A hybrid Coasean and Pigouvian approach to Payment for Ecosystem Services Program in West Lombok: Does it contribute to poverty alleviation?

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A B S T R A C T

The Payment for Ecosystem Services (PES) concept is mainly based on Coasean economics theory that emphasizes the creation of a voluntary or market-based transaction for ecosystem services. Alternatively, many PES practiced in developing countries are based on Pigouvian economic theory allowing government intervention such as through regulation, tax or subsidy. A hybrid PES approach that compound Coasean and Pigouvian theory was developed in West Lombok Indonesia leading to a new policy paradigm that combines elements of both a voluntary market-based and mandatory policy-based system. This study aims to assess how the hybrid PES program contributes to poverty alleviation. By employing a participatory econometrics approach, this study found that the hybrid PES system does not contribute to poverty alleviation in short-term. It is possible that this PES program contributes to poverty alleviation in long-term.

1. Introduction

Natural resources use frequently creates both positive and negative externalities that affect people differentially. Externalities are defined as external benefits or costs to some people that emerge as a result of others' activity (van den Bergh, 2010). Externalities can be positive if they come as benefits and can be negative if they come as costs for the affected parties. A simple example of a positive externality is that people can enjoy free clean and fresh air as a result of trees planted by other land-owners. On the other hand, unpleasant air as a consequence of the existence of a nearby chicken farm could be an example of a negative externality. Positive externalities are not likely to be the subject of contestation since the affected parties benefit from their existence. By contrast, negative externalities are often an issue of interest since their existence is likely to raise problems for those that are affected, and may ultimately result in disregard or damage to the natural resource itself.

To promote natural resources sustainability by reducing negative externalities, a relatively new paradigm has been developed into a new policy instrument, namely Payment for Ecosystem Services (PES). Ecosystem services can be defined as the tangible and intangible ecological components, the benefits of which are enjoyed by people directly or indirectly (Costanza et al., 1997; MA, 2003; Boyd and

Banzhaf, 2007; Fisher et al., 2009). Examples of ecosystem services include carbon sequestration, biodiversity conservation, watershed protection, and landscape beauty (Ferraro, 2001; Wunder, 2005). These are commonly categorized as public goods or quasi-public goods and typically are free to consume. However, the emerging scarcity of these resources causes them to become economic goods with the requirement to be managed and potential to be commercialized (Wunder, 2005).

In mainstream PES literature, PES is defined as a transaction based on mutual principles of buying and selling where a well-defined ecosystem service is bought by service beneficiaries from service providers with a condition that the providers continue to conserve the resource in order to secure the service provision (Wunder, 2005, 2007; Pagiola, 2007; Sommerville et al., 2009). PES is often implemented as a program to support natural resources restoration and conservation. As Muradian et al. (2010, p. 1205) argue, "PES aims to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources".

The terms ecosystem services and environmental services are often used interchangeably in academic and public policy literatures (Muradian et al., 2010) although there is inconsistency among scientists in the use of these terms (Derissen and Latacz-Lohmann, 2013). The term ecosystem services is used in this paper since it is the most

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commonly used in literatures because the definition of environmental services tends to be more ambiguous (Derissen and Latacz-Lohmann, 2013).

The concept of ecosystem services can be traced back to 1864 when Marsh wrote about the significant role of nature in human life (Marsh, 1864). More than a century later, concern about the unregulated use of ecosystem services continues to raise scholars' attention. For instance, in the late 1960s King et al. (as cited in Gómez-Baggethun et al. (2010)) published on the functions of nature in serving human needs. Throughout the 1970s and 1980s, scholars focused on people's dependence on the environment and the concomitant economic impacts, thus raising greater public interest in environmental protection and biodiversity conservation (Westman, 1977; Pimentel et al., 1980; Ehrlich and Ehrilch, 1981; Costanza et al., 1997). A paper presented by Costanza et al. in 1997 was a landmark in the development of the concept and awareness of ecosystem services. The concept of ecosystem services started to be employed in the policy arena in the late 1990s and early 2000s (Gómez-Baggethun et al., 2010).

Pagiola (2008) points out that Costa Rica's country-wide program, called *Pago por Servicios Ambientales* (PSA), in 1997 was the first full-scale implementation of the formal PES mechanism in a developing country. The PSA was developed to address the problem of deforestation when Costa Rica had become widely known as having one of the highest deforestation rates at the time.[1] As the best-known PES example (Pattanayak and Wunder, 2010), Costa Rica's PSA program succeeded in raising the interest of many countries in introducing PES programs as a tool for ecosystem protection including Brazil, Mexico, Colombia, Bolivia, Ecuador, China, and Indonesia. Further impetus came when the Kyoto Protocol established the Reducing Emission from Deforestation and Forest Degradation (REDD) program as a possible vehicle to articulate international PES schemes in the forestry sector.

Currently, there are four major types of ecosystem protection schemes operating globally using PES approaches (Wunder et al., 2008; Greiner et al., 2009; Engel et al., 2008):

1. Carbon sequestration and storage (e.g. an electricity company pays farmers or landowners for planting and maintaining additional trees). The REDD program is another example of this PES type which aims to compensate the effort of land owners in reducing carbon emissions from deforestation and forest degradation (van Wilgen et al., 1998; Agrawal et al., 2011; Venter and Koh, 2012);
2. Biodiversity protection (e.g. conservation donors paying local people for restoring areas to create a biological corridor);
3. Watershed protection (e.g. downstream water consumers paying upstream forest users for adopting land management that controls deforestation, soil erosion, flooding risk, etc.);
4. Landscape amenity (e.g. a tourism operator pays a local community for maintaining landscape beauty or not hunting in a forest being used for ecotourism).

The PES schemes that have been introduced world-wide often employ voluntary market- based PES (Pagiola, 2008; Wunder and Albán, 2008; Zhang et al., 2008; Greiner et al., 2009; Prasetyo et al., 2009; Clements et al., 2010; Matthew et al., 2010; Pereira, 2010; Milne and Adams, 2012). Most of the buyers come from the private sector, and the sellers are farmers located in the areas where the ecosystem services are sourced. Both parties contract to make voluntary transactions of certain ecosystem services (mostly related to water quantity and quality).

Since high levels of poverty are often spatially correlated with remote conservation areas that provide environmental services (Pagiola et al., 2005), it is argued that PES can be used as a tool for

poverty alleviation (Duncan, 2006; Pagiola, 2007; Wunder and Albán, 2008). However, the reality of the impact of PES programs on the livelihoods of poor households is an empirical question. Muradian et al. (2010) argue that the poverty alleviation goals of PES programs are hard to be achieved in some cases due to the misdistribution of PES benefits that should go to the poor. They stressed that benefits were often disproportionally distributed to the well-off landowners who hold formal land tenure. Similarly, Pagiola et al. (2005) contend that PES has primarily been an instrument for maintaining natural resource efficiency and not for poverty alleviation. They argue that "PES programs are not a magic bullet for poverty reduction, but there can be important synergies when program design is well thought out and local conditions are favorable" (Pagiola et al., 2005, p. 248). How effective of a PES program in improving the community members' livelihoods, and hence alleviating poverty in rural areas that supply environmental services is an open question that this study intends to address.

The reminder of this paper is organized as follows. Section 2 describes the methodology used in the study. Section 3 discusses the concept of Coasean and Pigouvian approach on PES programs, PES program introduction in West Lombok including how the program integrated into a community forest practice, the payment system and the role of intermediary. The results of this study including qualitative survey result and econometrics analysis are presented in Section 4. Finally, Section 5 provides the conclusions of this study.

2. Methodology

This study was conducted in Sesaot Community Forest in West Lombok, Indonesia. This forest is important for water supply to the most area of Lombok Island. Households and industries in two districts – Mataram City and West Lombok – use water from this forest for their daily needs. The Sesaot forest also supplies water for agricultural land in these districts as well as to two other districts, Central Lombok and East Lombok. The Sesaot forest is a pilot for a community forest management scheme in Lombok, where the PES program has also been introduced (see Fig. 1).

A mixed research method was used in this study. Mix method is able to minimize the weakness of solely quantitative and qualitative methods (Rao and Woolcock, 2003; Creswell and Plano-Clark, 2006). Integrated quantitative and qualitative method provides more comprehensive evaluation and evidence for a development program such as the PES (Rao and Woolcock, 2003; Creswell and Plano-Clark, 2006). Following Rao and Woolcock (2003), the mixed method approach used in this study was "participatory econometrics". The participatory econometric approach accommodated certain steps in sequence: (1) in-depth interviews to obtain a grounded understanding of the PES issue; (2) survey instruments based on understandings developed from the interviews and field visits; (3) hypotheses derived from qualitative work that was then tested using survey data.

Thus, there are variety sources of data for this study: (1) documents: legal documents, reports, and contracts between the PES intermediary agency (IMP) and farmers' groups; (2) maps, (3) interviews; (4) surveys. These data were collected through conducting two rounds of fieldwork in West Lombok. The first fieldwork was carried out in May–June 2014, and a second fieldwork period in January–May 2015. The first fieldwork aimed to generate deep information related to PES development and practice; the second fieldwork aimed to clarify the results from the first stage as well as to generate data from the survey and further observation. This multiple data collection technique allowed the researcher to perform triangulation (Burns, 1997) to cross check, compare and contrast data among several different sources.

Personal semi-structured interviews were conducted in the first stage of fieldwork with 22 different informants including PES initiators, a water services officer, forest service agency officers, a regional development plan agency officer, a regional environmental sector

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[1] Costa Rica's deforestation rate between 1973 and 1989 had an average logging rate of 32,000ha/year (Brown and Bird, 2010).