



Collective action vs. conservation auction: Lessons from a social experiment of a collective auction of water conservation contracts in Japan



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ABSTRACT

In this study, we explore the possibility of “collective auction” of conservation contracts, and related issues, through a social experiment. We then propose an alternative policy to achieve both collective action in irrigation management and cost-effective water environment conservation.

In a “collective auction”, individual farmers as well as farmers’ groups are allowed to participate. Communication and coordination among farmers and farmers’ groups are allowed.

Based on our participant survey and comparison with environmental payments for similar, previous conservation activities, the auction result shows that contract prices could be, at the very least, cost-effective. Moreover, collective irrigation management is not negatively affected owing to the auction.

We find evidence of group participation and price coordination, which result in saving auction transaction costs, among local communities active in collective action in local resource management. Conversely, we find that bidding occurred at the individual farmer level as well. This difference in approach depends on the extent of the auction coordinators’ commitment to the auction, reflected by their risk evaluation of unsuccessful bids. In either case, the auction coordinators could manage to minimize the likely unfairness arising from the auction.

Although establishing a competitive environment to prevent possible collusion in such auctions is challenging, this study provides empirical evidence that collective action in pre-existing local resource management can reduce auction transaction costs. Utilizing local communities’ abilities to organize collective action can reduce these costs and minimize the possible unfairness arising from the auction, thus facilitating compatibility between cost-effective conservation owing to the auction and local resource conservation by collective action.

Finally, we suggest that (1) the transaction cost of such an auction could be reduced by allotting adequate time for collective decision making, and (2) conservation programs should be designed to minimize their impact on production bases.

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Introduction

Environmental conservation is an important agricultural policy issue in developed countries (OECD, 2005; Shobayashi et al., 2012). Policy measures pertaining to this issue can be broadly classified into three categories: regulations, economic instruments,

and advisory measures. Some economic instruments are taxes and charges, eco-labeling centrally planned environmental payments, and market-based instruments (MBIs) (Amdur et al., 2011). Recently, MBIs have attracted significant attention, as this innovative policy instrument facilitates governments in attaining policy objectives cost-effectively despite national financial constraints.

MBIs in the agri-environmental field can be categorized as either trades (such as water rights and greenhouse gas emissions trading) or conservation auctions. In the case of the former, buyers and providers have an incentive to voluntarily allocate a resource whenever both exist and the market rules are set. As a prerequisite of trading, a sufficiently large number of buyers and providers must

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exist in order to create a competitive situation that would ensure efficient resource allocation. By contrast, in the case of conservation auctions, normally one provider designs the auction (the government or the local government), many buyers (farmers) exist, and only the buyers compete for resources.

Recent trends in the field of MBIs are a result of not only the concept's innovativeness, but also because policymakers and taxpayers are increasingly aware of the inefficiency of command-and-control regulation and centrally planned flat-rate payments for environmental conservation; they are also skeptical about the effectiveness of conservation activities (Latacz-Lohmann and Schilizzi, 2005; Claassen et al., 2008; Amdur et al., 2011). Moreover, theoretically speaking, inefficient conservation policies result from information asymmetry; while farmers hold private information about their true implementation costs for the conservation activities implemented on their private farmlands, conservation agencies find it difficult to gather such information.

A conservation auction resolves the problem of information asymmetry. Competing in such auctions drives farmers into revealing their private information. Conservation activities vary depending on environmental issues; examples of such activities are retiring lands from agricultural production during a certain period in order to prevent erosion, improving land management for salinity control, conserving water quality, and enhancing biodiversity (Latacz-Lohmann and Schilizzi, 2005). As regards performance, some studies have reported that auctions in agri-environmental management—that is, single-round auctions—are cost-effective (Stoneham et al., 2003; Latacz-Lohmann and Schilizzi, 2005; Milgrom, 2004). The efficiency gains reported range from a few percent to several hundred percent, depending on the hypothetical fixed-payment rate used as the benchmark to calculate efficiency (Stoneham et al., 2003; Latacz-Lohmann and Schilizzi, 2005).¹

However, there are some concerns over MBIs. If a resource is traditionally conserved by the collective action of resource users, the introduction of MBIs could destroy such cooperative behavior (Narloch et al., 2012). MBIs could create a competitive environment among resource users, while fairness at the community level can contribute to stabilizing collective actions (Hayashi, 2008). Historically, agricultural resources in Japan, such as agricultural lands, irrigation, and *iriai* (communal forests) have been managed by the collective action of farmers (Ostrom, 1990; Sarker and Itoh, 2001). Moreover, Japan's primary policies for agricultural resource management, called "Measures to Conserve and Improve Land, Water, and Environment" (MCLWE, 2007–2011; Nakashima, 2010), and the successive policy (from 2012) support collective action, although environmental conservation in rural areas is optional according to this policy. Experts have highlighted the need for formulating a comprehensive agricultural policy for environmental conservation, and the choice of the appropriate policy measure remains a significant issue (Shobayashi et al., 2010).

Therefore, this study explores the possibility of compatibility between cost-effective conservation by MBIs and local resource conservation by collective action. To the best of our knowledge, this is the first-ever social experiment of conservation auction conducted in Japan. We implement a carefully designed social experiment of a rural water conservation auction, namely a collective auction, our prime intention being the preservation of farmer-implemented collective action in irrigation management. As Narloch et al. (2013) mentioned, focusing on farming groups instead of individual farmers in the auction might reduce auction transaction costs. We believe this indication as being essential

to achieving compatibility between cost-effective conservation by MBIs and local resource conservation by collective action. Thus, this paper contributes to the literature by providing empirical evidence on how collective action in local resource management can reduce auction transaction costs and how the abovementioned compatibility can be achieved.

For this purpose, this study aims to identify the following: (1) the kinds of groups that could participate in the collective auction, (2) the process by which price coordination would occur, (3) the methods by which transaction costs are saved in the processes of bidder selection and price coordination, and (4) the issues that policy makers must consider while designing and implementing conservation auctions, in order to include collective action in rural water conservation.

Materials and methods

Given the aim of our research, the resource we focus on should have been managed by the collective action of farmers before we conducted the social experiment. Thus, we focus on irrigation water, because water use from gravity irrigation and scattered small-scale paddy fields has generated strong externalities, which motivated the collective action of farmers keen to avoid conflicts pertaining to irrigation water allocation and facility management (Shogenji and Hayashi, 2004). Although global warming has resulted in reduction in precipitation over the years, there is no sectoral competition for water, because water demand has been decreasing in all sectors (Kobayashi, 2006); however, water conservation remains an issue (MLIT, 2012). Therefore, we designed an auction for rural water environment conservation, to prevent the entry of effluents and eutrophying substances into the rivers.

A conservation program should be customized according to the natural environment and the conservation behaviors at the site whose resources are being auctioned. A common feature of several previous studies is that a certain conservation behavior and consciousness was fostered at the site under study before the conservation auction was conducted (Latacz-Lohmann and Schilizzi, 2005; Jack et al., 2009; Brown et al., 2011). Accordingly, we chose Shiga prefecture as the research site because a unique prefecture-wide agri-environmental conservation policy is being implemented there.

Environmental issues concerning water in Shiga prefecture

The most distinctive geographical feature of Shiga prefecture is Lake Biwa, the largest lake in Japan. Since almost all rivers in Shiga flow into Lake Biwa, the water pollution in each river contributes to the lake's pollutant load. Moreover, conserving the lake's water resources has been a pressing issue for Kinki region, which includes big cities such as Kyoto and Osaka, because the lake is the region's drinking water source.

The water resource conservation movement for Lake Biwa began after the occurrence of the freshwater red tide in 1972. The trends of the eutrophication indexes indicating the nitrogen and phosphorus concentrations in the rivers have remained unchanged, or have even decreased over the years. However, the chemical oxygen demand (COD) and the index of organic contamination have increased since 1984 and continue to remain high. Households are the largest contributors (20–30%) of organic contaminants to the rivers followed by urban areas (10–20%) and agricultural activities (more than 10%) (Shiga Prefecture, 2008).

Some measures are underway to tackle agricultural runoff in the region. They include conducting awareness-raising activities and constructing facilities to recycle such runoff. Preventing muddy runoff from the paddy fields (especially during the process of

¹ In multiple-round auctions, bidders could learn from the results of previous auctions and adjust their bids. This rent-seeking behavior is likely to erode auction performance (Latacz-Lohmann and Schilizzi, 2005).

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