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Payment for ecosystem service: A meta-analysis research

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INTRODUCTION

Payment for Ecosystem Services (PES) spread rapidly in the last decade and is defined as a new conservation paradigm (Jindal et al., 2013), as the popular mode for governmental and non-governmental agencies use in environment protection (Zabel & Roe, 2009), as the domain practical approach of commercialization of ecosystem services (Muradian, 2010). PES design is to identify at least one purchaser and one provider of Ecosystem Services (ES) (Wunder, 2005). In line with the cost-effect principle, only when the provider supply conservation outcomes, should the purchaser pay with a reasonable price (Wunder, 2005; Jindal et al., 2013). The contradiction between market efficiency and social / ecological sustainability can be a win-win situation through the practice of PES. The implementation of PES provides a path to understanding the interdependent relationship between protection and utilization of natural resources (Tacconi, 2012).

LITERATURE REVIEW

PES have attracted more and more attention, both theoretical and practical. Using the concepts of natural capital, environmental service, and ecological services (Westman, 1977; Pimentel, 1980), in 1981, Ehrlich & Ehrlich, first introduced the concept of ecosystem services (ES). Ecosystem services emphasizes on the social value of natural features. From 1990 to 2000s, ES became an academic hot topic. A number of scholars tried to assess the value of ES and to quantify ES (Gren et al., 1995; Wilgen, 1996; Constanz, 1997). ES is so-called welfare that people could directly or indirectly obtain from ecosystem (Constanz, 1997). After 2000s, researches began to emerge in analysing ecosystem services in the market context (Wunder, 2005; Muradian, 2010). The commercialization of ES is also utilized as the basis for decision-making in more and more countries and regions, which participate in the practice of eco-compensation.

The value of ES comes from two categories: ecological products and ecological services. Ecological products refer to tangible products, including scenic beauty, and various resource and raw

materials. Ecological services are intangible. This term refers to climate regulating, biodiversity conservation, and nutrient loop. The global value of ES has been valued at \$ 33 trillion US dollar per year on average (Constanza, 1997). Constanza (1997) measured the value of global ES through various approaches: opportunity costs, shadow prices, cost-recovery analysis, human capital, asset value and the travel cost method. The Surrogate market approaches (e.g. travel fees plus the expense of protection) and the hypothetical market approach (willing to pay for ES) are two prevalent method for determining the value for ES.

Based on the big value size of ES, purchasers and providers appear and are willing to make Payment for ES (PES) (Wunder, 2005). Payment for ES is viewed as an economic incentive, based on voluntary transactions (Wunder, 2005; Muradian 2010). The objective of PES is to ensure both social/ecological sustainability and market efficiency.

Its importance and legitimacy notwithstanding, the practice of PES in China showed a series of problems. With single capital source and the low compensation, it became heavy financial burden on the government. Both national and regional financial budgets for PES were relatively low, and could not guarantee both ecological protection and economic development. The failure of eco-compensation may cause the further deterioration of the environment. The process of PES was lacked of legal protection. At present, there are inadequate supporting systems of rules, laws and regulations for the providers (land users) and purchasers (government).

PURPOSE

Given the fact that above concerning has proliferated and not yet to be investigated, the purpose of this study was to investigate the models of PES in nature reserves, in order to provide some theoretical support for the practice of PES. Our intention is twofold:

1. This study will define the concept, and mechanism of PES and its stakeholders, following the systematic literature review (meta-analysis) and coding steps of grounded theory.

2. This article explores the empirical evidence of PES practices at 8 destinations, which contains cases in Brazil, Costa Rica, Japan and Mexico provide references for the establishment of PES in China. Specifically, the following questions will be addressed in the current research:

- What are the motivations of implementing PES?
- The role of stakeholders of PES. Who is the host/ beneficiaries (e.g. community residents), guest/ eco-builders or provider (ecosystem) and coordinator / mediator (e.g. government) of PES?
- The relationship between these stakeholders, how they interacted?
- The mechanism/ procedure to implement PES?
- Comparison of the advantages and disadvantages of the implementation across the 8 selected destinations.

METHODOLOGY

Meta analysis will be used to identify. In this approach, understanding the concept, stakeholders and mechanism of PES, a systematic literature review is yielded 81 empirical studies of PES, through data sources from Hospitality and Tourism Complete, Science Direct, and Social Science Index. Mining the articles manually is to report the observations with the identical variables. Through the application of meta-analysis, independents variables and dependent variables are tested to be significant correlated with the performance with implementing PES.

Case study is so-called “empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2003, p. 13). Case study is appropriate here for seeking an answer to “what,” “how,” and “why” of PES (Adler & Ziglio, 1996; Yin, 2003). Our cases were selected basing on five criteria: 1) Destinations are implemented or implementing PES, or undertook similar projects as PES. 2) The program of PES must have clear compensation standards, economic incentives, and definable the providers of ES. 3) The destination was typical or representativeness of PES, in both internationally and Chinese context.

EXPECTED CONTRIBUTIONS AND IMPLICATIONS

The contributes of meta-analysis to the literature are by providing clearer definition of the concept, the stakeholders and the theoretical framework of different types of PES mechanism. The PES procedure has been practical used frequently while rarely theoretically substantiated. This study also contributes to a better understanding of PES, which may provide fundamentally linked to some suggestions for the conservation practice of China, such as regulatory, persuasive and market-based instruments (Greiner & Stanley, 2013). First, to illustrate the Government-led mode in China, and is in need of introducing more active market mode to increase the limiting funding. Second, it provides crucial basis for establishing PES standard. Third, in addition to funding, other types of payment for ecosystem service should be bring in, such as material, technical, policy and social criteria support.

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