# Bringing transparency into the process: Social network analysis as a tool to support the participatory design and implementation process of Payments for Ecosystem Services

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### ABSTRACT

Payments for Ecosystem Services (PES) are criticized, amongst other reasons, for their basis in ideas suited to the neoliberal political economy and for the unequal distribution of power inherent in such models. However, PES can be a natural resource management approach that combines social and environmental objectives so that they not only serve to protect ecosystems such as tropical forests and wetlands but also to improve social conditions and rural development. Particularly for community-based PES, tools are needed to bring transparency to PES institutional settings and actor constellations by revealing power relations, as well as to empower local actors to engage in social learning through participatory processes. Considering both of these aspects will improve the equity aspects of PES and establish a social context conducive to a payment scheme that considers local behaviors and attitudes towards conservation. Close collaboration – in knowledge co-production processes – between social science and practitioners can address these challenges and support the PES design and implementation process.

In this paper, we demonstrate how Net-Map, as a specific tool for Social Network Analysis (SNA), can make actor relations visible for the purpose of group discussion within participation processes. We present how the results of participatory Net-Map Interviews can be used for participatory PES development, implementation and evaluation. In particular, we explain and discuss this for three case studies in Costa Rica.

We conclude that this combination – using empirical data from social sciences for participatory planning – facilitates the creation of a common understanding of the PES-governance models, the creation of ownership, and the consolidation of transparency and trust amongst the participants, as well as reflection on the existing social capital necessary for implementation. The results of the Net-Map tool support the design of inclusive and adaptive processes that shape institutions, choices, design and the implementation of policy instruments such as PES. The additional value of the tool is that it makes these processes transparent by generating knowledge during a participatory process and helps to balance the actors' interests and values. This method of undertaking research in combination with workshops has its limitations, as it reveals – to a group – confidential information given in personal interviews. Further, for the scenario development of PES design, actors must have a certain level of openness and creativity so that the PES design does not merely end up being a copy of the initially net-mapped PES example.

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## 1. Introduction

In recent years, the idea of Payments for Ecosystem Services (PES), defined as a program in which "land users are paid [...] for reducing allowable negative external effects on ecosystem services or for taking action to preserve or restore ecosystem services and biodiversity" (Matzdorf et al., 2014:12), has been promoted as a progressive governance model for environmental protection (Engel et al., 2008; Wunder, 2008). PES foster the provision of ecosystem services and biodiversity for the benefit of human well-being, which means that this type of natural resource management may not only protect nature but also has positive impacts

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on social issues, such as poverty alleviation, rural development and the improvement of socio-economic conditions in general (Adhikari and Agrawal, 2013; Pagiola et al., 2005; Muñoz-Piña et al., 2008). Consequently, PES is one approach to combine social and environmental instruments for natural resource management.

Nevertheless, PES are also criticized, mainly for three reasons (Van Hecken et al., 2015): (1) PES instruments are inappropriate because they use market-based solutions to environmental problems caused by market capitalism (Wittman et al., 2015; Anderson and M'Gonigle, 2012; Norgaard, 2010; Muradian et al., 2013; Lohmann, 2008); (2) ES are seen as commodities based on separate, additive entities, which neglects the complex dynamics between ecological and social systems (Kosoy and Corbera, 2010; Muradian et al., 2013); and (3) PES hardly consider aspects of environmental justice (Martin et al., 2014; Sikor and Newell, 2014; Pascual et al., 2014). PES suffer from "incomplete information, particularly regarding the relationship between ecosystems, human interventions and the provision of environmental services." (Muradian et al., 2010). Van Hecken et al. (2015) go a step further, arguing "that current approaches to PES remain weakly theorized, socially and politically, resulting in a merely superficial understanding of the roles of culture, agency, social diversity and power relations in the shaping of PES institutions and their outcomes." To confront these challenges, the authors claim that an "actor-oriented perspective with focus on power, related to knowledge, meaning and inequality, can help de-fetishize and re-politicize PES, and contribute to a better understanding of how purposely designed policy interventions are adapted locally so that they tend to materialize in unexpected ways." (Van Hecken et al., 2015: 118). Therefore, stakeholder participation during the process of PES design and implementation is essential to the development of locally adapted PES and equitable approaches to PES.

Social Network Analysis (SNA) is a suitable methodology to uncover involved actors, their motivations and power relations, and institutional settings. Thus, SNA can be used to bring transparency into PES governance and to foster social learning and co-production of network knowledge. These aspects have been proven to support the closure of similar gaps in other areas of environmental governance (Hauck et al., 2015).

We follow Reed et al. (2010) and understand social learning as a "change in understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks" (Reed et al., 2010). This highlights the importance of social interaction, such as social networks, for social learning: networks influence people's opinions and views through the transmission of information and deliberation of ideas (Hunter et al., 1991; Winter et al., 2007). Therefore, learning is situated within wider social units or communities of practice (Wenger, 2000), defined as "groups of people informally bound together by shared expertise and passion for a joint enterprise" (Wenger and Snyder, 2000: 139). Social learning is a process of social change in which people learn from each other in ways that can benefit wider social-ecological systems. However, it cannot be automatically assumed that the conditions and methods necessary to facilitate social learning are available.

Both concepts, SNA and social learning, can be brought together under the framework of knowledge co-production (Schuttenberg and Guth, 2015): facilitated collaboration, which emanates from individual capabilities, is needed within a co-production process. This process produces three types of outcomes: immediate outcomes (such as neutral working space, empowered stakeholders, strong social capital in terms of relations and cooperation between actors, transformative learning); intermediate outcomes (such as the genuine constituencies and influential knowledge that the stakeholders perceive); and ultimate outcomes (actions that are implemented and reflect the best available knowledge).

Knowledge co-production refers to "an inclusive, iterative approach to creating new information; it is distinguished by its focus on facilitating interactions between stakeholders to develop an integrated or transformational understanding of a sustainability problem" (Schuttenberg and Guth, 2015). Therefore, knowledge co-production can be both a governance strategy and a research method. (Schuttenberg and Guth, 2015). Here, we understand knowledge co-production as scientific integration – as exchange and collaboration among scientists and local stakeholders (Mauser et al., 2013; Lang et al., 2012). There is a knowledge gap with regard to the methods and concepts used in knowledge co-production: "Co-production of knowledge in global change research changes the way research is done and needs new methods and concepts. It requires appropriate communication tools, institutional arrangements, and tailored funding possibilities." (Mauser et al., 2013:428).

In this paper, we approach co-production as both a governance strategy and as a research method. Our research question targeting governance aspects is as follows: How can we use SNA for participatory planning procedures to develop and implement locally adapted PES? Our question targeting the research method is as follows: Is SNA a tool for knowledge co-production and social learning in the context of developing locally adapted PES?

This article is structured as follows: In chapter 2, we present our three case studies and the initial situation surrounding participatory processes. In chapter 3, we introduce the methodology used in this paper. In chapter 4, we present our results regarding the two research questions; that is, the suitability of SNA for participatory planning procedures as well as for social learning. Finally, in chapter 5, we discuss our results and critically reflect on the additional value of using a social-empirical method for participatory PES development and implementation; we end the article with concluding remarks.

## 2. Three case study settings

This study was part of a larger transdisciplinary research project on the capacity of civil society organizations (CSOs) and their networks in community based environmental management. As the project followed a transdisciplinary approach, it aimed to foster knowledge exchange between researchers and local stakeholders; additionally, a transfer of best practices in environmental management was anticipated within the different regions. In Costa Rica, the best practice in environmental management was a community-based blue carbon PES project in Golfo Dulce. Transfer regions were Térraba Sierpe and Nicoya, where PES had been planned but not yet implemented, or not yet planned but in the early phase of development (see Fig. 1). In this way, the research project tested the improvements to and development of an existing instrument – such as PES – in new contexts. Additionally, the CSO's rootedness was different in the three regions: in Golfo Dulce, the CSO had a long history of local engagement, but the CSO was less rooted and was newer in the other two regions.

• Golfo Dulce

The Golfo Dulce region on the Osa peninsula is situated on the Southern Pacific Coast of Costa Rica; it is located in the Puntarenas province and is part of the Osa Conservation Area (ACOSA). The project investigated here is located on the inner side of the Osa Peninsula, on the shores of the Golfo Dulce Bay. The entire area is one of Costa Rica's best preserved wilderness areas and is a