

Operationalizing payments for ecosystem services in Brazil's sugarcane belt: How do stakeholder opinions match with successful cases in Latin America?



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ABSTRACT

In this paper the initial draft design of a payment for ecosystem services (PES) scheme in a municipality within the sugarcane belt of São Paulo state, Brazil (PES-RC), is compared with prevailing characteristics of successful PES cases in Latin America (PES-LA). This systematic comparison is performed by analyzing four major characteristics of PES: identity of traded ecosystem service (ES); spatial scale; type of transaction involved between ES providers and beneficiaries; and the involved actors. Information on the biophysical characteristics, institutional arrangement and financial options of PES-RC were assessed using participatory methods. We found that on the one hand there is an agreement between our case study and the prevailing successful cases of PES-LA regarding the traded ES (water) and the PES spatial scale (local). However, stakeholder opinions diverge from the success cases when it comes to the type of transaction (cash preferred in PES-RC; in-kind in successful PES-LA) and the involved actors. Our results raise the question whether stakeholder opinions or the characteristics of successful (or failure) cases should be prioritized when planning and operationalizing new PES schemes. We argue that stakeholder participation should be considered as an additional success criterion for the construction of public policies directed towards PES implementation.

1. Introduction

The Brazilian Forest Code (FC) is the main law regulating land use and management in the country's farms since 1934 (Brasil, 2012; Soares-Filho et al., 2014). It requires landowners to protect native vegetation inside their properties through a Legal Reserve (LR; 80% of farm area in the Amazon and 20% in other biomes) and also through Areas of Permanent Preservation (APPs; forest alongside water bodies, hilltops and steep slopes). It was originally intended to “punish” non-compliant farmers by not granting them access to agricultural credits. Even though the law has been reviewed during the last decades, it has historically failed in its key-objective of conciliating agricultural production with conservation of natural resources, because both the compliance with and the enforcement of this law over the years have

been low (Soares-Filho et al., 2014). As a result, there is a considerably high deficit of natural vegetation in relation to what is requested by the FC, especially in the Amazon deforestation frontier areas and throughout the Atlantic Forest biome. This latter region is where large extents of sugarcane plantations, as well as pasturelands for cattle ranching and most of the country's population are located (Lapola et al., 2014) [see Supplementary material Section 1].

The new version of the FC issued in 2012 includes, for the first time in the history of this law, the possibility of payments or incentives for the conservation or restoration of ecosystem services (ES) such as carbon storage, conservation of biodiversity, water resources, soil properties, the fostering of cultural services and traditional knowledge, or simply the conservation of natural vegetation areas (Brasil, 2012). This represents a major step in the way LRs and APPs are seen in the

Abbreviations: APP, Areas of Permanent Preservation; CICES, Common International Classification of Ecosystem Services; ES, Ecosystem Services; ESM-App, Ecosystem Service Mapping Application; FC, The Brazilian Forest Code law; LR, Legal Reserve; NGO, Non-Governmental Organization; OC, opportunity cost; PCJ-WMC, PCJ [Piracicaba-Capivari-Jundiá water basins] Water Management Committee; PES, Payment for Ecosystem Services; PES-LA, Payment for Ecosystem Services in Latin America as analyzed by Grima et al. (2016); PES-RC, Framework of Payment for Ecosystem Services in Rio Claro – SP municipality, Brazil

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context of agricultural production, shifting from a paradigm of surveillance and fines for non-complying farmers to a paradigm of incentives for complying farmers. As such, PES schemes arise as a promising choice for landowners to comply with the FC (Grima et al., 2016; Pagiola et al., 2012).

However, the law does not specify the mechanisms through which ES could be identified, quantified and valued, neither how the PES schemes could nor should be organized in institutional and financial terms. So far, PES schemes in Latin America (PES-LA) are mostly implemented at the local scale [Supplementary material Section 2].

As such, it is reasonable to assume that one has to rely on the experience provided by successful cases of PES – regardless of their planning process – in order to increase the likelihood of success of new schemes under planning or implementation. On the other hand, the strong involvement of stakeholders in the planning, implementation and execution phases of a PES scheme is also increasingly seen as decisive for success (Alcamo et al., 2005; Grima et al., 2016; Henrichs et al., 2010; Priess and Hauck, 2014; Wegner, 2016). In this paper these two relevant and potentially antagonistic issues related to PES are confronted with the planning steps taken for developing a PES scheme in the municipality of Rio Claro (PES-RC) within the sugarcane belt of the state of São Paulo, Brazil. We compare them in a systematic fashion to the main characteristics of successful PES-LA as shown by Grima et al. (2016).

We explore the biophysical, institutional and financial options (which cover the major aspects of PES planning), to assess how they may influence the operationalization of PES-RC, applying participatory methods involving key stakeholders in the project either as ES providers, intermediaries or beneficiaries. As such, we assess:

- The portfolio of ES potentially supplied in the study region, via mapping ES related to the key land use types of the region;
- Stakeholder perceptions on ES and PES via different methods including a public survey, workshops and interviews;
- The link between stakeholder perceptions and the relevant legal frameworks, and, based on the previous items, defining the options for establishing the PES-RC scheme.

Finally, we systematically compare and discuss the characteristics that are shaping the PES-RC scheme under operationalization, with the overall characteristics of successful PES-LA.

2. Materials and methods

The methods used to pursue this paper's objectives were applied in two steps:

1. Acquisition of biophysical and socio-economic information about PES-RC planned in the study area. We collected information and assessed the opinions/perceptions about ES/PES from both potential ES providers and beneficiaries and also from intermediaries¹ such as governmental institutions who could have a role in the institutional, political, financial or technical aspects of PES-RC. The following approaches were developed concomitantly (Fig. 1): mapping of used ES in the study area; individual interviews with farmers; meetings with decision makers; public opinion survey; and workshops with stakeholders. The selection of stakeholders to participate in the workshops and interviews with farmers was based on a non-probabilistic sampling, or so-called convenience sampling (Ritchie et al., 2014). Despite the consideration that this strategy may induce a systematic bias in the assessed opinions, it is most

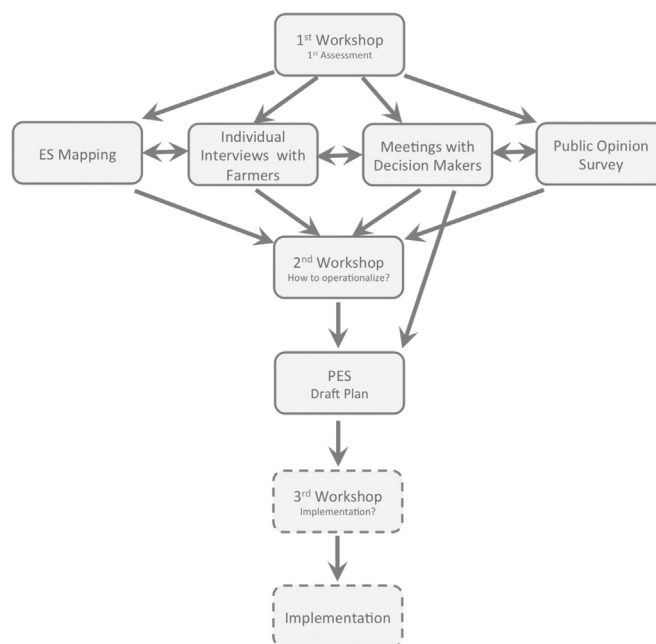


Fig. 1. Overview of the methods employed in this study for the acquisition of biophysical and socio-economic information and planning of the PES Scheme to be implemented in Rio Claro – SP municipality, shown in the order of execution (from top to bottom): the 1st workshop aimed at an initial assessment of farmers' and, to a smaller extent, decision makers' knowledge and perceptions about ES/PES; the mapping of ES aimed at identifying the current use of ES in Rio Claro municipality; individual interviews with farmers, meetings with decision makers and the public opinion survey targeted the assessment of detailed opinions from ES providers, intermediaries and beneficiaries; the 2nd workshop focused on the presentation of first results to decision-makers, and the discussion of regulations for a PES-RC and how to translate these opinions into a public policy; next step then was the elaboration of a draft plan for PES-RC by the scientists and decision makers, considering the opinions gathered in the 2nd workshop; next steps, are the 3rd workshop which will tackle the technicalities for implementing PES-RC and the implementation itself by the municipality government (dashed boxes, not addressed in this paper).

probably the only viable method to develop a participatory outline of a potential PES-RC, given that opinion surveys depend strongly on people's willingness to participate (Peterson and Merunka, 2014). The assessment of the current use of ES was based on a participatory mapping approach, which is presented below (see Sections 2.2–2.5).

2. Systematic comparison of the foundational characteristics of PES-RC gathered at "1" with the characteristics of successful PES-LA as presented by Grima et al. (2016). The aim here was to assess whether PES-RC was on the right track to a successful PES framework within the Latin American context. By "success" we mean that the PES scheme accomplishes its goals and attains some additionality (in environmental, social and/or economic terms) that would not be reached without the scheme (see Section 2.6).

2.1. Study region: Rio Claro - SP municipality

Rio Claro municipality is located in the centre-east part of the state of São Paulo and is considered a mid-sized town with approximately 200,000 inhabitants – with 97,6% living in the urban areas (IBGE, 2014). It is a typical municipality within São Paulo's sugarcane belt (in geographic and socio-economic terms), having sugarcane plantation widespread in its flat areas and pastures predominantly in the hilly areas (Fig. 2). Compared to other regions in Brazil, the study region is intensively managed, with high agricultural productivity and intense pressure on land resources, leading to the current 66% deficit in natural vegetation according to the FC (Soares-Filho et al., 2014), which caused the decrease of many important ES associated with

¹ Intermediaries are defined here as any institution to which both ES providers and beneficiaries will report and communicate with, implying that there is no direct contact, negotiation and/or reporting between providers and beneficiaries.

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