



Zentrum für Entwicklungsforschung
Center for Development Research
University of Bonn



Workshop on Conservation Tenders in Developed and Developing Countries Status Quo, Challenges and Prospects

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Abstracts

SESSION 1. SCENE SETTING AND THEORETICAL UNDERPINNINGS

1. Conservation tenders: motivation for their use, a review of theory, and practice

Jason Shogren

This contribution gives an overview of the literature to date across theory and practice. It provides a discussion of conservation auctions and conservation policy design, identifies key lessons from the literature and their relevance to policy. It discusses issues re the broader policy response to the opportunity of addressing diminishing public budgets and identifies the knowledge challenge for future development of conservation tenders – is it design and performance or is it more about policy integration and meeting policy makers' needs?

2. Specific challenges of auctions in developing countries

Tobias Wünscher

The opportunities of conservation tenders can be of particular interest in developing countries where payments for ecosystem services schemes (PES) grow at a disproportionate rate, information gaps are large and public budgets small. However, differences between countries in characteristics such as institutional capacity and infrastructure may affect auction implementation. This contribution's objective is to identify some of these challenges and discuss ways of dealing with them. I take a very practical approach to address this issue, by outlining the implementation steps of a conservation tender and by discussing how each of the typical characteristics of a developing country could potentially affect the implementation process in its individual steps. In addition, I also briefly discuss poverty alleviation and equity effects of conservation tenders. Each of the implementation steps are potentially influenced, sometimes positively and sometimes negatively, mostly by differences in infrastructure

and human capacity. Transaction costs and the scalability of auction PES appear to be clearly affected by some of the challenges in developing countries.

SESSION 2: WHAT DO WE SEE IN THE FIELD – A DEVELOPED COUNTRY PERSPECTIVE?

3. The use of auction in the US Conservation Reserve Program

Dan Hellerstein

The United State's Department of Agriculture's Conservation Reserve Program (CRP) is a voluntary program that retires highly erodible and environmentally sensitive cropland. Created in 1986, the CRP's enrollment peaked at 36.8 million acres in 2007, and currently about 27 million acres are enrolled. The enrollment mechanism of the CRP has evolved over time. At first, the program accepted everything that met soil erodibility conditions. After the first decade, two mechanisms have been used. Most acres are selected using auction like mechanism that uses a weighted index of environmental attributes and asking price to rank offers. A smaller, but ever increasing fraction, are chosen using a mechanisms based on geographically specific tight eligibility requirements (such as being in a riparian buffer). In both cases, bid caps are imposed that are based on cropland rental rates and soil productivity. In this presentation, I will review some of our findings on the operational features of these mechanisms. For example, does the use of a bid cap improve the cost performance of the program? Alternatively, could better environmental benefits be obtained at the same cost? Are there modifications of these mechanisms, such as more complex auctions, that could improve either cost or environmental performance?

4. The Australian experience in using tenders for conservation

John Rolfe

Over the past few decades Australia has been endeavouring to protect environmental assets and improve the management of environmental resources in a number of ways, including a variety of different regulatory, voluntary and incentive approaches. Of particular interest are initiatives in the past 15 years to use conservation tenders and other market based instrument approaches to generate environmental outcomes, particularly on private lands. The best known of these is the BushTender auction for vegetation protection in Victoria run by Gary Stoneham and colleagues in the early 2000s, with

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other subsequent trials sponsored through two nationally funded programs. A number of tenders have now been run, with substantial variations in application and methodology generated by a mix of both intended design and case study differences. The number of separate conservation auctions that have been performed, and the variations in environmental targets, state jurisdictions, case study circumstances, design and implementation, provides a rich data base of field experiments to analyse that is unique at the international level. The review section of the paper covers three broad areas. The first aim is to provide an overview of the various tenders and their history and design in different settings. The second is to review their performance, particularly in relation to design and their ability to achieve environmental goals in cost effective ways. The third is to explain why, after so many trials, conservation tenders are not more widely used in Australia compared to alternative mechanisms such as devolved grants. The paper concludes with an overview of the lessons learnt, an appraisal of the weaknesses and strengths of conservation tenders, and a review of potential transferability to developing countries.

5. Institutional constraints to the utilization of auctions in PES

Eva Primmer

Auctions appeal to analysts and policy designers because of their potential efficiency in recruiting new areas for nature conservation. If the authorities using auctions manage to develop and apply the tender selection criteria so that they genuinely allow comparing and ordering competing tenders, the competitive arrangement should generate cost savings as compared to a list price arrangement. In real-world ecological-institutional settings, however, formal comparison in tender arrangements is extremely difficult and authorities tend to choose pseudo-competitive arrangements instead of genuine competition. This paper explores a real policy instrument designed for forest biodiversity conservation in Southern Finland in 2007, called “*tender for natural values*”. This instrument specifies that the tenders should be invited and compared on an annual basis but the competitive procedure has not been formalized. Instead, sites are evaluated on a first come –first serve basis, applying ecological criteria and standard pricing formulae. Drawing on governance literature as well as empirical analysis of documents and interview data, I analyze the institutional constraints that a competitive arrangement faces when implemented by public authorities, generally geared toward implementing law and treating citizens equally. The analysis pays attention to cost-benefit arguments

and particularly the transaction cost savings arguments that are used to justify routine procedures.

SESSION 3: PRACTICAL DESIGN THROUGH EXPERIMENTAL ECONOMICS?

6. An overview of laboratory research on conservation auctions

Steven Schlizzi

This paper reviews the laboratory research on conservation auctions from three points of view: first, in terms of the questions asked and issues addressed; then in terms of the key insights contributed so far; and thirdly in terms of pending questions and unresolved problems. Each section considers three main aspects: a first one relates to the design of the auction institution; a second, to bidders’ characteristics and behaviour; and a third to performance evaluation. Rather than a standard literature review, this ‘overview’ also tries to capture the work that is currently going on and that has not yet been published. This review may perhaps not be exhaustive, but it should be representative of the work carried out in this area to date.

7. An experimental examination of target based conservation auctions

Peter C. Boxall, Orsolya Perger, Katherine Packman & Marian Weber

Conservation auctions are increasingly employed to increase the provision of Ecological Goods and Services (EG&S) for achieving environmental goals. Most empirical studies of conservation auctions examine the efficient allocation of a fixed conservation budget. However an important and under-explored application of conservation auctions is in meeting environmental targets either as part of regulatory compliance by industry or by governments in meeting specified policy objectives. This paper examines the ability of a conservation auction to meet an environmental target. Previous research on this topic used the number of contracts as a target rather than a specific environmental goal such as number of acres or level of nutrient reduction. We use experimental economic methods benchmarked to a wetlands restoration case study to examine bidder behaviour and efficiency in a target constrained auction. We find that rent seeking in target constrained auctions is less than in budget constrained auctions, but that efficiency erodes quickly in repeated rounds suggesting that learning effects are stronger in target constrained auctions as participants realize there is not budget cap. We find that a reserve price



significantly reduces rent seeking, however the reserve price increased the probability that the target was not met. This suggests the need for further analysis on the interaction between targets and auction design features.

SESSION 4: TRIALING CONSERVATION TENDERS IN DEVELOPING COUNTRY SETTINGS

8. Proposal for an inverse auction scheme for environmental services in Costa Rica

Oscar Sanchez

In Costa Rica a program of payments for environmental services has been implemented since 1997, regulated by a legal framework based on the Forestry Act N°7575 from 1996. This program establishes a financial mechanism based on annual conservation payments of 64 USD per hectare to owners and holders of forests, reforestation payments of 980 USD per hectare and 1.30 USD per tree in agroforestry systems. Higher payments are given for habitats of endangered species. These environmental services, which benefit not only the global society, have the challenge to ensure financial sustainability, but also an optimal use of natural resources. This leads to the search for schemes that permit maximizing the use of the scarce resources designated to the financing of the program. This article is confined to present a proposal for change in the way resources are assigned, making the resource use more efficient and allowing so to enroll more area in the program. Tattenbach, Obando and Rodríguez (2006), as well as Guiteras, Jack, Oliva and Pagiola (2012) proposed a scheme with an auction mechanism to allocate contracts, which would allow using the resources of FONAFIFO more efficiently. This idea has already been rejected once by FONAFIFO for the framework of the project Huetar Norte, co-financed by the Bank group KfW. However, recently, it has been decided to analyze the option of auctions as a mechanism that would allow expanding the impact of the program in the future.

9. Designing a field experiment of environmental service procurement auction for watershed services in the Sumberjaya watershed, Indonesia

Beria Leimona

Payment for environmental services (PES) is a market-based, conditional and voluntary policy option that, in this study, provides incentives for maintaining watershed services. The setting of this study is a watershed area in Lampung, Indonesia, where soil erosion has broad implications for both on-site and off-site environmental damage. A key condition of PES is transparency regarding the conditions under which incentives or rewards can be granted. Balanced information and the power of transaction are the basis for any environmental service (ES). A contract procurement auction is an alternative mechanism for extracting information from ES providers on levels of payments or incentives that will cover their costs when joining a conservation program. In this chapter we focus on designing a market-based payment for watershed services and using procurement auction method to reveal hidden information on the opportunity costs of supplying environmental services. This is an initial application of a procurement auction method in a rural setting in a developing country. Our study resulted in a set of auction rules for determining how limited watershed rehabilitation funds could be allocated. Our results show that a sealed-bid, multiple round, second-price Vickrey auction with a uniform price can be applied where most of the auction participants have a low education level, low asset endowment, small plot size, and where market-based competitiveness is not common. The rate of contract accomplishment was moderate and this may be influenced by many other factors such as the farmer groups' leadership and their institutional arrangements for conducting conservation activities. The implication of these findings is that designing a proper conservation auction method and estimating the 'right' value for contracts form only minimal requirements for the success of any conservation contract.

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10. Conservation auction and actual payments to set aside farmlands from agricultural residue burning in Nepal

Krishna Prasad Pant

Conservation agriculture needs organic matters for composting, manuring and mulching. It also requires a ban on biomass burning. Among biomass burning, crop residue burning is the result of a deliberate decision by farmers. In southern Nepal, rice straw burning in the open field ranks number one among several types of crop residue burnt, with the trend recording an increase. In this study, we use a uniform price unit supply reverse auction followed by an actual payment in order to measure the level of payment sufficient to stop smallholder farmers from open field burning of rice straw. A sample of 317 farmers from 18 villages in the Rupandehi and Kapilvastu districts participated in the reverse auction and quoted the minimum amount that would be sufficient for them to avoid rice straw burning for one season in 2010. We signed agreements with 167 farmers who quoted their price below the cut-off point to not burn rice residue. Among the farmers with the agreement 86 percent fully complied with the agreement for an average payment of USD 78/ha. The supply of ecosystem services by the farmers through avoided burning is unit elastic indicating that there is a linear relationship between the monetary incentive and avoided burning.

11. The experience with auctions in Germany – why are they few and far between?

Bernhard Osterburg

Auctions have been experimented with in Germany in several pilot projects over recent years. This paper addresses the following questions: What have been the experiences, and why are auctions hardly used for implementing agri-environment schemes?

12. Synthesis session – what does theory and the laboratory tell us – what do we still need to learn?

Stuart Whitten

This contribution summarizes the day.

SESSION 5: DESIGNING CONSERVATION TENDERS – CONTRACTS AND SERVICE MEASUREMENT

13. Lessons from auction and contract theory

Uwe Latacz-Lohmann

This paper reviews the theories of contracts and auctions as they relate to the procurement of environmental goods and services from private landholders. We start by considering the full-information contract between a principal (usually an environmental procurement agency) and a single agent (usually a private landholder). We extend the basic contract model by allowing for multiple heterogeneous agents and information asymmetry. We highlight the incentive problems arising from hidden information and hidden action and review possible remedies discussed in the literature. These include among others self-selection contracts, incentive contracts and the use of auctions to reveal agents' costs. Each approach differs in terms of its institutional, informational and technical complexity, as well as in its ability to reduce informational rents reaped by landholders. The second part of the paper homes in on the theory of conservation tenders. We demonstrate that textbook auction models are unsuitable for modeling bidding behavior in budget-constrained conservation auctions – the usual format used in agri-environmental contracting. Standard auction theory has focused on target-constrained auctions, where the target (number of items to be procured) is decided upon and known irrespective of what it might end up costing. We present a best-response model of bidding behavior in budget-constrained conservation auctions that includes both private and common values. We highlight the circumstances under which such auctions are likely to outperform alternative contract allocation mechanisms and highlight the limits of conservation auctions in achieving value for money in environmental policy.

14. Measuring what exactly?

Stuart Whitten and Art Langston

Created environmental markets such as conservation tenders and biodiversity offsets employ a metric as a way of comparing the relative environmental value offered by alternative options in the market. Largely driven by ecological theory, these metrics have received little attention by economists yet are the critical linchpin that defines the nature of the values that are traded in markets. In this paper we describe some of the features required by a suitable metric in an environmental market. We then examine what the



implications of deviation from these features are for the efficiency of one environmental market – the Australian Government’s Environmental Stewardship Program – via a case study of the different metric formats employed as the program has evolved from 2008 to 2012. Our preliminary results suggest that there is little divergence in the efficiency or other measures of performance for different benefit estimates within a single metric functional form. In contrast, different functional forms, even when closely related, deliver substantive differences in investment efficiency across two metrics examined. These results are sufficiently encouraging to motivate deeper analysis across a larger combined data set and three different metric forms.

15. Conservation auctions: Should information about environmental benefits be made public?

Thilo Glebe

Most bid evaluation systems in conservation auctions consider both the proposed payment and the environmental attributes. When auctioneers have a more comprehensive understanding of the conservation benefits than bidders do, information becomes a central element of the auction design.

Concealing information about conservation benefits may be the optimal strategy when entry decisions are not relevant. However, disclosing information may motivate landholders whose lands are associated with high environmental benefits to participate in an auction. The present study demonstrates that revealing information about conservation benefits can be an optimal strategy if it enhances an auction’s participation rate when bid acceptance rates are high.

SESSION 6: EXPERIENCE FROM THE FIELD IN DEVELOPING COUNTRY SETTINGS #2

16. Comparative analysis of action-based and outcome-based tree planting contracts – a field study in Kenya

Lucie Andeltova, Tobias Wünscher, Karin Holm-Müller & Elsa Cardona Santos

In this paper we compare the cost-effectiveness of two different contract types of payments for environmental services. The action-based contract on the one hand is tied to specified actions which are expected to deliver environmental services and the outcome-based contract is directly linked to the desired environmental outcome. The

latter is argued to have many advantages in terms of cost-effectiveness, but the risk implied is expected to induce landholders to request for higher contract prices. For the purpose of this study, a tree planting project was implemented in Kenya by randomly assigning landowners to one of the contracts and by selecting them through an auction mechanism. In order to analyze the cost-effectiveness, we used an analytical framework based on Matzdorf and Lorenz (2010). The results show that in this short-term 6 month long program the ecological performance was not significantly different between contract types. However, the findings suggest a higher cost-efficiency in the action-based scheme as a result of higher bids under the outcome-based scheme. This can be explained through the difficulty of landowners to calculate the costs they will incur, related to the outcome uncertainty they face. Despite this, the action-based scheme is perceived as more risky, which is not visible in the bid behavior probably due to the fact that landholders prefer it since it clearly stipulates which activities they are supposed to undertake. The flexibility supposed to be offered by the outcome-based scheme could not be confirmed and intrinsic motivation exists in both schemes. Additionality seems to be low for both contract types.

17. The role of competitive tenders in agricultural biodiversity-focused payments for ecosystem services schemes: case study results from Peru and Bolivia

Adam Drucker

Following the development of a conceptual framework and the identification of variety-level conservation priorities for an Andean grain in Peru and Bolivia, competitive tenders (reverse auctions) were implemented across a number of communities in each country in order to determine willingness to provide conservation services. Selection criteria were developed in order to facilitate the identification of preferred farmers/communities to undertake such services based on efficiency, effectiveness and equity considerations. Findings to date indicate that farmers/communities were indeed willing to undertake a conservation services contract for threatened priority crop varieties and that participation costs vary widely between communities, thereby creating opportunities to minimize intervention costs by selecting least-cost providers. In-kind, community-level rewards were shown to provide sufficient incentives and suggest that a number of them could be provided through existing government agricultural and educational development programmes. The enthusiasm of the project participants to maintain the threatened crop genetic resources in future years, regardless of any further



intervention and their interest in exploring market development opportunities for these varieties, suggests that the potential for agricultural biodiversity-focused payments for ecosystem services to support national biodiversity policy implementation and make a significant contribution to agrobiodiversity conservation and use goals, as well as to improve poor farmer livelihoods, once it is up-scaled, continues to appear promising. A number of future research and development issues are also identified.

18. The leakage and livelihood impacts of Payments for Environmental Services: Evidence from Malawi

Kelsey Jack & Elsa Cardona Santos

Most evaluations of payments for environmental services programs focus on immediate environmental impacts, and do not measure the effects on socioeconomic outcomes or on other land use activities (leakage). Efficient allocation of land use contracts, through auctions for example, may help mitigate concerns about adverse livelihood or leakage effects. This study reports on a field experiment that allocated afforestation contracts to smallholder farmers in Malawi. Households were randomly assigned to participate in an auction or in a lottery for the contracts, which provided three

years of payments based on tree survival outcomes. Households that did not receive a contract as a result of the lottery form a pure comparison group. The results show evidence for within-farm leakage for households that received a contract at random, in the form of additional land clearing. Randomly contracted households are also more likely to report household labor shortages. Both of these effects are mitigated when contracts are assigned through an auction. Together, the results point to leakage and livelihood impacts from payments for environmental services that are often overlooked in standard evaluations, but which may be reduced through improvements in contract allocation.

19. Land values and opportunity cost of conservation in Costa Rica

Ina Porras, David Barton & Adriana Chacón

Policy planners increasingly recognize the importance of understanding benefits, costs, and other motivations underlying decisions on land use. Opportunity costs are considered the largest costs affecting the decision to engage in conservation (e.g. REDD+), and are

key to understand drivers of deforestation, and who bears the highest costs across different social groups. But actually measuring opportunity costs is very difficult. They are elusive, time and space bound – even varying within the plot and the season. Calculations are extremely data-consuming, throwing policy planners off balance when faced with the need to move from theory to practice, especially for the design of national-level policies. Given the limitations of data collection, we propose to use the newly available information on land prices at national level (from the Zonas Homogéneas –ZH- study) as a first step to understand opportunity cost using a hedonic price model. With a GIS-linked database of nearly 35k observations we will link information collected at the property level (e.g. size, price, services) with distance variables (e.g. to San José); economic indicators (e.g. IDS, population); ecosystem services (e.g. distance to national parks, beaches, indigenous reservations); and PES (e.g. contracts signed in district). One of the limitations from this work is the static nature of the estimates. The richness of the information generated by the ZH study is not likely to be repeated often, therefore limiting the potential for understanding opportunity costs through time. A well-designed tender or auction approach will bypass this problem, and our land value study can offer a unique platform to compare and double-check values obtained through tenders and the opportunity costs captured by land values at the national level, as well as the potential distribution of outcomes across different groups given heterogeneity of farms and landowners.



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SESSION 7: THE VIEW FROM PRACTITIONERS' - WHERE DO WE GO NEXT?

20. Experience and discussion of conservation tenders within Conservation International

Margarita Mora

Conservation International (CI) has supported few initiatives using auctions to promote conservation. This presentation will focus on two examples of auction projects supported by CI. It will also show why auctions have not been adopted by CI as a conservation tool, and what criteria we consider necessary to be assessed before promoting the use of auctions.

21. Exploring the potential for using conservation tenders in an English context

Stephen Chaplin

England has a comprehensive programme of agri-environment agreements as part of the European funded Common Agricultural Policy (CAP) Rural Development Programme for England (RDPE). These agreements are delivered through our Environmental Stewardship scheme (ES). ES is a multi-objective scheme that targets biodiversity, water quality, landscape, historic environment, genetic resource preservation and climate change (mitigation and adaptation) objectives. It seeks to increase the delivery of these non-market public goods by supporting changes in land management practice and providing support for associated one-off capital investments as part of 5 or 10 year agreements with land managers. Agreements are also supported by the provision of funded advice. Currently there are over 50,000 ES agreements covering in excess of 70% of the agricultural area of England. Annual scheme spend is approximately £440 million. The scheme payments (for changes in land management) are based on the typical cost of participation following the income forgone, additional costs and transaction costs methodology required by the EU Rural Development Regulation/WTO. The potential for over (and under-compensation) as a result of this approach has been recognised for many years and empirical studies have confirmed low levels of additionality for some scheme management options. Consequently, there is considerable interest in England in the potential of reverse auction approaches to effectively reveal the cost of participation and deliver significant improvements in the value for money of the schemes. However, there has been no mainstream application of reverse auctions to

agri-environment scheme delivery in England. More recently there has also been an interest in the use of auctions as a potential mechanism for delivering co-ordinated spatial uptake of land management changes at a landscape scale. This paper explores some of the reasons for the lack of adoption of these approaches to-date in England.

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