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An analytical framework for assessing the potential of intermediaries to improve the performance of payments for ecosystem services

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ABSTRACT

The use of payments for ecosystem services (PES) to steer land use practices has increased considerably at an international level over past years. An efficient and effective PES implementation strategy often relies on active support from intermediaries. This paper provides an analytical framework for assessing the potential of intermediaries to improve the environmental effectiveness and cost-effectiveness of PES. Cost-effectiveness refers to transaction costs, whereas environmental effectiveness refers to ecological benefits provided. The framework assists in assessing how and for what activities of PES implementation intermediaries can improve performance based on the intermediaries' institutional design. The analytical framework is based on institutional economics and applies mainly the theoretical underpinnings of transaction cost economics (TCE). This paper illustrates an example of the practical application of the framework by assessing the potential of German Landcare Associations (LCAs) to improve the performance of public PES programs. It is emphasized how key institutional design characteristics of LCAs can potentially influence (1) public and (2) private transaction costs as well as (3) participation in and (4) spatial targeting of governmental agri-environmental programs and schemes in Germany. The analytical framework is, however, not restricted to assessing the potential of intermediaries in the large public PES programs of industrialized countries. This paper discusses how the framework can be transferred to smaller private or larger supra-national PES programs and to the contexts of developing countries.

Introduction

The concepts of ecosystem services (ES) and payments for ecosystem services (PES) have received considerable attention in the past few years, especially since Rio 1992 and the Millennium Ecosystem Assessment (Millennium Ecosystem Assessment, 2005; Gómez-Baggethun et al., 2010). The PES concept is defined only vaguely, with diverse definitions co-existing simultaneously and various conservation approaches being bundled under the "PES label" (Schomers and Matzdorf, 2013). The majority of PES schemes around the world are governmental payment schemes, being mostly input oriented payment schemes. Thus, land stewards are commonly paid for prescribed land use practices that are assumed to provide certain ES and/or to improve the agricultural biodiversity and landscape of the countryside (Schomers and Matzdorf, 2013). Agri-environmental payment schemes in the European Union (EU) and the Farm Bill in the US are the largest PES programs in the world (Scherr et al., 2007). Commonly, PES are developed and implemented in a complex legal and institutional environment. In the EU, most PES programs and schemes are implemented within the Common Agricultural Policy (CAP). The overall framework is set by the EU; the policy design of measures is worked out at the individual member state level. In Germany, precise regulations and measures are executed at the federal state level, i.e., the Länder. Farmers' cooperation and participation in PES schemes is voluntary (Prager and Freese, 2009; Hanley et al., 1999).

Diverse PES schemes are implemented by different governance structures. Frequently, PES implementation is supported by diverse intermediaries adopting various roles and responsibilities (Bosselmann and Lund, 2013; Huber-Stearns et al., 2013; Pham et al., 2010). In the context of large public PES programs, the PES implementing governance structure rarely relies on pure public–private interventions. Diverse intermediaries provide advisory services, with different roles for non-governmental organizations (NGO), private advisory organizations, governmental and semi-governmental entities (Bosselmann and Lund, 2013; Sutherland et al., 2013). Different intermediaries are likely to improve PES performance to various degrees. In this context, PES performance commonly refers to two related but distinct

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concepts: (1) cost-effectiveness and (2) environmental effectiveness (Schomers and Matzdorf, 2013). Environmental effectiveness refers to the extent to which the environmental aim of a PES scheme can best be achieved. Within the literature, environmental effectiveness is commonly assessed by looking at either overall participation rates and determinants influencing participation on behalf of farmers (Mettepenningen et al., 2013; Ducos et al., 2009; Defrancesco et al., 2008; Prager and Posthumus, 2010) or at the ecological impact of the schemes (e.g., Kleijn et al., 2004), in particular how environmental benefits can be raised through e.g., spatial targeting (Uthes and Matzdorf, 2013; van der Horst, 2007; Wünscher et al., 2008).

The cost-effectiveness of PES implementation is discussed within the transaction cost approach (Williamson, 1985, 1998, 2003, 2005). Transaction costs (TC) are defined as those costs arising due to information gathering, contracting and monitoring and controlling of contracts (Dahlman, 1979). TC can be considerable; Rorstad et al. mention that "the costs of managing a policy may be as important as the cost of producing the goods and services" (2007: 1).

Diverse intermediaries can help to improve the environmental effectiveness and cost-effectiveness of PES implementation by assisting and supporting transactions between buyers and sellers. An efficient and effective PES implementation strategy requires a potent management of two distinct and complex systems simultaneously: ecosystems and social systems (including individual decision making). A detailed exploration of the potential of intermediaries to navigate the transfer of ES between stakeholders has not been addressed sufficiently, despite a limited number of publications on the roles and impacts of intermediaries in diverse PES case studies (Bosselmann and Lund, 2013; Coggan et al., 2013b; Huber-Stearns et al., 2013) and the general recognition that intermediaries are "key in understanding the performance of PES" (Muradian et al., 2010: 1205, Sattler et al., 2013). What is missing is a framework for an institutional analysis on how discrete intermediaries within governance structures can improve the environmental effectiveness and cost-effectiveness of PES implementation. Given limited budgets, intermediaries that improve both the cost-effectiveness and environmental effectiveness of PES can help to maximize total ES provision and thus improve the economic efficiency of PES instruments.

To fill this gap, the paper develops and presents an analytical framework for assessing the relative potential of intermediaries to improve PES performance. The framework is based mainly on institutional economic theory.

Overall, the study aims to

(1) Develop a theory-based analytical framework for assessing how and for which activities intermediaries can improve the environmental effectiveness and cost-effectiveness of PES implementation and thereby
(2) Provide a tool for an institutional assessment of discrete governance structures that can be used to assess the potential of diverse intermediaries and transferred to different PES settings.

The remainder of the paper is organized as follows. Section "Method" explains the literature and theory-based development of the analytical framework and emphasizes its practical application. Section "Exemplified application of framework" describes a sample application of the framework by using the example of German Landcare Associations (LCAs) as one potential intermediary supporting the transfer of ES between public authorities (ES buyers) and farmers (ES sellers). Section "Discussion and conclusion" discusses the scope of the framework, highlights its transferability to assess the potential of different intermediaries in different PES settings and reconsiders the preliminary results on the potential of LCAs to improve PES performance in the context of German agri-environmental programs.

Method

Theoretical underpinning of framework

PES performance is frequently measured in terms of environmental effectiveness and cost-effectiveness.

Environmental effectiveness is influenced by (1) overall participation levels within PES schemes and (2) the ecological accuracy of the schemes themselves. Participation is usually positively correlated to environmental effectiveness (Mettepenningen et al., 2013) and is a basic requirement for achieving any effect at all. "Measures may have a high efficiency regarding ecological goals but if farmers are not willing to adopt the prescribed measures there will be no impact. A similar effect can be expected if farmers enroll but do not implement measures in an appropriate way" (Prager and Freese, 2009: 1155). The ecological accuracy of schemes is, for example, influenced by the spatial targeting of schemes (Uthes and Matzdorf, 2013). Overall participation levels and the ecological accuracy of PES schemes (spatial targeting) are influenced by, e.g., the nature and behavior of actors, certain market characteristics, attributes of transactions and governance structure (Mettepenningen et al., 2013).

The cost-effectiveness of PES implementation is influenced by public and private TC. Public and private TC can be considerable, and the overall level of TC is influenced by the attributes of transactions, the nature and behavior of the involved actors, the institutional environment and the governance structure (Williamson, 2003, 2005; Rorstad et al., 2007; Mettepenningen et al., 2011, 2009).

Thus, both the environmental effectiveness and cost-effectiveness of PES implementation is influenced by specific factors. This is the starting point of the analytical framework put forward in this paper. The theoretical underpinnings of the framework are based on transaction cost economics (TCE), as developed mainly by Oliver Williamson (1975, 1985, 1998, 2003, 2005).

According to TCE, different governance structures can solve the problem of TC to varying degrees, depending on how the determinants of TC are influenced by the respective governance structure. TCE and its "discriminating alignment" hypothesis emphasize that governance structures have to match the characteristics and attributes of the transaction so as to minimize TC (Williamson, 1975, 1985, 1998). Within the framework put forward in this paper, we expand TCE and the "discriminating alignment" hypothesis to also include environmental effectiveness and its respective determinants. It is expected that different governance structures will reduce public and private TC as well as increase participation in and the ecological accuracy (spatial targeting) of PES to varying degrees, depending on how well the respective governance structure can influence the various determinants. Consequently, governance structures implementing PES can be analyzed in terms of how well they can influence the determinants affecting environmental effectiveness and cost-effectiveness. The framework proposed in this paper provides a tool to assess qualitatively the potential of intermediaries, as part of a governance structure, to influence the various determinants and hence the environmental effectiveness and cost-effectiveness of PES implementation.

The framework is a theory-based procedure for elaborating key institutional design characteristics of intermediaries and for relating them to the various determinants affecting environmental effectiveness and cost-effectiveness. Thus, the framework helps to map which activities of PES implementation can be supported well by the corresponding intermediary and which cannot (Fig. 1).