What factors influence participation in payment for ecosystem services programs? An evaluation of Ecuador’s SocioPáramo program

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ARTICLE INFO

Article history:
Received 1 November 2012
Received in revised form 1 August 2013
Accepted 4 August 2013

Keywords:
Payment for ecosystem services (PES)
Conservation
Poverty alleviation
Ecuador
Páramo
SocioPáramo

ABSTRACT

PES programs have been touted as a means to achieve conservation goals while also alleviating poverty and promoting rural development. However, the degree to which these goals are met depends, in part, on accessibility and desirability of programs targeting rural communities and smallholders. Empirical research on factors motivating or dissuading PES landowner participation remains limited and a more complete understanding of these factors is critical to improving PES social equity outcomes. In this paper, we evaluate factors facilitating and constraining participation in Ecuador’s SocioPáramo program, a recently launched PES initiative targeting highland Andean grasslands (páramos). We conducted semi-structured interviews with all community landowner participants who had enrolled by May 2011, the majority of individual landowner participants who had enrolled by October 2010, and several non-participant communities and individuals. We found that, while SocioPáramo is attracting substantial participation among rural farmers and communities, a number of factors, including land tenure requirements, legal or biophysical land-use restrictions, and a need for pre-existing social, human, and financial capital, make SocioPáramo more accessible and desirable to larger, and often wealthier, landowners. While motivations for enrolling in the program varied, a key similarity among participants was access to alternative livelihood sources, a low opportunity cost associated with program land-use regulations, and a high value placed on the water provisioning services of the páramo. The majority of participants described incentives as a “reward” for conserving, as a means to strengthen existing conservation efforts or land security, or as a means to compensate for legal or biophysical land use restrictions. Our results suggest that the broader context of land tenure security, access to social capital, environmental attitudes, and alternative livelihood strategy development may require more attention in order to achieve greater participation among rural smallholders and communities. These results provide useful lessons for developing and adapting this and other PES programs so that they can better meet social goals.

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Introduction

Payment or Compensation for Ecosystem Services (PES or CES) programs represent a growing approach to protect natural and modified ecosystems critical to human well-being around the world (Wunder et al., 2008; Muradian et al., 2010; Costa, 2011). Yet, PES remains a highly contested approach with diverging opinions ranging from sharp critiques of PES as a neoliberal policy with negative implications for the marginalized and the global South (McAfee and Shapiro, 2010; Dempsey and Robertson, 2012) to strong advocates of its potential for more effective and efficient environmental protection in some cases (Wunder, 2005, 2007; Engel et al., 2008).

Critiques of PES have focused on equity concerns (Corbera et al., 2007a,b; Corbera and Pascual, 2012), problems with the commodification and valuation of ecosystem services (Kosoy and Corbera, 2007; Vira and Adams, 2009; Shapiro-Garza, 2013), and the perils of uncritical enthusiasm for and rapid adoption of a new, yet largely untested approach to conservation (Redford and Adams, 2009; Brockington, 2011). Much of the debate and critique of PES has centered on its common definition as a market-based approach with a “buyer,” and a “seller,” of a “well-defined ecosystem service,” (Wunder, 2005, p. 3). However, others have argued for a broader, more inclusive, definition that includes markets, subsidies, or other avenues to “...create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources,” (Muradian et al., 2010, p. 1205).

Opinions also diverge on the role that social goals can and should play in PES design. While some researchers assert that poverty alleviation and rural development should be considered potential side benefits rather than primary program goals (Pagiola et al., 2005;
Wunder, 2008), others consider social and environmental outcomes equally important and intrinsically linked (Rosa et al., 2004; Corbera and Pascual, 2012). Particularly in the developing world, social goals are often an explicit component of PES design, with few programs promoted as purely environmental initiatives (Landell-Mills and Porras, 2002; McAfee and Shapiro, 2010; Farley et al., 2011; Shapiro-Garza, 2013). As with other conservation approaches that strive to link conservation and development, however, the extent to which PES can represent a “win-win” for ecological and social goals remains a topic of intense debate (Adams et al., 2004; Vira and Adams, 2009; Muradian et al., 2010, 2013; Wunder, 2013). Yet there is widespread agreement that the sustainability and long-term ecological success of PES is, in part, dependent on these programs benefiting local communities in an equitable way (Rosa et al., 2004; Luck et al., 2009; Farley et al., 2011). Some have pointed to tradeoffs between environmental efficiency and social equity in regards to whether programs target few large or many small landowners (Pagiola et al., 2005; Zbinden and Lee, 2005; Wunder et al., 2008). However, where poverty has remained entrenched within areas critical for ecosystem service provision, ensuring that PES programs include and benefit marginalized rural communities and smallholders is vital for enhancing social equity and promoting long-term ecological success.

PES participation

While empirical research on PES participation remains limited (Brockington, 2011), several studies have evaluated the extent to which Latin American PES programs include marginalized landowners, given that many of these programs are intended to provide social as well as ecological benefits (Corbera et al., 2007b; Kosoy et al., 2008; McAfee and Shapiro, 2010). Outcomes are mixed, with some finding substantial participation among marginalized smallholders (Pagiola et al., 2008), while others point to a “land bias” whereby PES programs tend to favor large landowners (Grieg-Gran et al., 2005; Zbinden and Lee, 2005; Kollmair and Rasul, 2010). Socio-economic evaluations of Costa Rica’s national PES program, for example, found that PES participants are often relatively wealthy and well-educated landowners with large landholdings who often live in urban areas and do not rely upon farm income (Miranda et al., 2003; Zbinden and Lee, 2005). On the other hand, an evaluation of Mexico’s national PES program found that 78% of participants lived in areas classified as having high or very high levels of marginalization; however, this study also noted a lack of participation among the “poorest of the poor,” attributed either to how program participants are targeted and prioritized or to an obstacle to participation associated with poverty, including low education levels or few opportunities to interact with program officials (Muñoz-Pina et al., 2008, p. 733).

According to Pagiola et al. (2005), such patterns of PES participation can be explained by eligibility, access, and desire of landowners to enter these agreements and how competitive “poor” ecosystem service providers are in comparison to wealthier, larger landowners. The common eligibility requirement, formal land tenure, is labeled as “anti-poor” by some researchers, as it excludes both the landless and many of the most vulnerable landowners (Landell-Mills and Porras, 2002; Wunder, 2008, p. 283). Others have noted that marginalized smallholders may lack the social, human, or financial capital necessary to complete entry requirements or may not be aware of PES as a land-use option (Pagiola et al., 2005; Zbinden and Lee, 2005). PES may also be less desirable to smallholders than larger landowners due to lower incentive payments for small landholdings, a reliance on available land for subsistence food security, or a fear of land expropriation (Miranda et al., 2003; Grieg-Gran et al., 2005; Zbinden and Lee, 2005; Wunder, 2008; Southgate and Wunder, 2009). Finally, in terms of “competitiveness,” smaller landowners may be at a disadvantage due to high transaction costs (Landell-Mills and Porras, 2002; Pagiola et al., 2008; Wunder, 2008, p. 284).

In response to these obstacles, some PES programs have introduced “pro-poor filters” (Wunder, 2008, p. 294), including formal caps on land size enrolled in most public PES schemes, inclusion of poverty criteria in prioritization models (Luck et al., 2009), and a decreasing price structure with increasing area enrolled (de Koning et al., 2011; Farley et al., 2011). Rosa et al. (2004) suggest that PES schemes that incorporate working agricultural landscapes, such as agroforestry, are more likely to attract marginalized rural farmers who rely on their land for subsistence. Others have emphasized the importance of including rural smallholders and communities in PES design and decision-making and in linking PES to other development programs such that PES becomes featured as one strategy within a toolbox of approaches rather than a stand-alone approach (Rosa et al., 2004; Kollmair and Rasul, 2010; Muradian et al., 2010; Costa, 2011).

A number of researchers have pointed to the importance of “intangibles” or non-monetary factors in motivating PES participation (Kosoy et al., 2007, 2008; Garcia-Amado et al., 2011; Van Hecken et al., 2012). In addition to the availability of economic alternatives outside of enrolled areas, researchers have recognized perceptions toward conservation and environmental attitudes of landowners as key participation motivators (Klooster, 2003; Kosoy et al., 2007; Cranford and Mourato, 2011). Others have noted that, particularly where conservation opportunity costs are low, PES payments often become conceptualized as a “reward” for existing practices (Kosoy et al., 2007; Garcia-Amado et al., 2011) or as “incentives” that serve as a “tipping point” in changing land-use practices (Muradian and Rival, 2012, p. 94). On the other hand, a fear of land expropriation and mistrust of government programs may disuade participation in PES (Southgate and Wunder, 2009).

In Ecuador, as in other parts of the world, Reed (2011) notes that, while a number of indigenous communities have joined the government-sponsored PES program (SocioBosque), some indigenous communities and civil society organizations oppose PES, in part, for its potential to undermine property rights and livelihoods of forest-dependant communities. Clearly, a more complete understanding of the factors that motivate or dissuade participation in existing PES programs serves as an important first step to evaluate and improve the capacity of PES programs to meet social goals. However, while researchers have begun to unravel patterns of PES participation, analysis of which factors emerge as the most prominent in facilitating or constraining equitable access to PES programs remains limited (Zbinden and Lee, 2005; Kosoy et al., 2008). This study aims to fill this gap by providing an empirical evaluation of factors facilitating and constraining ability and desire to participate in PES in the Ecuadorian Andes.

Socio Páramo

Highland Andean grasslands (páramos), occurring from 3200 m to 4700 m above sea level, have become a focus of PES programs in Ecuador in response to increasing recognition of their role in regional water supply and high soil organic carbon stocks, in addition to high levels of endemic biodiversity (Sklenar and Ramsay, 2001; Buylaert et al., 2006; Vásconez and Hofstede, 2006; Farley et al., 2011, 2013). These ecosystems are an example of an area where high poverty rates and ecosystem services production correspond as many are owned and/or managed by some of the most marginalized communities and individuals in the country. Population growth, coupled with a lack of land availability in lower elevation areas, facilitates a continuing upward expansion of the agricultural frontier, threatening valued páramo ecosystem services. PES programs targeting páramo grasslands often have joint
Table 1
Community contracts as of May 2011 and individual contracts as of October 2010. Area enrolled rounded to the nearest hectare.

<table>
<thead>
<tr>
<th>Participant group (total/interviewed)</th>
<th>Land enrolled</th>
<th>Total participants</th>
<th>Landholding size range per contract (median/mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communities (18/18)</td>
<td>34,416</td>
<td>28,330</td>
<td>111–10,830 (842/1927)</td>
</tr>
<tr>
<td>Rural cooperatives/associations (17/17)</td>
<td>34,305</td>
<td>16,330</td>
<td>150–10,830 (941/2018)</td>
</tr>
<tr>
<td>Potable water organization (1/1)</td>
<td>111</td>
<td>111</td>
<td></td>
</tr>
<tr>
<td>Individuals (59/45)</td>
<td>15,823</td>
<td>279</td>
<td>4–4164/59(272)</td>
</tr>
<tr>
<td>Smaller landowners (&lt;50 ha) (29/20)</td>
<td>724</td>
<td>128</td>
<td>4–48 (24/27)</td>
</tr>
<tr>
<td>Larger landowners (urban or retired professionals) (9)</td>
<td>7177</td>
<td>69</td>
<td>52–4164 (449/797)</td>
</tr>
<tr>
<td>Larger landowner (urban/rural split) (5)</td>
<td>4419</td>
<td>16</td>
<td>92–3017 (452/884)</td>
</tr>
<tr>
<td>Larger landowner (medium-sized farmer) (11)</td>
<td>2590</td>
<td>47</td>
<td>64–676 (185/226)</td>
</tr>
<tr>
<td>Larger landowner (not interviewed) (5)</td>
<td>1480</td>
<td>19</td>
<td>84–310 (254/296)</td>
</tr>
</tbody>
</table>

a 19 communities enrolled in the program, but one has since left.

b 63 individual contracts, representing 59 families/land managers and 49 individuals were interviewed, representing 45 families/land managers. Note: Smaller landowners include statistics for all participants (including those not interviewed) while larger landowner participants are divided into interviewed and not interviewed.

social and ecological goals in recognition of the need to protect these ecosystems while also improving human well-being (Farley et al., 2011).

In this paper, we discuss patterns of participation in the first 1.5 years of Ecuador’s SocioPáramo (hereafter, SP) program. SP is a component of the Ecuadorian Ministry of the Environment (MEA)’s SocioBosque program, designed to conserve the country’s remaining privately and communally owned forests (de Koning et al., 2011). In July 2009, the MEA extended SocioBosque to include páramos through the creation of SocioPáramo. As of October 2010, páramo contracts made up 5% of total community land and 21% of individual land entered into the wider SocioBosque program (de Koning et al., 2011). SocioBosque, including SP, aims to protect and enhance biodiversity, carbon, and water, while also contributing to poverty alleviation through direct compensation to community and individual landowners (Farley et al., 2011). The program is intended to promote both social development and conservation, providing up to $30 USD per hectare per year for páramo conservation (de Koning et al., 2011). Enrollment remains open to landowners with either individual or collective land title. SP includes two important “pro-poor” elements, including higher payments levels for smaller enrolled land areas and inclusion of poverty levels in the official prioritization model (MEA, 2005; Farley et al., 2011). Participation is rapidly growing, with 18 communities and 63 individuals enrolled as of October 2010. SP prefers the term “conservation incentive” as opposed to “payment for ecosystem services,” given cultural resistance to the idea that services are for sale, and the emphasis placed on recognizing the stewardship role of local landowners (Albán, 2011; Farley et al., 2011). However, we are evaluating SP in the context of PES because it fits with Muradian et al.’s (2010, p. 1205) definition of PES as, “a transfer of resources between social actors, which aims to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources.”

We use an equity framework adapted from Brown and Corbera (2003, p. 545), focusing specifically on “equity in access” by evaluating patterns of participation and factors facilitating and constraining program participation (Fig. 1). An examination of such patterns and the factors behind them remains critical to understanding whether and how SP will be able to reach its goal of contributing to poverty alleviation while protecting 80% of currently unprotected páramos. In order to understand SocioPáramo’s relative accessibility and desirability to the rural smallholders and communities, we explore the following research questions:

1 Payments have since increased to $60 per hectare of páramo per year for individuals with less than 20 ha in their land title. Payments have increased to $60 for the first 50 ha and $40 for 50–100 ha for communities, regardless of land holding size.

**Fig. 1.** Factors affecting participation in PES (“equity in access”).

Adapted from Brown and Corbera (2003) and Pagiola et al. (2005).

Is SocioPáramo accessible and desirable to rural communities and smallholders?

a. What type of landowner is participating in SocioPáramo?

b. What factors influence the ability or desire to participate in SocioPáramo?

**Methods**

In order to understand the characteristics of current participants and motivations for enrolling in SP, we conducted semi-structured interviews with all community participants who joined by May 2011 (19/19) and the majority of individual landowner participants (45 of 59) who entered SP by October 2010 (Table 1). For community participants enrolling collective land, we interviewed community leaders (most often groups of 2–4). We focus on these respondents in this paper since a community’s decision to enroll is led by representative leaders, but must be accompanied by a document indicating unanimous consent by community members (MAE, 2009). However, in four communities, we also discussed the program with several households to gain a more diverse perspective. Interviews focused on participant characteristics and motivations for enrollment (the topic of this paper) as well as land-use and livelihood changes associated with participation. We included both closed- and open-ended questions in interviews that lasted between 1 and 4 h. Our focus was on qualitative methods, given our aim to uncover participants’ perspectives on the SP enrollment process and to identify the salient factors influencing their ability and desire to participate.

As a control, where appropriate, we also interviewed neighboring non-participants in order to understand how they differ from participants and how this relates to the ability and desire to participate. Given that land title of páramo grassland is a key program requirement, we set land title and ownership of intact páramo as part of the selection criteria for non-participant subjects. However, recruitment of non-participants proved difficult for several reasons. First, in many cases, neighbors did not have land title. Second, in the case of many individual landowners, they lived in areas distant from their páramo and often did not know or have contact
information for their neighbors. Third, in cases where landowners lived near their páramo and did know their neighbors, participants rarely had contact information for often-distant neighbors. Nonetheless, we located and interviewed five community and four individual non-participants. This included three individuals who met the criteria for inclusion and one individual neighboring landowner who had land title but had recently converted his páramo to crops and exotic pasture. Three of the non-participant communities were mestizo communities in the same region as four of the participating mestizo communities; although none of these communities had land title, two were in the process of obtaining it with the aim of enrolling in SP. According to an NGO working in the region, few communities have land title in this area so we included these communities to gain their perspective. The other two non-participating communities were indigenous communities in the adjacent province to three participating indigenous communities, but also lacked land title. Accordingly, while we were not able to interview an equal number of non-participants as participants, these interviews provided perspective on differences and similarities between participants and some non-participants and shed light on factors facilitating and constraining participation. For non-participants, we modified questions slightly, focusing on whether they were aware of SP and whether they would be able or desired to participate in the program.

In addition to participant and non-participant interviews, we also reviewed the participant database provided to us by SocioBosque, which included basic participant information including the amount of land enrolled and community and/or family size. We also observed several community and SP workshops and conducted semi-structured interviews with all four regional program extensionists in charge of implementing and managing SP on the ground and five NGO representatives who were working with SP to implement the program or who had expressed opposition to or support of the program. Interviews were conducted anonymously and with informed consent, according to IRB approval granted through San Diego State University and the University of California, Santa Barbara.

### Results and discussion

#### Who is participating?

Eighteen community participants enrolled 34,416 ha of communal land in SP as of May 2011, in some cases, including forested land in addition to páramo grasslands, including a total of 28,330 people. One other community joined the program, but is no longer enrolled and is not included in these calculations. Approximately three times as many individual SP contracts (63 contracts representing 59 families as of October 2010) have been signed as community contracts, but represent fewer hectares (15,823 ha) and includes far fewer total participants (279, including members of households of individual participants) (Table 1). Thus, approximately two-thirds of land enrolled and nearly 99% of total participants are associated with community contracts. This follows the general trends of the broader SocioBosque program, under which 87% of land entered and over 99% of the participant population pertain to community contracts (de Koning et al., 2011). The lower percentage of communal landholdings in SP compared with the greater SocioBosque program likely stems from the large land size of communal landholdings in the Amazon region which currently make up the vast majority of SocioBosque’s enrolled land (de Koning et al., 2011).

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2 This includes 12,000 people who utilize water from a potable water organization who is classified as a community participant (Table 1).

### Characteristics of community participants and land enrolled

SP community participants are mainly rural indigenous or peasant cooperatives or associations who own communal páramo and forest at a higher altitude than residential and agricultural areas. Of these communities, SP classifies half (9) as mestizo, seven as indigenous, and two as a mix of mestizo and indigenous. Community size among participating communities ranges between 83 and 7,458 members (median = 383); the exception to this is a potable water organization, with 12,000 water users, which joined SP as a community participant. Communities reported owning between 150 ha and 63,000 ha (median = 1462 ha) of land and enrolled between 111 ha and 10,830 ha (median = 842 ha) of forest and grassland in SP. Following the categorization used by the SocioPáramo program, we used a value of 50 hectares to distinguish between smaller landowners and larger landowners (de Koning et al., 2011). According to this categorization, all but four participating communities are classified as smaller landowners when communal land was divided on a per family basis (ranging from 1.5 to 51 ha per family; median = 7 ha). In addition to access to communal land, community members generally held small plots (1–3 ha) of land for agricultural production that they considered more productive and accessible than the páramo they entered. In cases with a mean exceeding 50 ha per family (4 communities) a large portion of the land had been set aside as a reserve either by the community or by government protection, such as a national park, which restricts most forms of productive land use. Thus, despite the relatively large land areas enrolled in community contracts, on a per family basis, these participants can largely be considered small landowners.

### Characteristics of individual participants and land enrolled

Landowner size varied much more among individual participants, ranging from 4 ha to 4164 ha (median = 59 ha) (Table 1). Approximately half (29) of individual participants enrolled in the program are classified as smaller landowners (owning < 50 ha; median = 24 ha). It is important to note here, that based on the 2000 Agricultural Census, 83% of Ecuadorian farms are 10 ha or less (Berdegué and Fuentealba, 2011), with Andean farms often consisting of 5 ha or less (Jokisch, 2002); thus, even those classified as smaller landowners may have landholdings well above the average. These participants were all members of indigenous rural communities with agricultural-based livelihoods and similar socio-economic characteristics to community participants. Of the 29 individual smaller landowners enrolled, 22 (79%) pertained to one community whose members subdivided the communal land among community members in the 1990s and enrolled their contiguous páramo plots in SP. We interviewed 15 of these 22 landowners. The other five smaller landowners interviewed were also from indigenous cooperatives, including three from a single cooperative, which had subdivided their collective land and two from two other cooperatives. While approximately half were utilizing the land entered into SP prior to enrolling in the program, all smaller landowners owned additional small private landholdings or had access to communal land where they were able to concentrate agricultural production.

The other 25 individual landowners (55% of individual landowners interviewed) are classified as larger landowners (owning > 50 ha) and can be divided into several groups (Table 1). The first group includes urban or retired professionals who inherited or bought their páramo as an economic investment or for the explicit goal of conservation (n = 9 landowners; median land size = 200 ha). Another set of larger urban landowners live in urban areas, but spend significant amounts of time on their property, adjacent to the páramo enrolled in SP (n = 5 landowners; median land size = 452 ha). The final group comprises medium-sized farmers who live in rural areas or on the outskirts of urban areas, but rely on agricultural production as their primary income source (n = 11 landowners; median land size = 185 ha) (Table 1). As with
smaller landowner individual participants and community participants, medium-sized farmer participants concentrate agricultural production and the most intensive grazing in areas outside of those enrolled in SP.

Thus, while approximately one-third of SP individual participants are larger landowners who live in urban areas, the program is attracting substantial participation among rural communities, smaller landowners, and medium-sized farmers (Table 1). Participation among rural communities and farmers is higher than reported in assessments of Costa Rica’s national PES program and in projections of PES outcomes in Brazil (Miranda et al., 2003; Zbinden and Lee, 2005; Borror et al., 2010) and corroborates research suggesting that PES can be attractive and desirable to rural communities and smaller landowners (Muñoz-Pina et al., 2008; Wunder and Alban, 2008). As found by Muñoz-Pina et al. (2008, p. 733), however, there appears to be a bias against the “poorest of the poor.” With the exception of one smaller landowner entering 3 ha, no individual landowner enrolled with less than 10 ha. We discuss obstacles to smallholder participation in the following sections.

Factors influencing participation

From interviews with participants and non-participants, several factors emerged as the key influences on landowner ability and desire to participate in SP. We found key factors affecting landowner ability to participate in SP to include land title, social capital, including social networks and community organization, and the availability of alternative livelihood sources outside of páramo lands enrolled. Factors stimulating landowner desire to participate include financial benefits as well as non-financial benefits, such as enhanced land security and strengthened natural resource management, while a fear of land expropriation dissuades participation.

Ability to participate

Land title. SP requires that participants hold formal land title and, according to regional program extensionists, land tenure insecurity remains the most important obstacle to widespread participation in the program (Table 2). Land title has been noted as an important “anti-poor” obstacle to participation in PES programs globally (Miranda et al., 2003; Grieg-Gran et al., 2005; Wunder, 2008, p. 283), and within the SocioBosque program in particular (Schloegel, 2012). In our study of SocioPáramo, all five non-participating communities interviewed lacked land title. In some cases, gaining land title is a matter of diligently organizing legal documents; such was the case with three non-participating communities we interviewed who were in the process of obtaining land title through the aid of a local NGO and hope to enter SP in the future. In other cases, however, securing land title is virtually impossible, as in the case of one non-participating community we interviewed who live on and manage communal land inside of a national park and lack the possibility of obtaining title since they settled there after park establishment. In contrast, all four individual non-participants had titles to their land. While this difference is likely an artifact of the small sample size, rather than any general pattern in land tenure among individual versus collective landholdings, it also demonstrates that a lack of land title is one potential barrier to participation, but that other factors also constrain wider participation.

Social capital.

Social networks. Once eligibility through ownership of “intact” páramo with recognized land tenure has been met, we found social capital, in the form of social networks, important in facilitating landowner ability to participate in SP (Table 2). To enroll in SP, landowners must have awareness of the program and the ability to complete transaction requirements, including a map of the property and, in the case of communities, a detailed community investment plan and a declaration of unanimous support for participation. For community participants, awareness of SP and the completion of entry requirements were facilitated through social networks, including connections to NGOs, government institutions, and, in one region, the city water company (Table 2). All participants communities (18) worked with NGOs, local water authorities, or government organizations in some capacity related to páramo or forest management, sustainable production, or forestry prior to enrolling in SP, with the majority of communities (11: 61%) having close and long-standing relationships with one or more institutions.3 These social networks were instrumental in their awareness of and enrollment in SP, as evidenced by the fact that the majority (15: 83%) of participant communities learned about the program through NGOs, community organizations, or government or private institutions with which they had existing relationships. These findings support other research pointing to the importance of access to this type of social and political capital (Rosa et al., 2004; Kosoy et al., 2008).

Of the non-participating communities interviewed, three worked closely with an NGO and were looking to join SP after securing land title, while one non-participant community with sporadic NGO contact explained that they had heard of the program but knew little about it. A final non-participating community, with no NGO contact, said they “did not know the program existed.” This community also did not have land title, which would preclude their enrollment, but a lack of access to social networks would also present a barrier to participation.

Social networks and access to NGOs and other institutions were also instrumental in assisting communities in completing enrollment requirements, and all but three communities obtained assistance from such networks. One community, for example, explained that their communication with SP had primarily been through the water agency with whom they had a long-standing relationship and that the agency had helped them with the community map, investment plan, and other program requirements. Three communities learned of SP through television or radio advertisements, but two were assisted by a very motivated and dedicated regional extensionist in the Central Andean region who has successfully enrolled a large number of individuals and communities. This extensionist had worked in development in the region prior to working with SP and so had strong networks with community organizations and was able to gain trust of community members. The one community we spoke with who sought out SP without the help of an NGO or other institution described the long and challenging process of traveling to Quito, finding the office, and then waiting three months for paperwork completion. While land-use requirements related to páramo management under SP do not require specialized technical capacity, as would be required in forestry PES programs (Zbinden and Lee, 2005; Pagiola et al., 2008), documentation, including a property map, a bank account, and an investment plan, can be an obstacle for enrollment, with many participants describing the enrollment process as “long,” “hard,” “expensive,” and in some cases, “frustrating.”

Smaller landowner and medium-sized farmer individual participants also primarily learned about SP through social networks, with all of the smaller landowners and the majority (6 or 67%) of the medium-sized farmers explaining that they learned of the program either through an NGO or government organization (Table 2). The 22 smaller landowner participants from a single community, for example, were directly recruited by a SP extension agent who was introduced to the community by a government institution that

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3 In the case of the potable water company community participant, the participant itself was an institution which was able to link water users to SP benefits.
Table 2  
Factors affecting ability and desire to enroll in SP among SP participants.

<table>
<thead>
<tr>
<th>Group</th>
<th>Factors affecting ability + eligibility to enroll in SP</th>
<th>Factors affecting motivation + desire to enroll in SP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals: smaller landowners</td>
<td>• Social capital (NGOs, social networks)</td>
<td>• Incentive</td>
</tr>
<tr>
<td></td>
<td>• Land title</td>
<td>• Avoid conflict</td>
</tr>
<tr>
<td></td>
<td>• Access to more productive land/alternative livelihoods</td>
<td>• Improve land security</td>
</tr>
<tr>
<td>Individuals: medium sized farmers</td>
<td>• Social capital (social networks)</td>
<td>• Already conserving or not utilizing the land</td>
</tr>
<tr>
<td></td>
<td>• Land title</td>
<td>• Land use limited by legal, biophysical, or labor capacity constraints</td>
</tr>
<tr>
<td></td>
<td>• Access to more productive land/alternative livelihoods</td>
<td>• Regional planning and policy making</td>
</tr>
<tr>
<td>Individuals: urban dwellers</td>
<td>• Social capital (social networks)</td>
<td>• Incentive</td>
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<td></td>
<td>• Land title</td>
<td>• Improve land security</td>
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<td>• Off-farm income</td>
<td>• Improve and sustain conservation efforts</td>
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<tr>
<td>Communities</td>
<td>• Social capital (NGOs, social networks, community organization)</td>
<td>• Already conserving or not utilizing the land</td>
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<td></td>
<td>• Land title</td>
<td>• Land use limited by legal, biophysical, or labor capacity constraints</td>
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<td>• Access to more productive lands or alternative livelihoods</td>
<td>• Regional planning and policy making</td>
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had been working in the area in conjunction with an adjacent protected area. In Cañar province, a local NGO has worked extensively with all of the smaller landowner participants in this region and also assisted one medium-sized landowner to enroll in SP from a neighboring province. While individual urban landowners who had purchased their land recently usually had maps of their land prior to SP, most smaller landowners and medium-sized farmers required technical assistance in creating land maps acceptable to SP. SP generally covers this expense for the first 50 ha, making the program more accessible to smaller landowners who are eligible and aware of the program. However, this requires the assistance of either the regional SP extension agent or a local NGO; while regional extension agents are highly motivated to help smaller landowners enter the program, they are limited by time constraints given that there is a single extension agent responsible for the implementation and management of the program in 2–5 provinces.

Larger, urban landowners, in contrast, tended to learn of the program through television or radio advertisements or through casual conversations, and approached SP directly. However, in Azuay province, the city water company assisted enrollment of all (4) individual participants in this region, including three urban landowners and one medium-sized farmer. Larger urban landowners all had maps of their properties completed prior to enrolling in SP and needed less assistance in enrollment than did communities, smaller landowners, and medium-sized farmers.

Community organization. In the case of community participants, social capital, in the form of organization and leadership was also an important factor facilitating enrollment. Enrolling in SP requires a statement of unanimous support from the community as well as a community investment plan, both of which require strong leadership and community organization. Six of the communities had formal community development plans and all communities indicated that they engage in community projects and have formal meetings at least four times per year. Several communities indicated that their struggle for land tenure security had strengthened community organization and leadership, and the fact that land tenure is an entry pre-requisite necessitates that participating communities have a relatively high level of organization. An NGO representative explained that they discourage communities who express substantial internal conflict and disorganization from enrolling in the program, as they believe that some level of community cohesion and organization is essential to facilitating positive program outcomes. Our finding that some NGOs are reluctant to help disorganized communities based on the idea that this could escalate conflict within the community also supports the idea that well-organized communities are more likely to enroll in the program. Likewise, well-organized communities without NGO links or other networks may have a more difficult time completing enrollment requirements. Overall, we found that community organization and NGO and other networks often go hand in hand, which may be due to NGOs tending to work with well-organized communities, or to collaborations leading to enhanced organization (Bebbington, 1997).

Social capital in the form of networks and community organization has been found to be important in sustainable development in the Andes, broadly (Bebbington, 1997) as well as in PES programs in other parts of the world (Zbinden and Lee, 2005; Jack et al., 2008; Muñoz-Pina et al., 2008; Corbera et al., 2009; Clements et al., 2010). Our interviews support the idea that pre-existing human and social capital play an important role in predicting PES participation patterns. We found that NGOs, government institutions, and community organizations serve as important intermediaries or networks facilitating participation, particularly with rural participants who otherwise would not have been aware, able, or willing to join the program. This suggests that greater attention to the idea that it takes capital to make capital is important in the context of PES reaching more marginalized communities.

Availability of alternative livelihood sources. We also found that participants in SP all had alternative livelihood options outside of the páramo lands enrolled. While approximately half of participant communities utilized their communal páramo enrolled in SP for permanent or seasonal cattle grazing or alpaca or llama grazing, all communities interviewed concentrated agricultural production
on individual plots located in more accessible and more productive areas (Table 2). Likewise, all individual participants had access to other areas considered more productive or had non-farm livelihoods. Thus, while SP program design does not necessarily favor larger landowners – and aims to favor smaller landowners through spatial targeting and a pay structure which decreases with land size (de Koning et al., 2011) – there is a ‘land bias’ in the sense that participants relying on farm income need to own enough land to enable them to focus production in certain areas while enrolling less productive areas. For example, one medium-sized farmer who enrolled páramo that he had already reserved for conservation noted that his ability to manage land for conservation, and thereby enroll it in SP, was contingent upon him owning more productive, lower elevation land. He noted that he “does not need to deforest to live… You are not going to convince landowners with small landholdings to change their practices. Payments are not enough.” This was the case for one no-participant individual interviewed who owned 2 ha of páramo, which he recently had converted to pasture and crops; in this case, the landowner indicated that he would not have enrolled in SP as an alternative to converting his land given the reliance on a small landholding for food security. Likewise, the two non-participant communities who were not considering enrolling in SP owned little to no land in lower elevation areas and thus relied more heavily on their páramo for production than did participant communities. This supports the idea that farmers with larger landholdings have more flexibility to engage with PES and other conservation programs (Zbinden and Lee, 2005), while size of landholdings is a constraint on the ability of smallholders to participate.

Desire to participate
Participants expressed a variety of reasons why they desired to participate in SP. While most participants expressed that the incentive payment was an important motivation for participation, non-monetary motivations including improved land security and the desire to continue or enhance water supply or biodiversity were also key motivations for enrolling in the program (Table 2). The most important factors affecting a lack of desire to participate are a fear of land expropriation and insufficient incentive payments to cover opportunity costs where there are not pre-existing constraints on land use.

Financial motivation. Our results suggest that incentive payments can be an important motivator of participation in PES, but that pre-existing constraints on land use and/or a desire to manage páramo lands for conservation played a role in lowering opportunity costs and making payments more attractive. In the case of SP, payments were considered lower than opportunity costs associated with the most productive páramo land uses, such as potato cultivation and intensive grazing. However, with few exceptions, land use of the enrolled areas was already limited due to biophysical, socio-economic, or political constraints on land use or because the landowner or community had already reserved the land for conservation prior to SP. For example, for a substantial portion of participants interviewed (38% of communities, 90% of smaller landowners interviewed, 40% of larger landowners) SP provides payments in cases where a protected area or environmental law already restricted land use (Table 2). One medium-sized farmer, for example, explained that “the municipality gave us no other choice because of the ordinance” and that they enrolled in SP because it was the only way to profit from the land. In this case, SP incentives function as a “carrot that makes the stick of regulations more palatable” (Engel et al., 2008, p. 669; Pagiola et al., 2008). Here, weakly enforced environmental regulations complement PES payments by bringing down opportunity costs, while PES payments serve to make environmental regulations more equitable.

In addition to legal restrictions on land use, biophysical constraints, including topography, soil fertility, elevation, and accessibility, particularly in comparison to other available land, often limited use of land enrolled in SP (Table 2). For example, some landowners expressed that their páramo “was difficult to work in,” “faraway,” or “produces little.” In several regions, land use was severely limited by inaccessibility, with one landowner explaining that, “you would need a helicopter” to reach his family’s páramo. A number of urban landowners who had initially purchased their land as an economic investment explained that SP offered an alternative to selling land that was less productive and/or accessible than originally anticipated.

A lack of labor capacity also played a role in limiting land use prior to SP, thereby lowering actual opportunity costs and making PES payments more attractive. A number of participants, particularly individuals, did not use or scarcely used their páramo simply because they did not have the labor capacity or time to work in the area (Table 2). Accordingly, a lack of labor capacity, related to demographics and land size, reduces actual opportunity costs and increases desire to participate in SP in some cases. Several participants explained that they were thinking about utilizing their páramo for more productive purposes, but that enrolling in SP would provide a less risky and more stable income source and would also simply “require less work.” This was particularly true in the case of several elderly smaller landowners who owned páramo located a long distance from their households; for them it was clear that one important reason for entering the program was the simple lack of capacity to work the land. In the case of biophysical and demographic constraints, PES payments may have little to no impact on land management, or, in cases where more intensive land use is possible but not ideal, payments may serve as the “tip- ping point” (Muradian and Rival, 2012, p. 97) to change behavior or prevent conversion to more intensive land use practices.

This concurs with other studies indicating that PES participants often enroll land in areas with low opportunity costs due to pre-existing biophysical, legal, or demographic constraints (Zbinden and Lee, 2005; Pagiola, 2008; García-Amado et al., 2011). With the exception of 7 smaller landowners and one medium-sized farmer who were required to eliminate grazing due to a pre-existing municipal ordinance, incentives were generally not seen in the context of opportunity costs. Rather payments were generally viewed as a “reward” for pre-existing conservation practices or as “support” to make the land profitable where few other options existed. However, in cases where biophysical or demographic constraints on enrolled land or intrinsic motivations for conservation exist, and where landowners have alternative livelihood options, SP payments can serve as incentives that “tip” land use management decisions toward conservation or sustainable land management compatible with SP objectives.

Environmental protection. While financial incentives were always cited as an important motivator of participation, non-monetary benefits or “intangibles,” were also important factors motivating participation in SP (Kosoy et al., 2007, 2008). Our data support research that has found environmental attitudes and perceptions toward conservation to be key motivators of participation in PES (Miranda et al., 2003; Zbinden and Lee, 2005; Kosoy et al., 2008; Van Hecken et al., 2012). All participants, with the exception of 13 of the smaller landowners interviewed, stressed that the páramo, first and foremost, remained important for its role in providing water. When asked about what the páramo was used for, the vast majority (16; 89%) of community representatives pointed to its importance for water supply for agricultural and household use, explaining that, “the páramo is the source of all water,” “water for our community and others comes from our páramo,” and that the páramo functions as a “sponge.”
That pro-conservation attitudes facilitate participation in PES is illustrated by the fact that 15 of the 18 participating communities interviewed had established conservation or sustainable development in their páramos prior to enrolling in SP. In one case, a community leader described how a neighboring village had “been left without water” due to deforestation and a rising agricultural zone and so had managed their area as a reserve since the early 1990s. In another case a community leader described how he had spent 15 years working in oil extraction in the Amazon region and, upon witnessing the deleterious effects of environmental degradation, decided to return home and lead a conservation movement to protect the páramo to ensure sustained water supply for the community. Another participant community linked the community’s long struggle for land tenure to their effort to protect the highlands for water and native biodiversity, demonstrating connections among community identity and pride, land tenure, and conservation. In some cases, protecting land coincided with a partitioning of communal land into individual plots in the lower zone and drawing an upper limit on agricultural expansion, a popular means to regulate previously unregulated land use in the upper zone. In other cases, communities pursued a strategy of improving production in lower areas in order to take pressure off of the upper zone. For these communities, entering SP was a way to strengthen and ensure the long-term sustainability of pre-existing conservation efforts, with one explaining that SP was a way to “awaken the consciousness” of the community to the value and importance of protecting the páramo (Table 2). In all cases, communities had additional lands where they were able to concentrate production, underscoring the importance of both conservation values as well as land-use flexibility.

All but three larger individual landowners expressed that the páramo is important for water supply, although fewer saw this as linked to their own livelihoods. Several larger landowners indicated that they managed their land explicitly for conservation, with one explaining that “I conserve to conserve, not only for water, but for biodiversity, for everything,” but the majority emphasized water as the most important function of the páramo. Others who had purchased their páramo as an investment recognized the role of the páramo for water, but were more motivated by the incentive payment than the potential for SP to enhance conservation efforts. For example, one individual participant living in an urban area who bought his land as an investment expressed, “water is fundamental” saying that he “liked to conserve,” but that the primary advantage of the program was the financial incentive, and without SP he would have to find some way of profiting from the land. Medium-sized farmers and smaller landowners who relied on their páramo for grazing also expressed the importance of the páramo for water, but explained that they saw grazing as a compatible land use for water protection.

The 15 smaller landowner participants interviewed from one community explained that the regional extension agent suggested that conservation through enrolling in SP was a way to prevent the “land from drying up.” While these participants did not equate páramo conservation (or reduction of grazing and burning) with increased water supply, all were cognizant of links between land use and water supply, expressing that they felt “cheated” by government-sponsored pine afforestation efforts which they believe have reduced water availability (a perception that has been supported by some research (Buytaert et al., 2007)) and provide fewer financial benefits than originally expected. These smaller landowners suggested that, while the opportunity to gain economically from underutilized land became the primary motivation for the first community members to enroll, potential benefits for water supply also played a role. In this case, SP payments can be seen as a combination of a “carrot” and an incentive to “tip” land use decisions toward conservation (Pagilla, 2008, p. 718; Muradian and Rival, 2012, p. 97).

Land security. Another important factor influencing the desire to enroll in SP for some participants was the potential to increase land security (Table 2). This was conceptualized both in terms of protecting land boundaries for political and economic reasons, as well as an ecological concern, to prevent outsiders from degrading natural capital. This was cited as a primary reason for enrolling by four larger landowners (3 urban, 1 medium-sized farmer) and one smaller landowner. The smaller landowner, for example, explained that his primary reason for enrolling in SP was the economic incentive, but that, since he was not using his land, joining SP also helped to demonstrate land ownership. The three urban landowners indicated that land security was a reason they decided to participate, focusing on the value of having an alliance with a government institution, with one participant explaining, “I was already conserving and it made sense to have a legal document” (Table 2). While no community participant cited improved land security as a primary reason for enrolling in the program (in fact, most explained that there was substantial initial fear of land expropriation by the government in joining the program), half of the communities indicated that a benefit of participation was improved protection of their páramo. One community, for example, cited a benefit of SP as helping to “gain the respect” of their neighbors, which was believed to help prevent encroachment on land by neighboring communities. In this sense, enrolling in SP is a way to demonstrate land use and ownership: the importance of demonstrating land ownership over conserved lands that could be otherwise considered idle has, similarly, been noted in previous studies of adoption of PES in Latin America (Miranda et al., 2003). In Ecuador, there is a history of needing to show that land is “productive” to claim ownership, and past research has found a variety of ways of doing so, including planting trees in the páramo (Farley, 2007, 2010). However, the idea that conservation itself can equal ownership when the conservation is sanctioned by a state-program is a new and interesting variation.

However, conversely, we found a fear of land expropriation to be a major factor dampening desire to participate in SP, particularly among smaller landowner individuals and communities. As revealed in other PES studies in Latin America (Southgate and Wunder, 2009), we found a strong fear of land expropriation among rural community participants, smaller landowner participants and non-participants. All community landowners stated that enrolling was a unanimous decision, but most explained that, at first, some community members did not want to join due to a “fear that their land would be taken away.” The majority of smaller landowners also expressed initial and in some cases ongoing suspicion that SP “would take their land away” or “take their water away.” The decision to participate, despite this fear, grew out of relationships with NGOs or other institutions who had worked with the landowners prior to SP or through regional extensionists slowly gaining the trust of landowners. This further underscores the importance of social and political capital in facilitating program entry (Zbinden and Lee, 2005; Muñoz-Pina et al., 2008; Clements et al., 2010; Schloegel, 2012).

Four of the five NGOs we interviewed generally supported SP’s goals, although they remained critical of certain aspects of the program, including land tenure regulations and limited capacity to manage a growing number of contracts. The other NGO interviewed strongly opposed SP and other payment programs; this NGO contended that such programs lock communities into agreements with stiff fines, encourage fragmentation of communal lands due to payment structure, and cause social conflict within communities. This organization considers SP as part of the larger REDD+ agenda, which they caution will lead to a commercialization of ecosystem services, threatening rural land rights and sovereignty (Acción
Ecología, 2010). Reed (2011) found similar opposition among several civil society organizations, including Acción Ecológica and Fundación Pachamama, who were actively engaging with communities to resist enrolling, as well as among indigenous organizations, including the national indigenous confederation, Confederación de Nacionalidades Indígenas del Ecuador (CONAIE) and its political party Pachakutik. Resistance is attributed to ideological opposition to neoliberal policies promoted by the Ecuadorian government which are perceived to commodify natural resources and threaten indigenous property rights and sovereignty (Reed, 2011). In particular, some indigenous groups, including CONAIE, contest the government’s interpretation of the new constitution as giving the state control over forest resources and environmental services, creating political challenges to implementing SocioBosque, which has been equated with REDD+ in some cases, despite being quite distinct in its goals and mechanisms.

All regional extensionists stated that, after land tenure, a fear of the government “taking away the land” was the greatest obstacle for increased participation. While our research pointed to widespread fears of land and natural resource expropriation and distrust of government programs as a potential dissuading factor in PES participation, this concern was not specific to indigenous communities. Although the widespread suspicion of SP among interviewees could stem from the opposition of some NGOs and CONAIE, and one regional extensionist mentioned that some of this fear stemmed from “rumors from extreme NGOs”, no interviewee discussed this concern in specific terms related to ecosystem services, characteristics of SP, or to campaigns by opposing NGOs or indigenous organizations. Rather a general suspicion of government programs related to land management emerged from the context of Ecuadorian land ownership history, and another extensionist asserted that this general suspicion followed from the belief that, “people always do things with a motive.” Broader resistance to neoliberalism may also play a role, though the Ministry of Environment promotes the program as a “conservation incentive,” and explicitly avoids the terms PES or REDD+, likely in an effort to distance themselves from neoliberal conceptualizations of PES and to curb suspicions of land or resource expropriation. Participant interviewees, likewise, conceived of the program as a “conservation” program, never referring to “environmental services” in their discussions of the program. Nonetheless, the wider political context of PES and its influence on the extent to which indigenous and rural communities continue to enroll in SP may be a fruitful area of further research.

In contrast, larger individual landowners, particularly those who had purchased their land, did not express such a fear of land expropriation, likely related to a greater sense of control over their land tenure and understanding of the limits of government powers. However, among non-participating larger landowners, we encountered resistance to the idea of having to grant access to program staff or of having their land use and management controlled by the government. For example, a non-participant, and neighbor of a medium-sized farmer participant, explained why he chose not to enter SP, stating that, “I don’t want people walking on my property.” Similarly, a community participant who did not have to change land use by participating in SP explained that he would not have entered if he had to change his land use in any way and asserted that he refused to take money in exchange for being told what to do.

Social relations. We found unique reasons for entering SP among the smaller landowners from one community who enrolled individually held land, in that social relations among community members influenced decisions to participate in SP. Half of those entering the program were not using the párano prior to enrollment, explaining that with SP they would at least earn something from their land. The other half were utilizing their land for grazing prior to entering the program and explained that they entered “to avoid conflict” that could arise if their free ranging sheep and cattle enter into areas enrolled in SP. They explained that, due to the lack of fencing between individual landholdings, it would be impossible to keep animals within individual parcels, thereby making it difficult for part of the community to enroll and part of the community to not enroll, given program restrictions on grazing and burning (Table 2). Community members not utilizing their land joined first, followed by those who were utilizing their land for seasonal or permanent grazing. While other researchers have pointed to the role that social relations may play in altering decisions of whether to participate in PES (Kosoy et al., 2007), we argue that this deserves far more attention, particularly in cases where individually held land is effectively utilized collectively.

Reed (2011, p. 545) suggests that participation in SocioBosque among indigenous communities could increase through ‘positive leakage’ where communities perceive “how their counterparts are reaping benefits while not suffering threats to their sovereignty and traditional ways of living.” We found such evidence of positive leakage in one region, where several mestizo communities enrolled due to interaction with an NGO and to seeing a neighboring community enroll without threats to security. Conversely, negative experiences with the program could dissuade participation and alter civil society opinion.

Conclusions and policy recommendations

In this paper we discussed social outcomes of SocioPáramo in terms of “equity in access” (Brown and Corbera, 2003, p. 545). Although approximately one third of individual SP participants are urban dwellers with non-farm livelihoods, SP has enrolled a larger percentage of rural smaller landowners and communities than reported in Costa Rica’s program (Miranda et al., 2003; Zbinden and Lee, 2005; Kosoy et al., 2008). This finding supports other studies that have found substantial participation among marginalized rural farmers and communities in other PES programs in Latin America, demonstrating that PES can be accessible and desirable to rural smaller landowners and communities (Muñoz-Pina et al., 2008; Wunder and Alban, 2008). Moreover, the majority of urban professionals joined in the first year of SP, and participation patterns shifted to a larger percentage of rural smaller landowners and medium-sized farmers in the second year, suggesting that, as SP awareness and size grows, it is becoming more available and attractive to these groups. However, although SP seems to represent a shift away from programs attracting primarily wealthy landowners, our results support Muñoz-Pina et al.’s (2008, p. 733) finding of scant participation among the “poorest of the poor.” This is due to land tenure insecurity, mistrust of government programs, and hesitancy to lock up limited land, all of which constrain smaller landowner participation.

We argue that if SocioPáramo is to meet its goal of protecting 800,000 ha of unprotected páramos while contributing to poverty alleviation, it is important to consider how to make the program more accessible and desirable to smaller landowners and rural communities. Redressing land tenure insecurity remains a key challenge to successfully attaining SP’s equity goals. From the program’s perspective, ensuring that participants maintain control over their land is critical to obtaining external funding for the program. At the same time, enrolling land without clear ownership rights could cause social conflict. However, filtering potential participants through strict land title requirements precludes wider participation among the most marginalized (Schloegel, 2012). Land reform stemming from the Agricultural Reforms of the 1960s and 1970s is incomplete and varies by region and between indigenous and mestizo landowners (Schloegel, 2012). Schloegel (2012) notes that most indigenous communities have government adjudicated land titles...
recognized by the program, but argues that land tenure insecurity has become a major obstacle for mestizo smallholder participation in one region that is important for both ecosystem service provision and poverty alleviation. In this case, the “ad corpus” land title type (land title defined through physical boundaries rather than a georeferenced property map) which mestizo landholders have “purchased, registered, and paid taxes on,” does not meet program standards (Schloegel, 2012, p. 97). The two existing options to get around this constraint are extremely expensive and unlikely in the short-term. These financial barriers to obtaining land title further limit the ability of more marginalized communities and individuals to participate.

While land tenure represents an important obstacle to participation, it could also become an important opportunity if SP were able to provide financial and logistical assistance to communities and individuals who want to join but have yet to gain secure land tenure. At the same time, it is recommendable that SP include a broader range of land tenure types, including “ad corpus” that reflects regional differences and realities. As pointed out by Milder et al. (2010, p. 1315), investing in socially equitable tenure reform is critical, as “equitable and well-defined tenure rights can help ensure that PES does not become a cause for resource appropriation that dispossesses low-income land stewards.” There is some precedence for this type of approach; in southern Ecuador, one NGO has been working with communities to formalize communal land title, which, among other benefits, allows them to enroll in SP. Such assistance should be combined with wider structural land tenure reform; such reform may be beyond the scope of SocioBosque at present, but is critical if a national-scale PES program is to provide equitable outcomes at regional and local scales.

At the same time, our results point to the need for broader structural land reforms, which might give smallholders enough land to make PES participation feasible and desirable. Unequal land distribution in the Andes of Ecuador is a relic of the hacienda system and small landholdings a relic of the Agricultural Reforms of the 1960s and 1970s, which redistributed hacienda lands, but often only the most hilly and least productive and, often in parcels of 3–5 ha (Jokisch, 2002). In the time since the agricultural reforms, land has been further fragmented into smaller and smaller sizes with continued agricultural expansion into páramo areas (Jokisch, 2002; De Zaldívar, 2008), although patterns of land distribution and tenure vary regionally (Bebbington, 2000). Given that we found only one example of a participant enrolling less than 10 ha, this has important implications for the feasibility of SP for the majority of individual landowners in Ecuador. For SP to be profitable and feasible, rural farmers and communities need to have access to more land. Likewise, communities owning collective land need to have access to fertile, often lower elevation, lands where they can concentrate production in order to be able to set aside land in the páramo for conservation or less intensive use. At the same time, it is critical to monitor and evaluate the effect that enrollment in SP may have on communal land ownership and title. Since the time of our interviews, it has been suggested that the land size payment structure could contribute to the partitioning of communal land into smaller private landholding, which could have adverse social and ecological impacts. These and other potential unintended side consequences of PES should be monitored and evaluated.

Beyond land tenure, one commonality among all participants was low reliance on the páramo enrolled for their livelihoods and for food security. In some cases, the páramo enrolled was important as seasonal grazing land, but all participants had access to more productive land or gained their primary livelihoods from off-farm income. Current payment levels are unlikely to attract participation among smaller landowners who rely primarily on the páramo for their livelihoods since payment levels do not cover opportunity costs for the most productive páramo land uses. Very small landowners who rely on land for their livelihoods are unlikely to have the flexibility to enter into PES agreements, at least at current payment levels. Rectifying this situation will be difficult since simply offering higher incentives could lead to situations where landowners abandon development and are “paid to do nothing” (Wunder, 2006) unless there are initiatives to facilitate the development of sustainable off-farm livelihoods. Thus, if SP aims to include very small landowners, representative of a large percentage of landholdings in the Andes, a strong focus should be placed on developing alternative livelihood strategies.

Our results support the argument that PES could be one effective strategy in a toolbox of approaches to sustainable development and environmental stewardship rather than a stand-alone approach (Rosa et al., 2004; Kollmair and Rasul, 2010; Muradian et al., 2010; Vignola et al., 2010). This is particularly important given the pressures faced by smallholders in Latin America on the one hand and the imperative to conserve high biodiversity ecosystems in the region on the other (Carr et al., 2009). We found that the majority of participants, particularly community participants, had zoned their land into conserved and productive areas prior to participation in SP, often with flatter, lower elevation land used for agricultural production and limited use of the highlands. A number of participating communities had worked with NGOs to improve production in lower elevation areas to enhance livelihoods and reduce pressure on the highlands. Interviewees, particularly community participants, often emphasized links between protecting their páramo and enhancing agricultural production in lower areas, explaining that improved páramo management leads to better water provision while improved agricultural production in lower elevation areas takes pressure off of the highlands. Rosa et al. (2004, p. 193) call for PES/CES programs to adopt a “landscape perspective,” which recognizes that ecosystem services are provided by “complex mosaics – or landscapes that combine natural and intervened ecosystems.” Where livelihoods and production are strengthened and concentrated in certain areas, the option of enrolling some land in SP becomes a more viable one.

In addition to increasing collaboration with other conservation and sustainable development efforts, this study also suggests that participation in SP may increase if some level of production is allowed in a greater number of SP agreements. Grazing with alpacas and llamas and low levels of grazing with cattle and sheep are permitted in some SP contracts, which are outside of protected areas, but burning is strictly prohibited. Rosa et al. (2004) note that rural smaller landowners are more likely to enroll in PES programs that allow some productive land uses since traditional conservation approaches may be considered a threat to food security. SP has recently raised the incentive payment to $60 per páramo hectare per year for smaller landowners with less than 20 ha in their land title. This should help attract more small landowners, but still will not likely suffice as compensation for smaller landowners who rely on the majority of their land for food security. SP’s capacity to attract rural smaller landowners could be increased by allowing low-intensity “working landscapes” with grazing and some level of burning, given that those with very little land are not able to participate because they are unable to greatly reduce production on any of their land. This would allow SP funding to supplement rather than replace current livelihoods, making it a more viable and inclusive option for a wider variety of landowners, potentially allowing it to more effectively prevent further agricultural expansion. Improved understanding of ecosystem services associated with burned and grazed “working landscapes” remains imperative in order to clarify whether it is necessary to minimize these complementary livelihood sources in order to maintain ecosystem services (Farley et al., 2011, 2013).

Similar to some earlier studies, we also found that environmental attitudes and perceptions of the value of páramo conservation
and sustainable management are important motivators of participation (Miranda et al., 2003; Kosoy et al., 2008). This is related to the relative ease of enrollment for landowners who do not have to change their land use, but also to a desire to enhance and ensure continued protection of natural capital. Communities often reported that long histories of fighting for land tenure, coupled with a realization of the protective role the páramo plays in their water supply, spurred their conservation movement. We argue that PES could collaborate successfully with environmental education and land tenure reform initiatives in order to enhance intrinsic motivation for conservation, but also to make conservation more viable from a livelihoods standpoint. Our results support Schloegel's (2010, p. 3) idea that, “in isolation, education, in the absence of economic alternatives, may not be able to achieve lasting conservation outcomes, nor will the presence of economic alternatives in the absence of education.” Concern has been raised that economic incentives may ‘crowd out’ social norms and intrinsic motivations for conservation (Clements et al., 2010; Muradian et al., 2010). However, although it is difficult to draw definitive conclusions given the relatively short time since program implementation, our findings suggest that payments can be complementary to intrinsic motivations and serve as incentives to “tip” land use toward conservation or sustainable management (Muradian and Rival, 2012).

Our results also highlight the importance of social capital, in the form of community organization and networks with NGOs and other organizations, in awareness of participation in PES (Gong et al., 2011). These findings point to the value and importance of strengthening existing collaborations and forming new ones with NGOs and community institutions who work locally with communities and smaller landowners. Strengthening alliances with NGOs and community organizations may help to overcome some of the mistrust of the program among rural inhabitants and will likely prove critical in raising program awareness and aiding potential participants in completing program entry requirements. Moreover, strengthening such networks also remains critical in the development of alternative livelihoods that will enable greater SP participation.

In the case of SocioPáramo, the socio-economic and biophysical context under which PES transactions occur is clearly a critical determinant of program access and outcomes. To improve equity in access, PES programs may usefully be developed in conjunction with efforts to improve land tenure security, strengthen social networks, and develop alternative livelihoods. At the same time, addressing issues of land distribution and broadening PES programs to include a broader array of “working” landscapes may become essential if a wider variety of landowners are to gain access to and benefit from PES programs. Future research comparing participants and non-participants in SP and other PES programs will help to further unravel where, how, and under what conditions PES may enhance access equity.

Acknowledgements

This study would not have been possible without the support, patience, and enthusiasm of many people. We thank SocioPáramo (Socio Bosque) staff for their time, insight, and assistance in contacting program participants. We are grateful to José Romero, Karina Paredes, and Patricio Padrón for their assistance in the field. José Romero was instrumental in forming interview questions and in considering strategies for improving program design. We thank Fundación Cordillera Tropical, Ecociencia, Naturaleza y Cultura, and Fulbright Ecuador for institutional support. Most of all we thank the participants of SP for their patience and willingness to share their stories with us; it is our hope that this study helps in the continued development of this program to improve the livelihoods of program participants. This material is based upon work supported by a Fulbright Student Grant, the National Science Foundation under Geography and Spatial Sciences Grant no. 0851532 and Dynamics of Coupled Natural and Human Systems (CNH) Program (EF0709627), and the SDSU University Grant Program. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Fulbright Foundation, the National Science Foundation, or San Diego State University.

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