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ANALYSIS

The viability of local payments for watershed services: Empirical evidence from Matiguás, Nicaragua

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ABSTRACT

Using both qualitative and quantitative approaches, this article investigates the under-researched demand-side of locally-financed Payments for Environmental Services (PES). It assesses downstream users' willingness to pay (WTP) for improved tap water quality in a setting where upstream landowners are clearing watersheds. The research findings are indicative of a considerable WTP for improved drinking water services and a definite local awareness of upstream–downstream interdependencies, suggesting potential for successful PES. Contingent Valuation (CV), however, found a substantially lower WTP under a PES scenario than under an alternative scenario involving infrastructure investments. The qualitative research angle indicates that the feasibility of a locally-financed PES system may have been negatively affected by the prevailing discursive framing of agricultural externalities and entitlements, raising issues about the fairness of such payments. Moreover, low levels of mutual trust were found to undermine the credibility of the PES framework. These results confirm that institutional failures contribute to environmental degradation and that PES should not be viewed as a market panacea transcending the local institutional context, but rather as a potentially complementary instrument within a broader rearrangement of environmental governance.

1. Introduction

While farming activity is generally considered to be among the leading direct causes of tropical deforestation and biodiversity loss (Chomitz et al., 2007), under certain policy scenarios it also shows potential for contributing to their reversal (Angelsen, 2010). Therefore, substantial attention has been redirected at farmers as potential protectors and providers rather than as destroyers of natural resources. This amounts to a paradigm shift that is increasingly reflected in global debates on climate change (cf. 'Reducing Emissions from Deforestation and Forest Degradation' or REDD-plus), resulting in more research and a growing implementation of mechanisms known as Payments for Environmental Services (PES), with explicit focus on remunerating the production of positive environmental externalities (Engel et al., 2008; Pagiola et al., 2002; Wunder, 2005). PES is held to be a valuable complementary instrument in assuring more effective environmental governance (Engel et al., 2008), whereas approaches such as government regulation, integrated conservation and development projects (ICDPs), and educational strategies have, on their own, often been criticised for failing to halt ecosystem degradation (Baland and Platteau, 1996; Pagiola et al., 2002; Wells et al., 1998).

The PES approach builds upon the metaphor of ecosystem stocks as providers of environmental or ecosystem services (ES), generating huge benefits for society (Millennium Ecosystem Assessment, 2005; Norgaard, 2010). The core idea is that land users, who, in the absence of direct incentives, are poorly motivated to protect or reproduce natural resources on their property, will become motivated if they receive direct payments from ES buyers that at least cover their opportunity costs of using the land. PES argues that, rather than to impose ineffective sanctions for 'bad practices', the providers of positive externalities ought to be paid by the beneficiaries. Although the original conceptualisation of PES has recently been the subject of criticism from various angles (see below), the dominant literature still builds upon Wunder's (2005, p.3) conceptualisation of PES as a voluntary transaction where a well-defined ES is 'purchased' by an ES buyer from an ES provider if and only if the latter ensures ES provision. These original PES notions are essentially grounded on a Coasean foundation, as it is assumed that, under low transaction costs and clearly-defined property rights, problems of externalities can be overcome through private negotiation between affected parties (Coase, 1960; Engel et al., 2008; Pattanayak et al., 2010).

For the flow of ES to be sustainable, PES programmes generally require continuing rather than finite payments (Pagiola et al., 2002). Expectations for sustainable 'fund-raising' in the context of PES are increasingly focused on decentralised efforts that capitalise on local

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sources of funding and thus local demand for ES (Pagiola et al., 2007; Wunder et al., 2008). Local mechanisms are deemed more efficient and sustainable than government-financed ones (Engel et al., 2008), and less vulnerable to volatile national and international political circumstances (Blackman and Woodward, 2010, p.1627). This local focus naturally directs attention to watershed services (as opposed to carbon or biodiversity services), since these offer the clearest and most valued locally-perceived benefits. Indeed, Engel et al. (2008) note that upstream–downstream watershed scenarios usually reflect situations in which it is easy to identify the users of ES (water resources) and arrange for them to pay. Continuous and qualitative water provision to water users therefore 'constitutes a convenient lasting payment vehicle' and is argued to allow other, more global, benefits such as biodiversity conservation to 'piggyback on these more marketable forest services' (Wunder and Wertz-Kanounnikoff, 2009, p.585). In other words, watershed contexts are believed to tie in better with the Coasean upstream–downstream externalities framework, as they can capitalise on the production of straightforward externalities (water services) and the generation of relatively low transaction costs by adding ES payments to financing structures already established by local water utilities (e.g. Kosoy et al., 2007). Hence, ongoing research is increasingly exploring the potential of local payments for watershed services and the prospects it offers for securing long-term ecosystem protection (Ortega-Pacheco et al., 2009; Porras et al., 2008; Southgate and Wunder, 2009).

However, few studies thus far have explicitly focused on demand-side aspects of locally-financed PES. Johnson and Baltodano (2004) and Ortega-Pacheco et al. (2009) assessed local rural households' willingness to pay (WTP) for watershed PES in Nicaraguan and Costa Rican communities respectively. But both studies used small sample sizes, found quite diverging WTP results, and failed to deal explicitly with broader institutional aspects. The present article attempts to address these issues by assessing local WTP for water and related hydrological PES schemes and by identifying and understanding the factors that affect it. It presents a demand-side analysis that demonstrates – as has previously been argued from a supply-side perspective (Corbera et al., 2009; Van Hecken and Bastiaensen, 2010a) – that the feasibility of PES programmes is mediated and constrained by the local socio-institutional context, a claim that is increasingly recognised among PES practitioners and scholars, but remains under-researched in the PES literature (Muradian et al., 2010; Vatn, 2010).

In what follows, we first introduce the research setting of Matiguás, Nicaragua (Section 2) and explain the mixed-method approach to assessing the complex reality of environmental governance and the WTP of the local urban population for improved water delivery and watershed services (Section 3). Section 4 analyses the local WTP for a watershed PES programme in Matiguás using contingent valuation (CV) techniques. Relying on the qualitative research findings, Section 5 discusses these results in the context of the local institutional background. The article ends with some tentative conclusions.

2. Research Setting

The research setting, i.e. the rural municipality of Matiguás, is located in the central Nicaraguan Department of Matagalpa and includes two nationally protected areas: the Quirragua Nature Reserve and about 30% of the Cerro Musún.[3] Besides urban Matiguás, the municipality encompasses eighty-eight rural communities and covers a total area of 1710 km^2. In 2005, the population of urban Matiguás was approximately 9000, distributed over some 2000 households. The rural population was around 32,000. The municipality lies in the region with the highest poverty incidence in Nicaragua (Instituto Nacional de Información de Desarrollo, 2005).

Until the early 20th century, the area was predominantly forested. However, colonisation for cattle raising, both by peasants and landlords, resulted in rapid deforestation from the 1920s onwards (Maldidier and Marchetti, 1996). According to local estimates, over 40% of the forested area has disappeared in the past twenty years (Instituto Nicaraguënse de Fomento Municipal, 2004). Much of the soil has a low natural water infiltration capacity, which, according to the local municipality, has been further reduced by intensified agricultural land use, resulting in rivers running dry during the dry season and in uncontrolled run-off and surface water during the rainy season (ibid). Agricultural practices are moreover polluting water sources with agrochemicals and organic contaminants (Ministerio del Ambiente y los Recursos Naturales, 2010), putting increasing pressure on the drinking water supply in downstream urban Matiguás. It currently depends on a system that captures water from the Cusiles River, which springs in the Nature Reserve of Quirragua, northwest of urban Matiguás. Although Quirragua is a Nature Reserve, about 70% of the land is privately owned by about sixty farming households who use it mainly for agriculture, including the cultivation of corn, beans, and coffee, and as pastures for extensive cattle raising (Ministerio del Ambiente y los Recursos Naturales, 2010). As will be explained below, the negative consequences of these farming activities are perceived locally as a growing threat to the downstream urban tap water supply, which is suggestive of an urgent need for more effective, negotiated environmental governance.

3. Research Methods

The main research focus was on the downstream urban demand side of a potential locally-financed system of Payments for Environmental Services within the upstream–downstream context of water governance in Matiguás. The research design was based on a mixed method approach, combining qualitative and quantitative techniques. The purpose was to generate more detailed, qualitative information about the institutional context of water and environmental governance as well as about perceptions and knowledge of the relevant upstream–downstream interactions. This information was subsequently used to construct a relevant survey instrument and to outline adequate, understandable scenarios for a CV study.

3.1. Qualitative Research

The preparatory qualitative research was conducted over six months during 2008 and 2009, and consisted mainly in in-depth responsive interviews (Rubin and Rubin, 2005). Over twenty-five key informants from different local institutions and organisations were interviewed, ranging from consumer group representatives to (central) government institution delegates, and from political party secretaries to Quirragua farmer cooperative presidents. The main focus of the interviews was on perceived environmental problems, their causes, and proposed solutions, as well as on agro-environmental externalities and the potential of PES schemes for dealing with them. Additionally, several inter-institutional meetings on local environmental issues were attended. Some of the interviews were taped and verbally transcribed, but most were noted down during the interview sessions, as this created a more confidential environment.

3.2. Urban Household Surveys

The qualitative research was complemented with a carefully designed quantitative household survey in urban Matiguás. It was based on information obtained through the qualitative research and three additional focus groups, and was gradually tested and improved during several rounds of small pilot surveys, implemented by locally-

[3] Both areas were declared national Nature Reserves by Presidential Decree no. 42-91 in 1991 and belong to IUCN category IV (Habitat/Species Management Area).