100.0%
	Both	n/a	1	100.0%
	Discriminatory		4	17.4%
		Cost Effective	5	21.7%
		Fair	5	21.7%
		Heterogeneity	6	26.1%
		Not Fair	2	8.7%
		Price/profit	1	4.3%
	Neither	n/a	2	100.0%
	Uniform	n/a	12	50.0%
		Cost Effective	2	8.3%
		Fair	7	29.2%
		Heterogeneity	1	4.2%
		Not Fair	1	4.2%
		Price/profit	1	4.2%

Based on the opinions in the survey, there is no clear evidence strongly supporting either payment type; it was essentially split.

Q.16 – Do you have a better understanding of the reverse auction mechanism after participating in this workshop?

Overall the participants felt they had learned something from attending the workshop. Based on the discussions during the workshop, many felt the simulations were effective as an introduction to the idea of the conservation auction but would like to have more exposure to the idea to get a better grasp of the concepts.

Q.17 – Do you feel that a reverse auction is a fair mechanism to deliver environmental programs for Manitobans? Why?

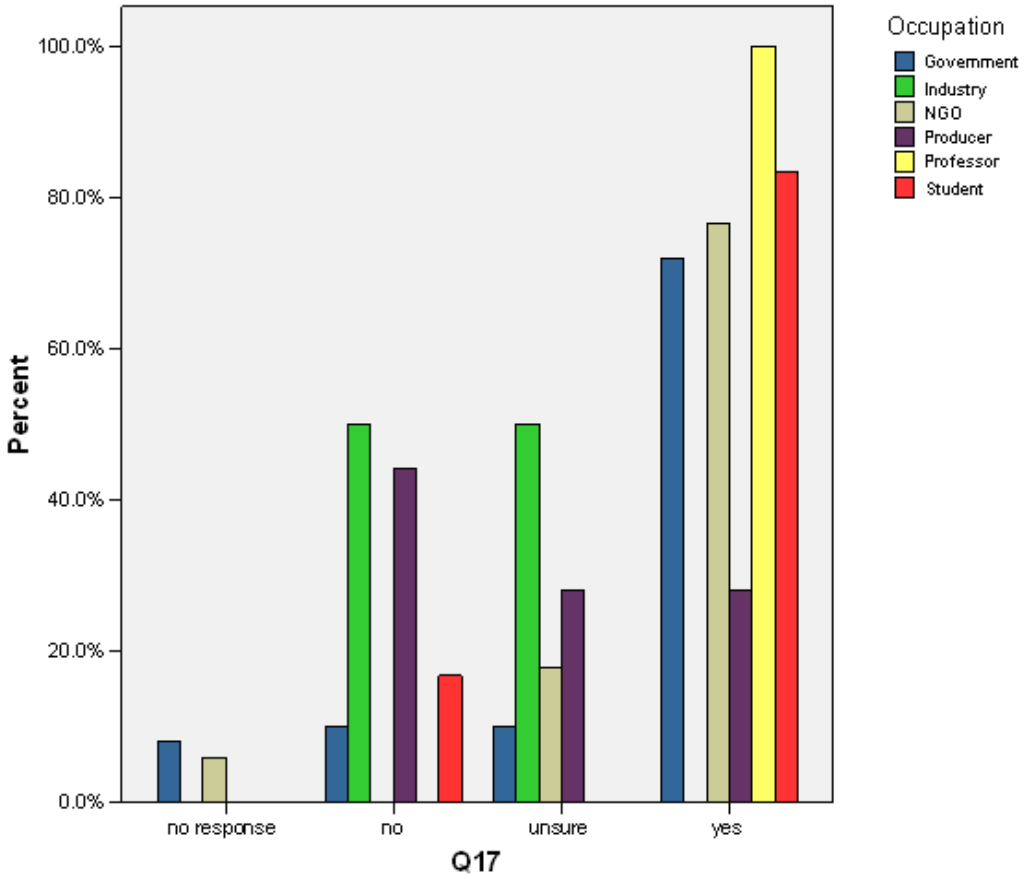

Figure 10 Breakdown of responses of all participants by occupation for Q.17 asking "Do you feel that a reverse auction is a fair mechanism to deliver environmental programs for Manitobans?"

Figure 10 illustrates the opinions of the participants on the fairness of the auction mechanism. It is divided by occupation because it was expected that groups were likely to have different answers. Most groups (e.g. government, NGOs, students, and professors) thought that the conservation mechanism is fair with over 60% of each group voting "Yes" for this question. Cost effectiveness was one of the main reasons of being in favour of the mechanism. Farm level benefits (e.g. being able to name the price you would like for providing EG&S) and flexibility for farmers (i.e. do not have to participate, chance to be paid for services) were also important factors for participants being in favour of conservation auctions. Another reason individuals thought the mechanism was fair was because of the public benefits the auction could provide. Many participants indicated that, yes, the mechanism is fair, however, it would depend how it was delivered and that there would be challenges in delivering an auction. Some suggested that the auction should be delivered with more information/extension for producers to ensure understanding, and that it is one tool to be considered, but not the

only tool. Those who were unsure of the mechanism stated that they would require more information prior to making a decision.

Conversely the majority of producers (44%) stated that this was not a fair mechanism to deliver environmental programming. This is most likely because producers are the ones who will be asked to participate in the auction, as opposed to other groups, and therefore have more variables to consider than the other groups. The reason why producers were opposed to the conservation auction was because of the competitive nature behind the auction and the view that it is not fair for producers. They are concerned with the potential social implications of putting neighbours in a competitive situation with each other, and that only a limited number of farmers would receive a payment. There was also concern that the competition will drive down the price of providing EG&S and force producers to bid below their costs in order to "win" at the auction. Producers were also hesitant about the auction mechanism because it is complicated and could reduce participation rates due to a lack of understanding. However, some did still say that it was a fair mechanism (28%). Like the other groups, producers felt that the auction is a good tool to deliver EG&S, but that it should be used in combination with other methods. Producers also felt that more extension work would be required in order to provide information to producers.

The final questions were about demographics, which were introduced at the beginning of this chapter. Demographic questions were important, especially about occupation since the type of occupation (e.g. government, academia, NGO, producer, industry) would influence how the survey would be answered.

5 Overall Impressions of the Workshop

Based on the survey responses and general discussion during each session, the conservation auction simulations were successful in raising awareness of conservation auctions and the process behind the auction, as well as getting an indication of the applicability of conservation auctions in Manitoba. The overall response from participants was positive; they were able to participate in an auction simulation to learn, in a hands-on way, how the auction mechanism works, and each session was very open to questions, comments, and suggestions. The workshops were also a stage for stakeholders to interact with each other, share ideas beyond the narrow scope of conservation auctions and discuss other relevant issues pertaining to environmental programming in agriculture.

There were several suggestions from all groups about how to make the auction simulations more effective as an educational tool: namely have them be more realistic and representative of real farmers. While the simulation was not designed specifically to be used for education about conservation auctions, it was beneficial to learn what variables are important to farm level decision making. This type of information can be applied to future research in the economic laboratory or in a field trial with real producers.

Some participants, mostly producers, remained skeptical of the auction mechanism, which was somewhat expected. There was much concern about the social implications of "pitting farmers against farmers, neighbours against neighbours" and lowering the price of EG&S to the point where farmers would be forced to pay out of

pocket to provide EG&S. An attempt was made by the workshop administrators to explain that lowering the price below costs was not the intention of the auction. Several producers who attended the workshops were advocates of ALUS and agreed with the method. Comparisons were also made between the European system of environmental programming and Canada. While the European system may not be entirely applicable to Canada, the information is still useful for the development of a Canadian, or Manitoban model.

Provided that the auction simulation was based on wetland restoration, a lot of discussion surrounded the debate between incenting wetland restoration versus wetland conservation.

5.2 Summary of Discussions

During the workshops, notes were kept to document the conversations and ideas that were expressed in each session. While the themes ranged from producer needs to actual implementation of auctions, similar points were addressed regardless of the group participating that day. This section will provide a summary of those ideas along with some explanation.

5.2.1 Implementation of Auctions

If the auctions were to be used in Manitoba, it would be ideal to package the program to include multiple BMPs in conjunction with a comprehensive EBI to account for a number of environmental benefits while maintaining policy objectives. Multiple BMPs give producers more flexibility to incorporate practices that fit their operations. For example, wetland restoration (which was used in the simulation) would be more appropriate for cattle producers rather than grain producers, because there would be higher costs for annual crop producers due to their higher opportunity and nuisance costs associated with lost profit and maneuvering around the restored wetlands. For crop producers, another BMP such as zero-till may be a more appropriate practice. The comprehensive EBI would then be applied to quantify the benefits provided from each practice for a relative score.

In addition to providing a number of BMPs to choose from, numerous participants remarked that more conservation practices should be included, such as wetland retention, woodlot maintenance or prairie grassland maintenance. In other words, rewarding "good behaviour", or inaction, rather than rewarding those who change from their poor practices. A reason why restoration or other changes in practice are being targeted is to increase the overall amount of EG&S being provided; however measures should be taken to ensure that remaining natural capital is not being lost. Some producers and NGOs suggested an ALUS-like approach where producers were rewarded for their conservation activities through fixed annual payments.

Different levels of targeting should also be considered for an auction program such as the issue at hand (e.g. eutrophication in Lake Winnipeg or increasing duck populations), EBI, and region. By targeting the EBI, more environmental benefits can be

achieved that better reflect the issues at hand. This can be done through the use of weighting - where projects that would abate more phosphorus, for example, would get a higher score than those that do not, even if those projects can provide other benefits. This way other environmental benefits will be acknowledged/credited and the issue can still be addressed productively. Targeting the region is especially important in order to have an "apples to apples" comparison of producers. This would take into consideration that producers are heterogeneous across regions and have different underlying conditions such as climate, soil conditions, water availability, population density, proximity to urban centers, etc. This will even the playing field so that producers just outside of Winnipeg with high land values (higher opportunity costs) would not have to compete with producers near Thompson where land values are lower (lower opportunity costs). A smaller regional scale would also be a more manageable size to deal with administratively.

There was concern about the transparency of actions between the government (or other program authority) and producers/landowners, in other words providing complete information to both parties. To some extent this can be achieved by providing producers with an idea of what environmental benefits could be provided if they were to adopt a new practice. However, caution should be taken under full disclosure of information as it could lead to large degrees of profit seeking by participants, as has been documented by a number of authors in the conservation auction literature (refer to Section 1.4.4).

Accountability from both parties, government and producers is necessary to make sure projects are being implemented and maintained, and that EG&S are being provided through the project. There should be a method of ground-truthing bids prior to signing a contract, to ensure that the proposed project is relevant and provides adequate EG&S. Monitoring and/or enforcement may also be necessary to guarantee that projects that were accepted in the auction are implemented properly and the desired EG&S are being produced. Self-regulation may also be a potential solution as was introduced in Section 1.5.

Extension would be required prior to the auction to educate producers on the intention of the program and the auction process, and how it achieves environmental goals in a fair and cost effective manner. Assistance should also be provided to aid in cost estimation for producers, as well as bid determination, to make sure that producers have solid estimates and can be confident that they will not be "in the red" if they are selected in the auction process. This could be a very involved and time consuming process. In Saskatchewan, administrators found that it took multiple "kitchen table visits" to work with producers to a point where they felt comfortable formulating a bid. This can potentially add to the overall costs of delivering the program. However, extension is a better option than allowing producers to be influenced by their neighbours and wrongfully estimate their costs, or collude.

Research efforts should go towards contract development and delivery for EG&S payments within the auction context. Factors that should be considered are contract length as well as the longevity of the practice that was contracted. By this it is meant, what happens when the contract expires? Would there be any stipulations requiring farmers to keep their land the same even when the contract is complete? Or would it be expected that the project would be terminated along with the contract. While it would be

greatly beneficial in terms of EG&S to keep the project in place even after the contract, it would not be fair to do so.

5.2.2 Producer Concerns

Producers themselves provided some information on the issues that would influence decision making, especially in relation to environmental programming and conservation auctions.

- Neighbours
    - What types of environmental practices they will be adopting if they are participating in the auction, and what they would be bidding?
    - Would there be any adverse effects on neighbours land as a result of the implementation of a project (e.g. wetland restoration leading to flooding of neighbouring land)?
- Markets
    - Relevant markets include land, commodities, and inputs
    - Producers do not want to be locked into a long-term contract, because of opportunity costs associated with good market years (e.g. commodity markets, land markets)
    - Producers would like to have additional compensation from the EG&S payment for good market years (i.e. be paid not to produce)
- Type of production
    - The type of production can have significant effects on the costs (specifically opportunity costs) of implementing EG&S projects, especially conservation projects. Grain producers are likely to have higher opportunity costs with projects like wetland restoration; this will result in very high bids and little chance of being accepted in the auction unless they also have very high EG&S delivery potential. Conversely, cattle producers will have lower costs and may also extract private benefits from a wetland restoration project
- Costs
    - Costs are a significant factor that would affect producer decision making, however estimation of costs could be very difficult. One participant expressed that the only way to find out the costs of a project is after everything has been paid; this participant ultimately had to spend money out of pocket to complete an EG&S project in the past because he was unable to estimate his costs accurately
    - Therefore effort should be taken to educate producers on such matters
- Contract length
    - Longer contract lengths are less preferred because of uncertainty of opportunity costs the farther you look into the future, therefore shorter contracts are preferred (e.g. 4 years for one crop rotation)
- Life situation
    - Older farmers nearing retirement are less likely to enter into the auction so that they have flexibility with their land

    - Desperate farmers are more likely to participate in the auction to get cash quickly, even if it means bidding below costs

- Profit
    - Producers would require/want to make a profit off of the auction, however the amount of profit depends on how well producers can estimate their costs
- Previous activity
    - If a producer has spent time and money towards a certain project (e.g. wetland drainage) they are not likely to participate in the auction to reverse it

Many producers indicated that they would be more satisfied with a fixed price program to EG&S, but the price has to be right. Current fixed price programs offered by Ducks Unlimited Canada and Manitoba Habitat Heritage Corporation have prices that can be insufficient to induce participation. For the sake of comparison, the auction mechanism ensures that those participating will receive an adequate price for their EG&S, so there is a lower chance of having to pay out of pocket. Some participants, who had some experience with the European fixed price model, exclaimed that it is tried, tested and true, and Canada should use it as a model to develop new programs. While the European model may be successful in increasing participation, it is questionable if it is actually cost effective. Also, there are many cultural differences between agriculture in Canada and Europe, which makes the applicability of the European model questionable.

While auctions have been used extensively in Australia, the cultural differences in Canada may pose as barriers to the acceptance and success of a conservation auction. In the workshops, there was a sense of stigma around government payments for EG&S. Producers wish to use the payments for income support when that is not their purpose, but believe that the government wants to buy EG&S as inexpensively as possible to take advantage of farmers and force them to pay out of pocket.

With respect to the auction, producers were also concerned with the types of individuals who would sign-up to participate. The auction might encourage the "worst offenders" to put in bids, and subsequently be rewarded by being paid to reverse their poor management strategies. Perverse incentives[17] may also arise as good producers see that only poor producers are being issued payments. They may reverse some of their good management decisions in order to get a payment. One participant was also concerned that environmental NGOs would be eligible to partake in the auction. This participant expressed that they should not because they can offer land far below the value and almost be guaranteed a payment, thus taking payments away from producers.

In addition, producers were concerned that, over the course of the auction, they would end up bidding themselves down below cost in competition for payments. Some participants would vocalize that it makes no sense for producers to purposefully bid below their costs for a payment. Of course there are implications if cost estimates were not accurate, but even with a rough estimate it is not a rational decision to bid below costs unless one is getting some private benefit from the practice in question. Given that this

[17] A perverse incentive is an incentive that has an unintended, undesirable effect, usually against the interest of the incentive maker

was such a popular belief by both producers and other groups (e.g. government, NGOs), more education may be required to address this issue.

6 Conclusion

Theoretically, the competitive bidding process under a procurement auction can lead to economically efficient and cost effective outcomes in the face of information asymmetry and lack of a direct market. They become a vehicle to distribute public money in a cost effective manner while maximizing the environmental benefit. Recently, the procurement auction framework has been applied to use for EG&S in countries such as the U.S., Australia, and in Europe. The auction process fits well with the provision of EG&S because it is fairly difficult and complicated to value EG&S, therefore there is no direct market, and there is a great deal of information asymmetry between producers and government.

Taking time to carefully think through auction design will be necessary in order to have an auction that caters to the public and producers, and that will be cost effective. While it may be too soon to be discussing details surrounding the implementation or design of an auction in Manitoba, more thought may be required on related issues, such as development of an EBI and associated extension program.

These workshops were developed to allow stakeholders to become aware of the conservation auction, and learn more about the process and why they are implemented around the world. It was also a platform of discussion amongst stakeholders to gauge how acceptable an auction would be in Manitoba to procure EG&S from producers: a lot of information and ideas were shared from all sides of the story. Overall, it was a very positive experience for all of those involved and generally a positive reaction to the auction process was encountered. However, some still remain apprehensive and skeptical of the mechanism in terms of its application in Manitoba.

Next Steps

Stakeholders in Manitoba have indicated an interest in the use of conservations auctions to tackle environmental issues in the province of Manitoba; such as addressing eutrophication in Lake Winnipeg. It is recommended that further efforts be made to provide outreach and extension to producers to educate them on the auction process. This is necessary in order to increase interest in these potential programs, and subsequently encourage participation in a future auction. This may be done through more workshops similar to the ones reported here, or other extension activities.

The authority overlooking the auction must also clearly define the issue that is being addressed in order to ensure that the auction is being used effectively. An EBI framework, or other system of scoring EG&S, should be developed in concert with the issue at hand so that appropriate weighting can be given to priority EG&S to achieve the policy goal. Keeping these elements in mind, particular practices eligible for enrollment in the auction could be selected. While bidders may have freedom to choose suitable practices to implement, having a list of acceptable practices could potentially decrease administrative costs for participating producers. The practices should be selected in a way

that ensures that there will be heterogeneity among producers with respect to costs in order to establish a certain level of competition. Contract design will be a key factor that will influence participation by producers. Contracts should be flexible enough to appeal to producers, while at the same time rigorous enough to obtain the benefits of the EG&S acquired from the auction. Establishing a geographical region to target the auction to achieve significant levels of relevant EG&S will also be important to the success of the auction.

Developing a small scale pilot auction is also recommended in order to test potential auction rules and contracts. While lessons may be learned from auctions documented in the literature, communities are inherently different and auction design in one area may not be completely suitable for another. The pilot will also provide an opportunity to evaluate if the auction is suitable for Manitobans: e.g. is there adequate producer participation to hold a successful auction. Given that a conservation auction has been conducted by the ASWA in Saskatchewan, it would be useful to complete an auction with different rules (e.g. uniform pricing instead of discriminatory pricing) in Manitoba as a comparison.

References

Cason, T.N. & L. Gangadharan. 2004. Auction design for voluntary conservation programs. *American Journal of Agricultural Economics*, 86(5): 1222-1217.

Cason, T.N. & L. Gangadharan. 2005. A laboratory comparison of uniform and discriminative price auction for reducing non-point source pollution. *Land Economics*, 81(1):51-70.

Chan, C., P. Laplagne, and D. Appels. 2003. The role of auctions in allocating public resources. Productivity Commission Staff Research Paper, Productivity Commission, Melbourne, Australia.

CPC (Canadian Pork Council). 2009. Hog Transition Program. http://www.cpc-ccp.com/program-farm-transition-e.php, accessed April 2010.

Cummings, R.G., C.A. Holt, and S.K. Laury. 2004. Using laboratory experiments for policy making: An example from the Georgia irrigation reduction auction. *Journal of Policy Analysis and Management*, 23(2): 341-363.

Groth, M. 2005. Auctions in an outcome based payment scheme to reward ecological services in agriculture: Conception, implementation, and results. 45th Congress of the Regional Science Association, Amsterdam, 23-27 Aug. 2005.

Hartwell, R. & B.Aylward. 2007. Auctions and the reallocation of water rights in central Oregon. Deschutes River Conservancy, River Paper Series No.1.

Hailu, A. & S.Schilizzi. 2005. Learning in a "Basket of Crabs": An agent-based computational model of repeated conservation auctions. Book: Lux,T., E.Samanidou, S. Reitz. Series: Lecture notes in economics and mathematical systems. Nonlinear dynamics and heterogeneous interacting agents. Springer Berlin Heidelberg. Pp 27-39.

Klemperer, P. 1999. Auction Theory: A guide to the literature. *Journal of Economic Surveys*, 13(3): 227-286.

Latacz-Lohmann, U. & C. Van der Hamsvoort. 1997. Auctioning conservation contracts: A theoretical analysis and an application. *American Journal of Agricultural Economics* 79 (1997):407-418.

Latacz-Lohmann, U. & S. Schilizzi. 2005. Auctions for conservation contracts: A review of the theoretical and empirical literature. Report for the Scottish Executive Environment and Rural Affairs Department, Project No.: UKL/001/05.

Reichelderfer, K. & W.G. Boggess. 1988. Government decision making and program performance: The case of the Conservation Reserve Program. *Journal of Agricultural Economics*, 70(1):1-11.

Stoneham, G., V. Chaudri, A. Ha, L. Strappazon. 2003. Auctioning biodiversity conservation contracts: An empirical examination of Victoria's BushTender trial. *Australian Journal of Agricultural and Resource Economics*, 47(4): 477-500.

Appendix

Assumptions from conventional auction theory

- Auction sells a single item
- Bidders are risk neutral
- Bidders have independent private values: Each bidder has a valuation of the traded good that is unknown to the seller and rival bidders and that is not influenced by others' views (no resale value)
- Symmetry among bidders where the probability distribution of valuations is the same for all bidders
- Seller does not know each bidder's exact valuation and perceives this valuation to be drawn randomly from some probability distribution. Likewise, bidders have prior knowledge about the probability distribution of rival bidders' valuation, but not about the competitors' exact valuations
- Competitive bidding: all bidders enter the auction with the intent to win and know the number of rival bidders. There is no collusion and bidders do not have the ability to influence market demand.
- Payment is a function of bids alone
- There are zero costs to bid construction and implementation

Figures comparing budget spent and rent seeking for all auction simulations

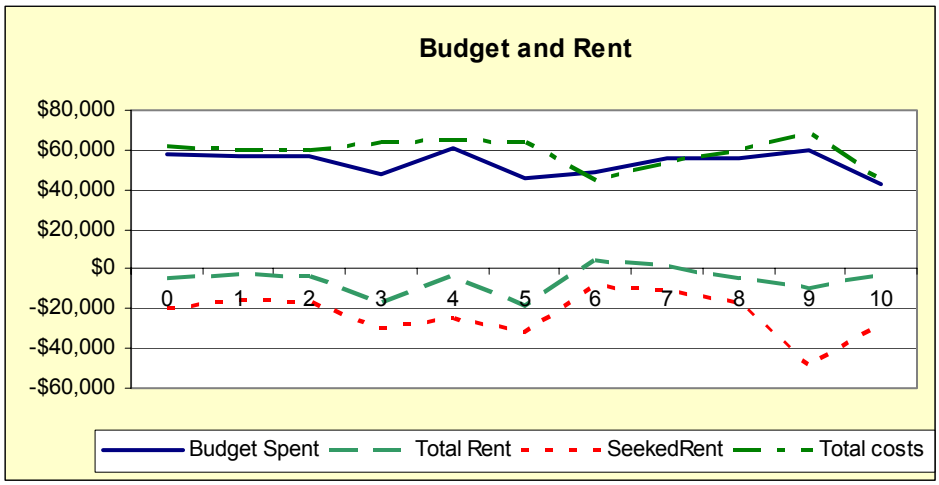

Figure 11 March 8 - MCU1 – $ 62218.65, 12 participants

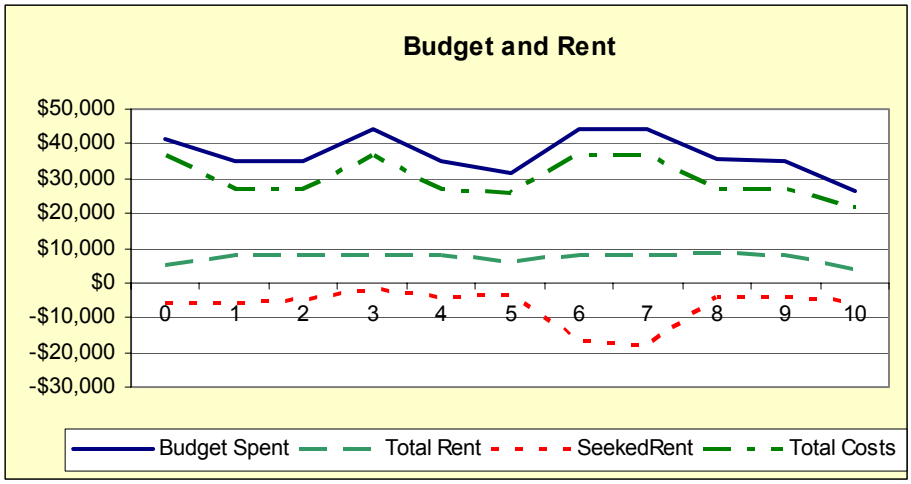

Figure 12 March 10_am - MCU2 - $45,377.23, 8 participants

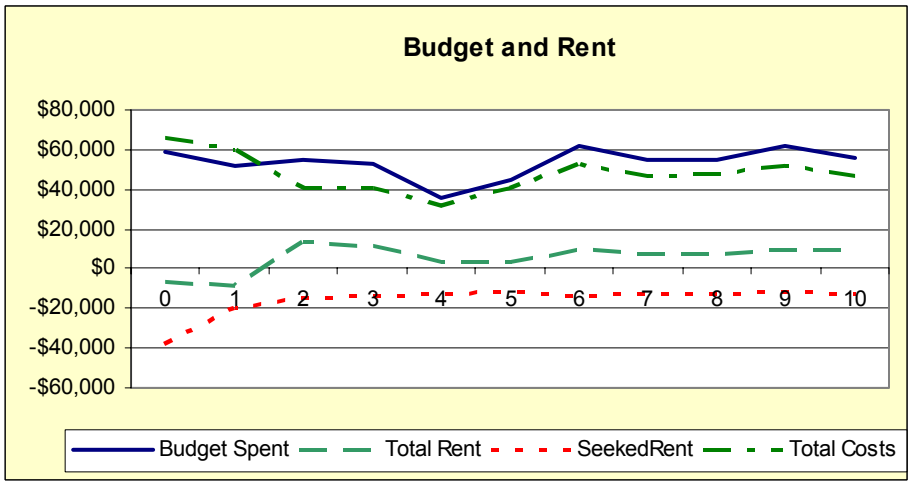

Figure 3 March 16_am - MCU3 - $62,218.65, 9 participants

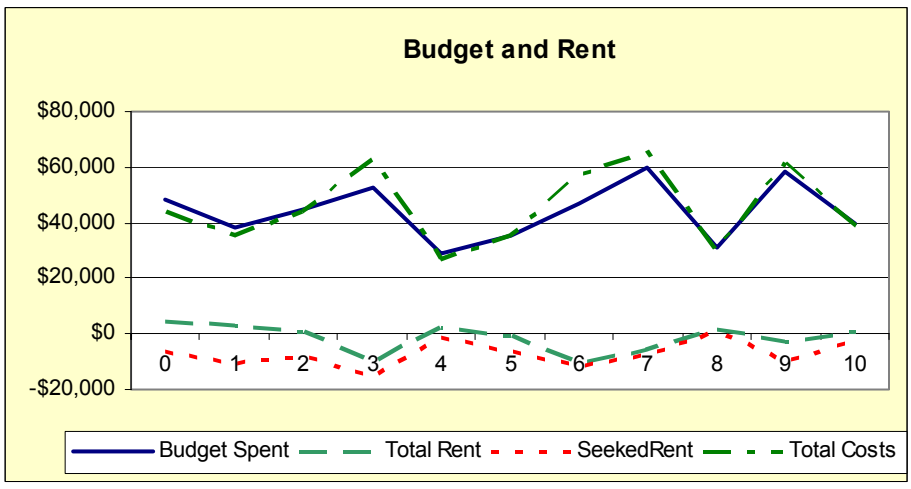

Figure 4 March 19 - MCU4 - $62,218.65, 9 participants

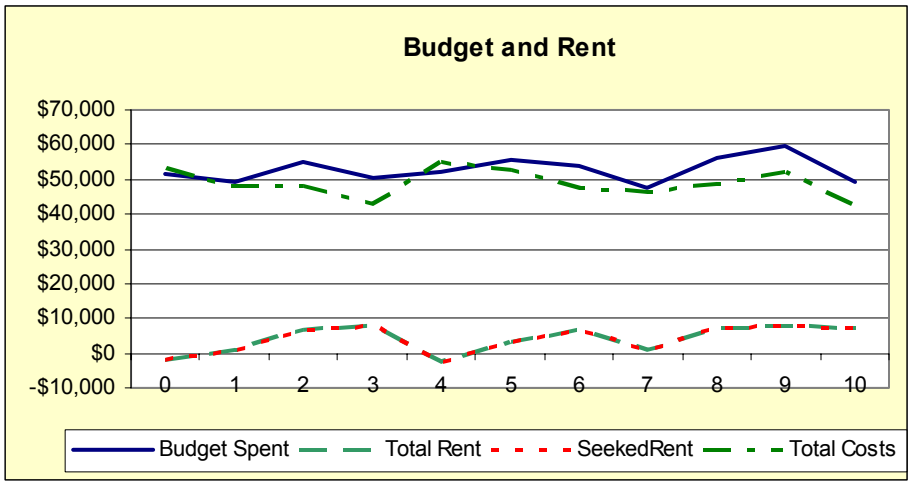

Figure 5 March 9_am - MCD1 - $62,218.65, 9 participants

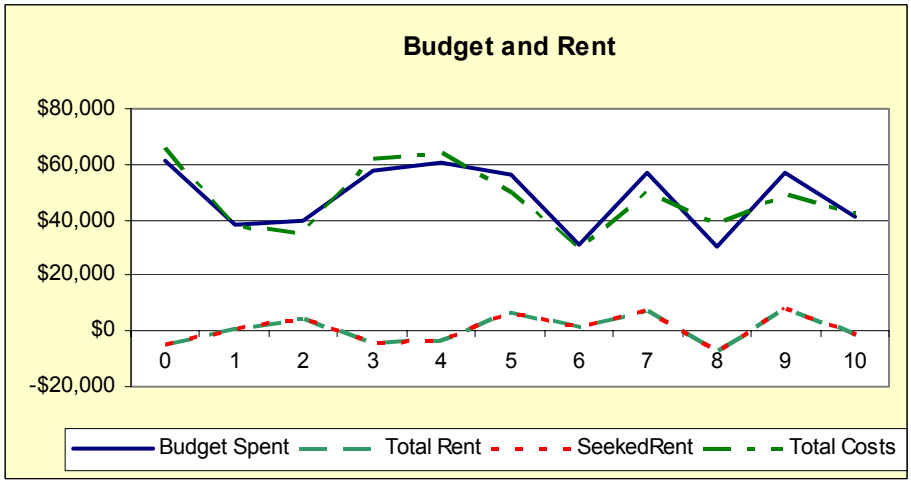

Figure 6 March 9_pm - MCD2 - $62,218.65, 9 participants

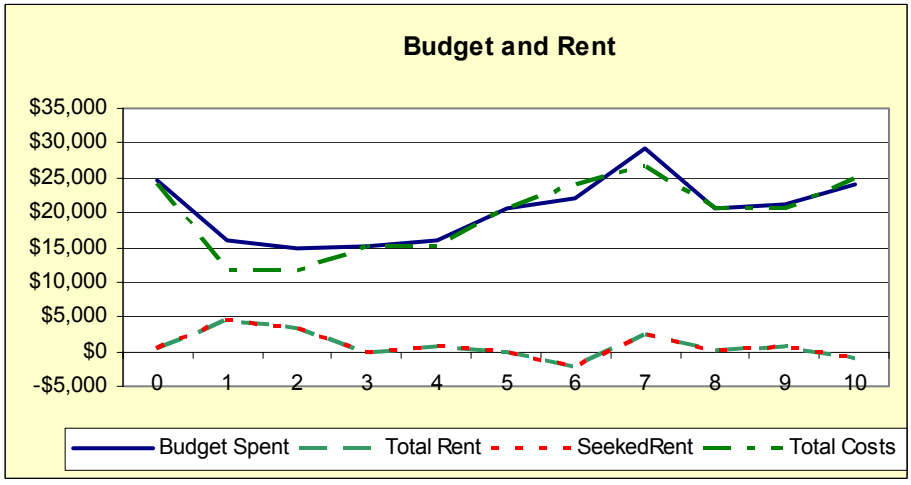

Figure 7 March 15_am - MCD3 - $29,860.80, 8 participants

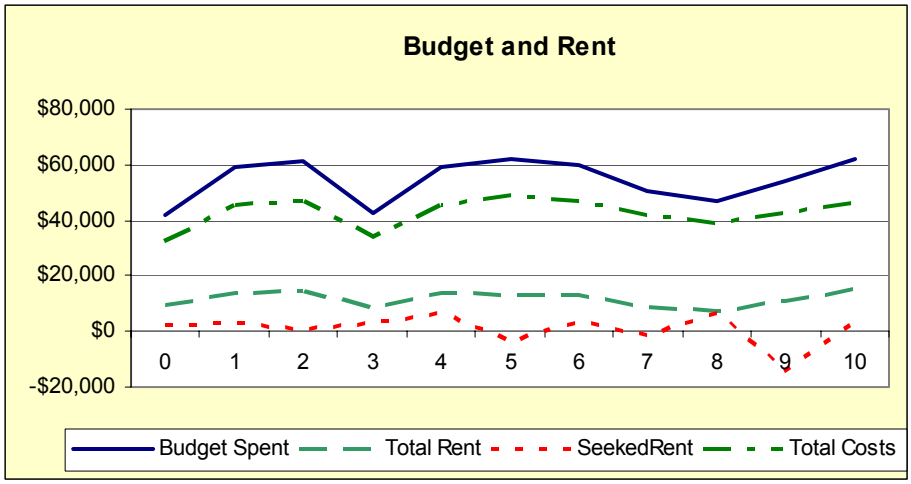

Figure 8 March 10_pm - MPU1 - $62,218.65, 11 participants

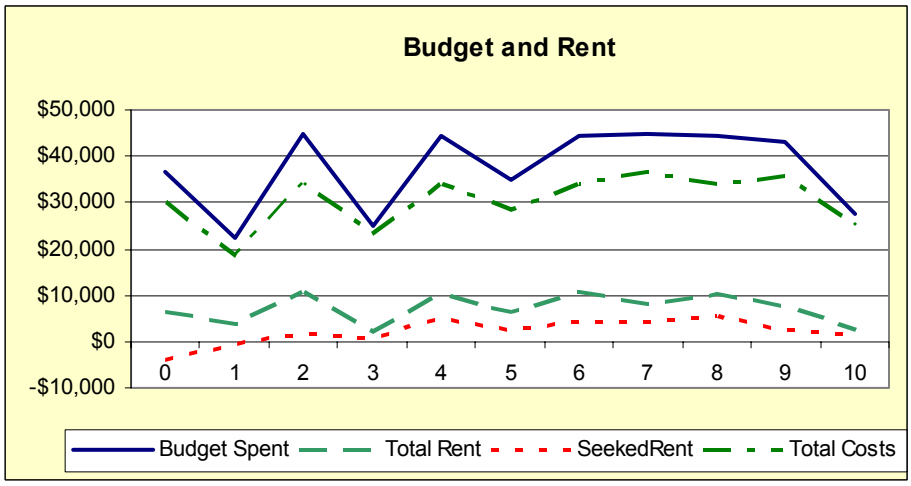

Figure 9 March 15_pm – MPU2 - $44,772.15, 7 participants

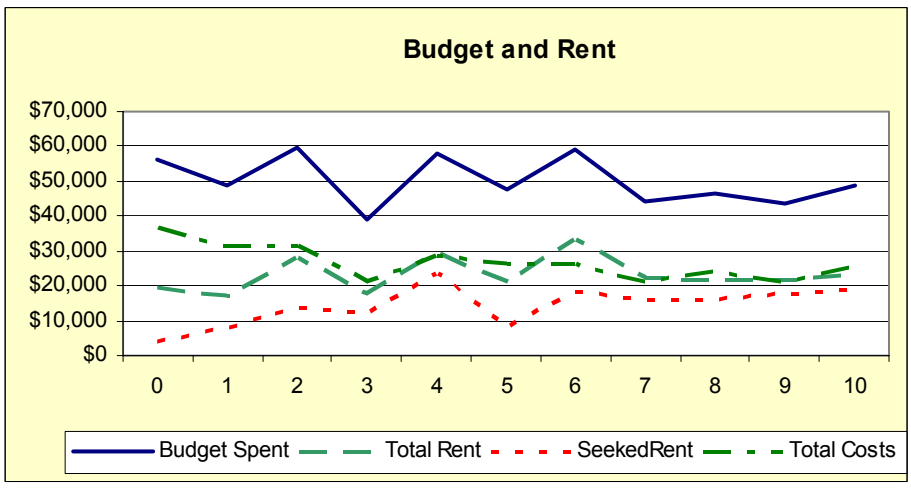

Figure 13 March 17 – MPU3 - $62,218.65, 8 participants

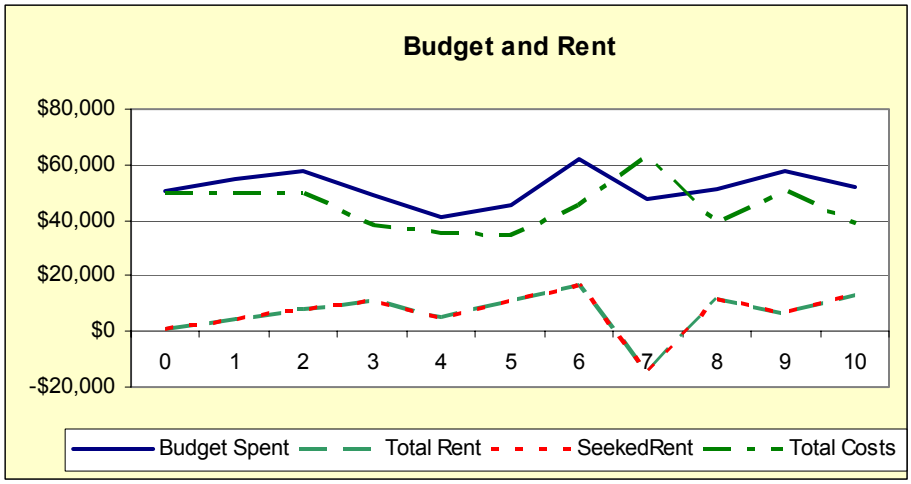

Figure 11 March 16_pm - MPD1 - $62,218.65, 7 participants

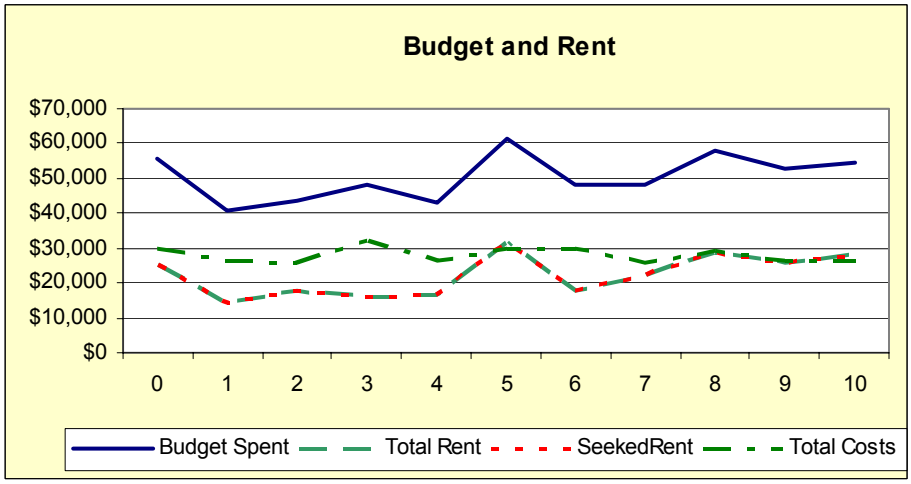

Figure 12 March 18_am - MPD2 - $62,218.65, 6 participants

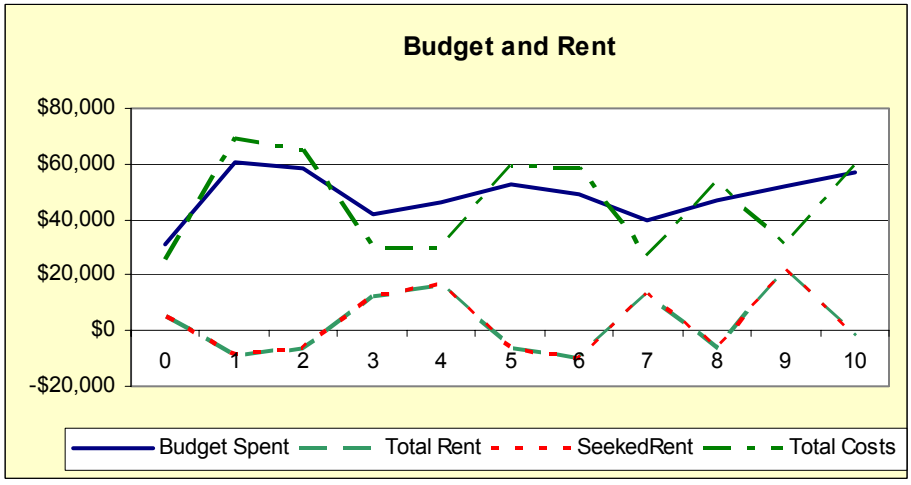

Figure 14 March 18_pm - MDP3 - $62,218.65, 6 participants

AUCTION WORKSHOP

Location:_____ **Date:** _____

We would like to know your opinion about the workshop you have participated in today.

Please rate the following statements from 1 to 5 by circling the appropriate number:

1 – Strongly disagree
2 – Somewhat disagree
3 – Neither agree nor disagree
4 – Somewhat agree
5 – Strongly agree

1. I enjoyed participating in this workshop

   1 2 3 4 5

2. I learned something in this workshop

   1 2 3 4 5

3. I found the visual presentation on the computer screen useful

   1 2 3 4 5

4. Was there anything you found confusing regarding the conduct of the auction?

5. Is there anything you feel would improve the implementation of these auctions in an actual Manitoba setting?

6. Please provide any additional comments that you would like to share with us about today's workshop.

We would now like to ask you some questions in regards to environmental programs in Manitoba.

7. Do you currently participate in an environmental program?

   Circle Yes No
   If yes, what program are you a part of and why did you choose to participate?

8a. Would you participate in an auction for any practice if it was offered?

   Circle Yes No
   Why?

8b. If you answered yes above, would you participate in an auction for any of the following BMP (beneficial management practice)? Please circle.

a.	Forage conversion	Yes	No
b.	Zero tillage	Yes	No
c.	Holding pond installation	Yes	No
d.	Wetland restoration	Yes	No
e.	Wetland conservation	Yes	No
f.	Others	_____	

9. In general, would you know your costs (farm parameters) associated with any of the abovementioned practices?

   Circle Yes No

10. Do you think that an auction would be an effective tool to deliver incentive programs in Manitoba to support agricultural producers in reducing identified environmental risks and improving the management of agricultural land?

   Circle Yes No
   Why?

11. Do you think that an auction would be an effective tool for providing incentives to induce more restoration of wetlands?

   Circle Yes No
   Why?

12. Would you participate to an actual auction aimed at wetland restoration if it was offered?

   Circle Yes No
   Why?

13a. What contract length would you agree to if you were going to restore wetlands?

Annual	Yes	No
5 years	Yes	No
10 years	Yes	No
20 years	Yes	No
Permanent	Yes	No
Other	Yes	No

Please indicate length: _____.

13b. What is the maximum contract length that you would consider?

We would like to get your feelings and opinions on the reverse auction mechanism.

There are two different ways to give out payments; *discriminatory* where you are paid what you bid, and *uniform* where everyone receives the same unit price (which is equal to the unit price of the first rejected bid therefore is larger than your own unit price).

14. Please circle the payment type that was used in the session you participated in today.

Discriminatory Uniform

15. Which payment type would you prefer to receive in a real auction? Why?

16. Do you have a better understanding of the reverse auction mechanism after participating in this workshop?

Circle Yes No

17. Do you feel that a reverse auction is a fair mechanism to deliver environmental programs for Manitobans?

Circle Yes No
Why?

18. Please choose the following as it applies to you:

Gender

Male ☐ Female ☐

Age

Under 25 ☐ Between 41 and 60 ☐

Between 26 and 40 ☐ Over 61 ☐

Occupation

Farmer – crops ☐ Government ☐

Farmer - livestock ☐ Non-government organization ☐

Farmer – mixed operation ☐ Industry ☐

Professor ☐ Student ☐

Other ☐ _____

Geographic location

In which rural municipality of Manitoba are located?

THANK YOU FOR YOUR PARTICIPATION!

Canada Growing Forward Manitoba