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## The Different Dimensions of Livelihood Impacts of Payments for Environmental Services (PES) Schemes: A Systematic Review



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### ARTICLE INFO

#### Keywords:

Ecosystem services  
Conservation incentives  
Impact  
Evaluation  
Developing countries

### ABSTRACT

Through a systematic review of peer-reviewed and grey literature, this paper analyzes evidence of the livelihood impacts of Payments for Environmental Services (PES). Forty-six studies assessed PES livelihood impacts. The assessments presented more positive livelihood impacts than negative ones, focusing on financial benefits. Non-monetary and non-material impacts of PES were largely understudied. Most reviews focused on ES providers, hindering the understanding of broader societal impacts. The review yielded examples where participants lost from their participation or where improvements in one livelihood dimension paralleled deterioration in another. Consequently, we identified key research gaps in: i) understanding the social and cultural impacts of PES, ii) evaluating environmental and economic additionality from improving other ES at the expense of cultural ones, iii) and assessing PES impacts in terms of trade-offs between multiple livelihood dimensions. Moreover, increased knowledge is needed on the impact of PES on changes in household expenditure and choice, and on trade-offs between household income and inequality in ES provider communities. Finally, if PES schemes are implemented to sustainably improve livelihoods, targeting disaggregated populations, understanding equity and social power relations within and between ES providers and users, and better monitoring and evaluation systems that consider locally relevant livelihood dimensions are needed.

### 1. Introduction

The first experiences with Payments for Environmental Services (PES) date back to the 1990s. PES are agreements between providers and users of environmental services<sup>1</sup> (ES) in which users who benefit from ES compensate providers who maintain them off-site. In the agreement, ES providers must take action to maintain and improve ES provision, or reverse their degradation, to achieve conservation goals (Wunder, 2015). PES rely on the idea that positive environmental externalities can be internalized by creating appropriate markets and market instruments such as conditional rewards (Pearce and Turner, 1990). Wunder (2015) redefined PES as voluntary transactions (not necessarily market-based) between service users and providers (not limited to markets or individuals) to generate off-site services (benefits received off-site that cannot be otherwise charged). These transactions

are conditional on agreed rules of natural resource management. Other mainstreamed definitions rely on the incremental provision of environmental services (Sommerville et al., 2009; Tacconi, 2012) or on incentives to align individual/collective land-use decisions and social interest by transferring resources between social actors (Muradian et al., 2010). In practice, most PES schemes do not follow the original Coasean concept where externalities are best dealt with through private negotiations (Martin-Ortega et al., 2012; Schomers and Matzdorf, 2013). Some definitions reflect how PES were designed in practice. For example, reward-based conceptualizations include pro-poor or fairness objectives as part of the PES definition criteria (Bulte et al., 2008; Iftikhar et al., 2007; Van Noordwijk et al., 2007). This implies a synergy between socioeconomic and environmental impacts, usually assumed by nongovernmental organizations, donors, and international co-operation agencies when providing support to PES (Wunder, 2008).

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<sup>1</sup> The term “environmental” services is argued to include ecosystem services, as they can be considered a subcategory focusing on the human benefits derived from natural ecosystems.

However, this assumption has seldom been assessed (Pagiola et al., 2005; Pattanayak et al., 2010) nor, more in general, has the link between well-being and environmental indicators (Cruz-Garcia et al., 2017).

The effectiveness of PES in achieving multiple objectives simultaneously is debatable (Muradian et al., 2013; Wunder, 2013).

Few studies have explored or proved the synergies between PES and livelihood outcomes (Landell-Mills and Porras, 2002; Pagiola et al., 2005; Wunder, 2008; Tallis et al., 2008). Certainly, assessing the socioeconomic impacts of PES is complex and requires evaluation across a range of actors – ES providers, direct users, and beyond (Grieg-Gran et al., 2005; Hegde and Bull, 2011) – and time scales. Systematic monitoring and evaluation of PES, including their long-term environmental and livelihood effects, lag behind (Ezzine-De-Blas et al., 2016; Hejnowicz et al., 2014).

Therefore, understanding to what extent and under what conditions PES schemes have successfully improved livelihoods is urgently needed to guide future PES implementation with synergistic environmental and livelihood goals.

In this paper, we examine published evidence of the livelihood impacts of PES, based on a systematic review of peer-reviewed and grey literature available online. As different authors refer to impacts on poverty, well-being, equity, and so on, we use the term livelihoods as an umbrella definition. Using the sustainable livelihoods approach, we define livelihoods as capabilities and means of living embedded within a paradigm of equity and sustainability (Chambers and Conway, 1992). We analyze PES impacts in relation to different dimensions that contribute to sustainable livelihoods, including but not limited to financial, social, human, physical, and natural capital. Our review aims to answer two research questions: (1) what is the evidence of livelihood impacts of PES schemes evaluated in the literature? and (2) what are the current gaps in the generation of evidence of livelihood impacts of PES schemes?

## 2. Contextual Background

According to the literature, the positive effects of PES include increased land tenure security (Lawlor et al., 2013), financial gains, income stability, and diversification (Pagiola et al., 2005; Wunder, 2008). Additionally, PES can generate health benefits through improving and stabilizing sources of drinking water (Wunder, 2008). PES can provide recreation benefits, cultural opportunities, strengthened social networks and institutions, and economic growth (Iftikhar et al., 2007; Tacconi et al., 2013).

PES can also generate negative livelihood impacts. Constraints to resource-extractive activities may lead to lower local production, price increases, and market dependency (Pagiola et al., 2005; Wunder, 2008). Social tensions can arise from unequal benefit appropriation (Grieg-Gran et al., 2005; Wunder, 2008). PES-induced land-use restrictions can affect cultural traditions (Trac et al., 2013; Yang et al., 2013). Disbursement of payments only in the first years of PES scheme operation can affect income stability in the long term (Mahanty et al., 2013; Tacconi et al., 2013).

Previous reviews that analyzed livelihood impacts, among other aspects of PES, are available. In their review of REDD+ schemes, Lawlor et al. (2013) find that, despite the lack of robust evidence, these incentives improved land tenure security and decision-making power but provided moderate income gains. According to Leimona et al. (2009), low population density in ES provider areas and low opportunity and transaction costs determine significant effects on rural income. Tacconi et al. (2013) illustrate that several PES schemes strengthened local institutions and community engagement with local government, and expanded farmers' networks. Samii et al. (2014) reported trade-offs between conservation and poverty reduction goals, but identified only two rigorous studies on livelihood impacts of PES. Hejnowicz et al. (2014) analyzed the conditions under which PES achieved multiple

objectives. Börner et al. (2017) highlighted an important gap in the analysis of trade-offs between PES ecological performance and social outcomes.

Calvet-Mir et al. (2015) highlighted the need to generate more evidence through systematic reviews to foster comparable analyses on PES scheme design and implementation. We address this by a systematic analysis of the published evidence of livelihood impacts of PES. While previous reviews focused on defined geographic or economic areas, outcomes, types of PES, or PES features, we provide a global search of PES evaluations that report any livelihood impact. We go beyond previous reviews by focusing only on livelihood impacts and comparing positive and negative impacts on disaggregated actors. We do not use a specific definition of PES and include all PES schemes defined as such in the publications found. Our analysis addresses the gap between PES theory and practice to contribute to ongoing debates on the role of PES in livelihood improvement, and the challenges of designing PES for this purpose.

## 3. Methodology

We systematically reviewed peer-reviewed publications and grey literature, following the PRISMA guidelines (Moher et al., 2009). A comprehensive search for peer-reviewed studies on the livelihood impacts of PES was performed using the online SciVerse Scopus (*title*, *abstract*, and *keywords* search) and Thomson Reuter's Web of Science search engine (*title* search, *topic* search). We did not specify document type, language, year of publication, or study region. The search terms used were “payments or rewards”, AND “environmental or ecosystem services”, AND “impact\*”, AND “evaluation or assessment”.

According to the [Greynet.org](http://www.greynet.org) definition, we included the following types of grey literature: institutional reports, working papers, consultant reports, non-peer-reviewed book chapters, and conference proceedings. We consulted the following databases: Agricola, 3ie, Abdul Latif Jameel Poverty Action Lab, Grey Literature Report, OpenGrey, OAIster, and Google. Given the different archiving systems of these databases, the search terms used were “payments or rewards for environmental or ecosystem services” AND “impact”.

We first searched all databases in April 2016 and then reran the whole search in January 2018 to update the analysis (Appendix A).

After removing duplicates and reading through all 1268 titles, we screened 885 records, of which we identified 74 eligible for full-text assessment. We excluded studies that reported only on the environmental impacts of PES or focused on the design, planning, frameworks, and concepts related to PES or other topics. We also excluded review papers in favor of studies that provided an in-depth analysis and evaluation of the livelihood impacts of specific PES schemes. The final sample of documents eligible for full-text review had 46 publications. We analyzed them in terms of who gained and who lost from PES implementation and whether they participated (as ES providers, users, or buyers) or not in the PES. We highlighted methods to evaluate impacts and sources of data collection.

Fig. 1 shows the methodological approach, while Appendix A details the databases consulted, the search terms used per database, and the final number of records included after removing duplicates.

## 4. Results

We briefly overview here the general trends of the studies reviewed. Appendix B details the 46 publications, while Appendix C provides a synthetic table with the main characteristics of the PES schemes they evaluated. Appendix D provides more detail about geographical distribution of the studies, key features of the PES evaluated, and the methods used by the studies to evaluate them. Finally, Appendix E shows the positive and negative impacts of PES in the studies reviewed, the method they used to analyze them, who gains and who loses from positive and negative impacts.

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