



Measuring transaction costs incurred by landowners in multiple land-use situations

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ABSTRACT

This paper describes the development and implementation of a method to measure the transaction costs in situations of multiple land-use, where the actions of one actor have negative effects on the other and vice versa (*i.e.*, where the two actors' usage patterns are interdependent). In situations where more than one agent is using a limited resource, transaction costs arise, which may affect the governance of that resource. For example, in northern Sweden the forestry and reindeer husbandry sectors incur transaction costs during consultations over land-use management. The analysis presented here indicates that the transaction costs incurred by the forestry industry are mainly affected by the number of consultations held, and that the industry's costs could be reduced if more of the reindeer-herding communities drew up formal land-use plans (RBP). The availability of these RBP affected the behaviour of the forestry companies' agents. For example, they were more likely to draw up detailed plans prior to consultations when a RBP was available. The method used to measure and model transaction costs may be useful in other situations involving multiple interdependent actors competing for the use of a common resource, especially in cases involving co-management.

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Introduction

In northern Sweden, forest owners have been in conflict intermittently with local reindeer-herding Sami communities since the middle of the 20th century. Forest owners typically wish to exploit timber resources, while reindeer herders, with customary or immemorial usage rights, utilize the land as a natural grazing area to provide fodder for their reindeer. These land practises are not always compatible, and each has negative effects on the other; *i.e.*, interdependence, which cause conflicts between the two groups (see further discussion on interdependence in Widmark and Sandström, 2011). In an attempt to alleviate these disputes the Swedish government initiated mandatory consultations between the two parties in 1979. The purpose of the consultations was to involve both groups in land-use management and thereby reduce conflicts and encourage the groups to strive towards co-management. Institutional arrangements, such as consultations, are crucial to avoid overexploiting resources but may themselves cause costs that exceed the value of the resource (Carlsson, 2008). It is therefore vital to understand the effect of transaction costs to evaluate the success of co-management, and to enable an

analysis of why some governance institutions succeed and others fail (Bromley, 1991; Williamson, 2000; Paavola and Adger, 2005; Paavola, 2007).

Previous research on the uneasy relationship between the forestry sector and reindeer-husbandry communities in the Nordic countries has highlighted (*inter alia*), the negative economic effects of forest management on the reindeer herders (Bostedt et al., 2003; Zhou, 2007; Widmark and Sandström, 2011). Research has also shown that the consultations are not working as well as intended and stakeholders as well as the government has requested further research on the economic effects of consultations (Sandström et al., 2006; Sandström and Widmark, 2007; Widmark and Sandström, 2011). Widmark and Sandström (2011) made an attempt to evaluate the economic impact of consultations by identifying the drivers of transaction costs and trying to assess the effect of consultations. However, there have been little research of the factors that influence transaction costs (Coggan et al., 2010), and no method for measuring monetary transaction costs in multiple land-use situations was available at the time. Therefore, a model for evaluating the impact of such costs was proposed in Widmark and Sandström (2011), but no estimates could be provided.

This paper focuses on the transaction costs associated with the consultations, aiming at further developing a theoretical framework and a robust methodology for measuring transaction costs in monetary terms. The model developed by Widmark and Sandström (2011) is used here to estimate transaction costs in joint forest

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management in northern Sweden. Although both parties incur transaction costs throughout the process of gathering information, planning, conducting consultation meetings, adjusting land use plans, *etc.*, the focus is on the transaction costs incurred by the forest company group, leaving analysis of the reindeer herding party for future studies. The focus in this study is on the consultation process *per se*, trying to find factors that influence the size of the costs before, during and after these consultations. In this, we disregard background factors such as the complexity of the conflict, the lack of clarity regarding property rights, and the unequal distribution of power between forestry and reindeer husbandry since these factors are not easily influenced by the actors themselves. Knowing what is affecting the transaction costs may also help to reduce them and to mitigate conflicts in land use management in presence of interdependence in general and in northern Sweden in particular.

Theoretical framework

Negative effects of natural resource use

Negative interaction between the actors caused by common land-use may be defined either as an externality situation or interdependence. Externality prevails when an unintended and uncompensated effect occurs, which makes the externality concept more specific than the wider concept of interdependence, where the choice of one agent affects the choices of other agents over the same resource (Pigou, 1920; Coase, 1960; Paavola and Adger, 2005). A growing body of literature analysing environmental problems use interdependence as a starting point, rather than externality (Ostrom, 1990; Keohane and Ostrom, 1995; Paavola and Adger, 2005; Paavola, 2007; Hagedorn, 2008). Describing a governance situation by interdependence helps in understanding the design of an institutional arrangement (Ostrom, 1990; Paavola and Adger, 2005). In the case of the forestry-reindeer sector, a balance between the different interests (timber or grazing ability) is the goal of the institutional arrangement. The agents in the forestry-reindeer husbandry situation cause negative effects on each other; lichens are affected by forestry activity and forestry – at least to some extent – is affected by reindeer husbandry activities. Thus, the circumstances are more akin to interdependence, than to an externality situation (Widmark, 2009; Widmark and Sandström, 2011).

The interaction of the two groups can be described as a common pool resource (CPR) problem involving one of the non-timber amenities produced by the forest. Commercial timber felling reduces the amount of lichen in the forest, but reindeer husbandry is dependent on the lichen for grazing. This gives rise to a rivalry over the land (subtractability). Both actors have rights to use the land and it is impossible to exclude the other land-user, as is typically the case in CPR situations (Ostrom, 1990; Widmark, 2009).

Interdependence and transaction costs

Transaction cost theory, originating from basic microeconomic theory, is based on the assumption that information is costly to retrieve in imperfect markets (Dahlman, 1979) and the term transaction cost has several definitions. According to new institutional economics, leading from Williamson (*e.g.*, 1998, 2000), institutions are incapable of perfectly resolving all interdependencies, and negotiations will create transaction costs (Williamson, 1985; Paavola and Adger, 2005). Transaction cost analysis in natural resource management and its effect on environmental governance is a growing field (see Falconer and Saunders, 2002; Mburu et al., 2003; McCann et al., 2005; Paavola and Adger, 2005; Adhikari and Lovett, 2006; Paavola, 2007; Rørstad, 2007; Kuperan and

Abdullah, 2008; Coggan et al., 2010; Vatn, 2010; Enengel et al., 2011; Mettepenningen et al., 2011). However, only a few studies deal more specifically with governance of the forest resource in relation to transaction costs (see Zhang, 2001; Behera and Engel, 2006; Ray and Bhattacharya, 2011). The importance of transaction costs in co-management situations is also recognized in recent literature (Bromley, 1991; Williamson, 2000; Paavola and Adger, 2005; Paavola, 2007).

Missing in the current literature is a method to measure transaction costs in an interdependent situation in monetary terms, in which stakeholders draw their livelihood from the same resource. The institutional arrangement – consultations – were created in order to mitigate conflicts caused by the interdependence, but have had limited success in doing so (Sandström and Widmark, 2007). To understand why the institution, in our case consultations, are unsuccessful and find proper improvements it is therefore important to develop a theoretical framework to measure these costs (Bromley, 1991; Williamson, 2000; Paavola and Adger, 2005; Paavola, 2007; Widmark and Sandström, 2011).

According to Abdullah et al. (1998), following Williamson (1985), transaction costs can be divided into *ex ante* and *ex post* costs (Paavola and Adger, 2005). *Ex ante* costs include a range of expenses incurred in devising appropriate regulations and the institutional bodies required to manage a shared natural resource, while *ex post* costs include the costs of implementing and monitoring these various arrangements. The model developed by Widmark and Sandström (2011) specifies four main transaction cost types, two *ex ante* and two *ex post*: information costs, collective planning costs, collective decision-making costs, and operational costs. Information costs comprise the costs of acquiring knowledge of the resource and its users, and of gathering information on the resource. Collective planning costs include those incurred in planning and coordinating land-use by taking the other agents' usage patterns into account. The *ex post* transaction costs include collective decision-making costs (expenses associated with consultation meetings, site visits and the subsequent adjustments of land use management plans) and operational costs (arising from monitoring and evaluating land-use and conflict resolution) (see further Table 1).

This paper contributes to the theoretical literature with an approach to analyse natural resource management, especially where interdependence prevail, and complements the existing literature by adding on a model and a method to measure transaction costs in monetary terms. The model is especially useful in situations where the function of management is in focus. In this case, the aim of analysing the established format of consultations, besides improving the multiple land-use situations, is to find causal factors influencing transaction costs. The results may be used to find acceptable solutions that improve institutions' activities and thus minimize transaction costs and reduce negative effects (Hanna, 1994; Abdullah et al., 1998; Paavola and Adger, 2005).

Case study

Case study area and its actors

In northern Sweden (see Fig. 1), forestry is practised by a large number of non-industrial forest owners, small companies and four large, land-owning companies. The four large forest companies (owned by private investors or the Swedish government) own around 9.7 million hectares, or 59% of the forest land in the region (Swedish Forestry Agency, 2010). Traditionally, the forest companies have managed their forests mainly for the production of timber and pulpwood, but recently biomass for energy production has become an increasingly important additional assortment.

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