

Evaluating Costa Rica's program for environmental services payments in the Monteverde region

Nathaniel F. Meyer

Environmental Studies and Biology Departments, Oberlin College

ABSTRACT

Costa Rica's environmental services payments or "PSA" ("*Pagos por servicios ambientales*") program was created to provide an economic incentive for landowners to conserve forest, thus compensating them for the ecosystem services their conservation activities provide. This study was conducted to evaluate the program's performance twelve years after its inception. By interviewing 20 private landowners in the Monteverde region, I ask (1) whether certain demographic parameters or property size affect participation, (2) whether the government is effectively informing farmers of the PSA opportunity, (3) what obstacles are preventing potential participants from successfully obtaining contracts, and (4) whether the program is functioning as a viable economic alternative to land uses that degrade ecosystem services. It was found that occupation affected participation, but not education, whether landowners live or work on the property, or property size. Business people did not participate, while conservation organizations tended to, perhaps implying that PSA payments are not a very financially lucrative endeavor for individual landowners. This was supported by the fact that while most interviewees found the program helpful, most would probably be conserving their forest anyway. It was also evident that government agencies are not informing many landowners of the program and that the application requirements, specifically the deed requirement, are a significant barrier to participation. The government agencies involved should reevaluate their application requirements to create an application process easier to navigate for the average small landowner, and should also actively seek out local conservation organizations to facilitate awareness of the program. If these measures are to be worth it, though, the program must also be advertised aggressively as a good carbon offset project in order for it to provide PSA payments large enough to present conservation with PSAs as an economically viable use of private land.

RESUMEN

El programa "Pagos por servicios ambientales" (PSA) de Costa Rica fue creado para proveer a propietarios de incentivo económico para conservar el bosque, pagandoles por los servicios ambientales que sus actividades conservacionistas proveen. Este estudio fue hecho para evaluar los resultados del programa doce años después de su nacimiento. Con 20 entrevistas a propietarios privados, pregunto (1) si parámetros demográficos o el tamaño de la propiedad influyen en la participación, (2) si el gobierno informa eficazmente a participantes potenciales de la oportunidad PSA, (3) cuáles obstáculos hay que prevengan que los participantes potenciales tengan éxito obteniendo contratos, y (4) si el programa funciona como alternativa económica que sea viable a los usos de tierra que degradan el medio ambiente. Fue encontrado que la participación era afectada por la ocupación, pero no por la nivel de educación, por si los propietarios viven o trabajan en la finca, ni por el tamaño de propiedad. Las personas de negocios no participaban, mientras las organizaciones conservacionistas participaban. Esto sugiere que los pagos PSA no son muy lucrativos para los propietarios individuales. Esto está apoyado por el hecho que mientras la mayoría de propietarios cree que el programa es beneficioso, es probable que la mayoría conservaría su bosque en cualquier caso. También, era evidente que las agencias gubernamentales no informan a muchos propietarios del programa y que los requisitos de la solicitud, específicamente el requisito del título, previenen más participación. Las agencias deben reevaluar estos requisitos para crear un proceso de solicitud más fácil para fomentar más conocimiento del programa. Sin embargo, para que vale la pena hacer estos, el gobierno de Costa Rica necesita anunciar agresivamente el programa PSA como un proyecto bueno de los créditos de carbono. Con este dinero, podrían dar los pagos PSA bastante grandes para que la conservación sea viable económicamente para los propietarios privados.

INTRODUCTION

Support for conservation of the biosphere has grown with increasing awareness of the environmental problems we face in modern times. However, these problems are also intensifying, as demonstrated by the scientific consensus regarding anthropogenic climate change (IPCC 2007), rising tropical deforestation rates and the associated erosion of biodiversity (Brook et al. 2003), altered biogeochemical cycles (Vitousek *et al.* 1997), and the degradation of ecosystem services (Vitousek *et al.* 1997), to name a few of the challenges confronting humanity today. The need to develop effective mechanisms that stimulate forest preservation is thus greater than ever. Rarely has civilian support for conservation, on its own, successfully thwarted development, population growth, or the forces of global free-market capitalism. To rein in the expanding challenges it may therefore be necessary to widen the appeal of conservation activities with incentive-based programs that directly reward landowners.

In some parts of the world, including Costa Rica, conservationists and policymakers are attempting to entice landowners with outright payments to preserve forests and protect ecosystem services. Ecosystem services are benefits that natural habitats provide for human society, which include air and water purification, drought and flood mitigation, soil generation and protection, waste recycling and detoxification, crop pollination and dispersal, pest control, maintenance of biodiversity, climate stabilization, aesthetics, and recreation, all together comprising an immense contribution to human welfare (Costanza et al. 1997). The economics involved in preserving these ecosystem services usually lead to the classic “tragedy of the commons” (Hardin 1968). This is because the benefits provided by forest on one person’s property are shared with others on local, regional, and in some cases global scales, while the costs are borne almost exclusively by the landowner. Unless a landowner can meet the costs, conservation may not be economically viable (Steed 2007). This situation may justify intervention, possibly governmental, to provide incentives for the protection of forest on private lands.

Costa Rica’s groundbreaking conservation laws have garnered international attention and prestige, and forest now covers more than a quarter of the country’s land area (Evans 1999). Despite its impressive (although fragmented) reserve and national park system, established largely in the mid-1970s, Costa Rica maintained one of the highest deforestation rates in the world through the 1980s and 1990s, resulting in very little forest cover remaining outside of protected area (Evans 1999; Sánchez-Azofeifa 2001). In order to combat deforestation of private land, in the early 1980s the Costa Rican government began to implement programs designed to provide economic incentives for farmers that reforested their land (Steed 2007). In 1996, Costa Rica built on these programs with Forestry Law No. 7575, setting up the Payments for Environmental Services or PSA (“*Pagos por Servicios Ambientales*”) program through the newly created government agency, the Fondo Nacional de Financiamiento Forestal (FONAFIFO) under the Ministerio del Ambiente y Energía (MINAE) (FONAFIFO 2000; Joyce 2006). The push for the new program came from Costa Rica’s then-new commitment to environmental sustainability made at the Rio de Janeiro Earth Summit in 1992 (FONAFIFO 2000). The program provides incentives for small and medium landowners to maintain forest cover on private land to protect ecosystem services, defined in Law 7575 as (1) mitigation of greenhouse gases through carbon sequestration, (2) protection of water for rural, urban, or hydroelectric users, (3) protection of biodiversity, and (4) preservation of scenic beauty, particularly for ecotourism (Joyce 2006, FONAFIFO 2007). While the PSA land-use categories, restrictions, and payments have changed over the years, at present forest protection or regeneration earn landowners \$64 USD per hectare per year while active reforestation earns \$82 USD (FONAFIFO 2000, Ortiz and Kellenberg

TABLE 1. Application requirements for FONAFIFO's PSA program (Pagiola 2006, FONAFIFO 2007, Masters 2007, Rodríguez 2008).

<p>1. Pre-application (brought to regional FONAFIFO office—for Monteverde region: Cañas, San Carlos, or San José):</p> <ul style="list-style-type: none">- Pre-application form with applicant information sheet- Public notary certification- Certified property map with registration data (ledger number, blueprint number, location, and contact information)- Copy of applicant identification card- Photocopy of cadastral property plan (extent, value, and ownership) <p>2. Receipt of Pre-application Confirmation from FONAFIFO</p> <ul style="list-style-type: none">- Contingent upon resolution of legal matters regarding pre-application <p>3. Application (submitted to regional FONAFIFO office)</p> <ul style="list-style-type: none">- Certified property map with registration data (ledger number, blueprint number, location, and contact information)- Land title (must match both national registry records and property map)- Technical study/comprehensive sustainable forest management plan (prepared by certified forestry engineer)- Forestry engineer certification- Contract with forestry engineer for yearly inspections- CD with archived photographs of property perimeter
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2002; Pagiola 2006, FONAFIFO 2007, Steed 2007). This study focuses on protection, which represents over 90% of PSA contracts (Pagiola 2006).

In order to obtain a contract, which lasts for five years, a landowner must complete a comprehensive application process that consists of submitting a substantial pre-application, resolving legal concerns identified by FONAFIFO, and submitting a final application (see Table 1). A prospective applicant must request a pre-application and then bring it completed to one of eight regional FONAFIFO offices, which can be quite far away (FONAFIFO 2007; Rodríguez 2008). Once the pre-application is processed, an applicant must resolve any legal conflicts regarding his property claims before proceeding to the general application, which involves finding and hiring a forestry engineer to conduct a technical study and develop a “sustainable forest management plan” (Zbinden and Lee 2005; Rodríguez 2008). Furthermore, the landowner must officially hold title to the land in the national registry (FONAFIFO 2007). This arduous process ideally ensures that the program is not taken advantage of by potentially deceitful opportunists, although it also probably hinders honest landowners wanting to participate (Pagiola 2006, Rodríguez 2008).

The program is currently funded by recipients of two of the four ecosystem services recognized in Law 7575, carbon sequestration and protection of water resources (Pagiola 2006). Currently, the majority, about \$10 million USD per year, comes from Costa Rica's 3.5% tax on fossil fuel consumption (Pagiola 2006, Steed 2007). Costa Rica also sells carbon offsets internationally, is a beneficiary of World Bank projects and the Global Environment Facility's (GEF) Ecomarkets Project, and receives voluntary payments from Costa Rican hydroelectric producers (Pagiola 2006; Rodríguez 2008). Since its inception, the PSA program has grown steadily, reaching 6000 contracts for 532,668 hectares in 2006, making up roughly 10% of Costa Rica's land area (FONAFIFO, 2006).

Despite the program's apparent success, however, many landowners with sizeable forest plots are not currently participating (Rodríguez 2008). They therefore lack an additional incentive, beyond the ecosystem services themselves, to conserve their forest. With today's high wood and food prices and more generally the fluctuating economic pressures of global capitalism, it may be very difficult for a landowner to justify forest preservation, given such high

opportunity costs (Pagiola 2006). This study explores PSA participation in Monteverde in order to identify ways the program could be improved to facilitate more participation and to determine whether it is effective in increasing forest conservation. I ask whether certain demographic characteristics, such as occupation, education level, living on the actual or potential PSA property, and working on the property affect participation in the PSA program. I also ask how Monteverde residents tend to discover the PSA opportunity, and what obstacles prevent them from participating. Finally, to evaluate the overall success of the program, I ask whether the payments actually provide sufficient motivation for landowners to conserve forest, and use interviewee input to suggest possible improvements to the program.

Given the application requirements (see above) and the culture of Costa Rican land acquisition and possession, which tends to shun legal formalities (Rodríguez 2008), I predicted that the general arduousness of the application process, and the deed requirement in particular, prevents many landowners from participating. All work applying must necessarily be done without any guarantee of receiving payments, and it is likely that many landowners consider this process too costly, too time-consuming, or too confusing to pursue. In addition, I predicted that given limited government resources, FONAFIFO is probably not effective at informing landowners about the PSA opportunity and the accompanying requisites, benefits, and application process. Furthermore, with the program's modest payments, I predicted that those having received PSA payments would have larger landholdings, as it is more worth their energy to apply. A study in the Northeastern lowlands suggests that this is the case (Zbinden and Lee 2005).

The Monteverde region is an ideal place to conduct this study. It has long been a hotbed for conservation with numerous conservation organizations operating, and there are mechanisms in place facilitating conservation practices and initiatives more there than perhaps anywhere else in the country. Furthermore, many biologists reside in the region, and ecotourism makes up the vast majority of the economy. If there is a single place in Costa Rica where the residents are likely to know about and be able to participate in this kind of program, it is Monteverde. Therefore, determining what prevents residents here from applying to receive these payments reveals where improvements to the program are most needed. Protecting Monteverde's particularly valuable ecological resources is important in maintaining not only ecosystem services but also in maintaining its incredibly rich biodiversity. So, while identifying ways to facilitate more applications is surely helpful, it is also important to evaluate whether or not the program is actually successful as motivation for conservation. If it is, then supporting such economic incentive systems would help fortify what is already a robust conservation ethic. If the program is shown to fall short of its objective, this must be acknowledged and policymakers must revisit and improve the system, as economic incentive schemes show promise as powerful drivers of conservation.

MATERIALS AND METHODS

I interviewed private landowners and representatives of conservation organizations throughout the Monteverde region, using a 27-question survey, prepared in both English and Spanish (see Appendix). Yúber Rodríguez, a forestry engineer and Monteverde Conservation League administrator, provided a preliminary list of landowners in the area who had participated in or had shown interest in the PSA program. Further interviewees were subsequently provided by people on this list. I recorded in-person interviews with a jWIN JX-R16 micro-cassette

recorder. When in-person interviews were not possible, a phone interview or an e-mail survey were substituted.

The relationship between property size (total and in PSAs) and participation was analyzed using a Wilcoxon U-test. The effect of occupation, education level, living on the property, and working on the property on participation was analyzed using a G-Test (X^2 likelihood ratio). The sources of initial information on the PSA program and suggestions for program improvements were analyzed using a Chi-square test.

RESULTS

Twenty interviews were conducted with 15 individual landowners and five people representing organizations, 18 of which were in person, one by phone, and one via email. The average age and median age were 55. Sixteen interviewees were Costa Rican-born, while four were from outside the country. Seven were currently receiving PSA payments and 13 were not, though of those not participating, six had participated in the past. The properties were located in Cabeceras de Tilarán, La Cruz de Abangares, Cañitas de Abangares, San Bosco, San Gerardo, Cerro Plano, Monteverde, La Lindora, and San Luis. The three larger private reserves were Monteverde’s Bosque Eterno S.A. and Bosque Eterno de los Niños, and SelvaTica near Puerto Viejo de Sarapiquí.

Property Size

The average total property size for PSA participants (currently or in the past), 1895.5 ± 1677.1 hectares (ha), was significantly higher than that of non-participants, 61.7 ± 15.9 ha (Wilcoxon Test, $Z = -1.9826$, $p = 0.0474$; Fig. 1). However, excluding the property of the largest reserve, Bosque Eterno de los Niños (BEN), the participants’ average total property size was 161.7 ± 81.6 ha, not significantly different from non-participants ($Z = -1.82$, $p = 0.0690$; Fig. 1). The average size of plots earning PSA payments, 216.2 ± 85.3 ha including BEN and 124.6 ± 79.1 ha without BEN, was not significantly different than forested plot sizes of non-participants, 43.7 ± 13.3 ha (Wilcoxon Test, $Z = -1.70$, $p = 0.0883$; $Z = -1.52$, $p = 0.1280$, Fig. 1).

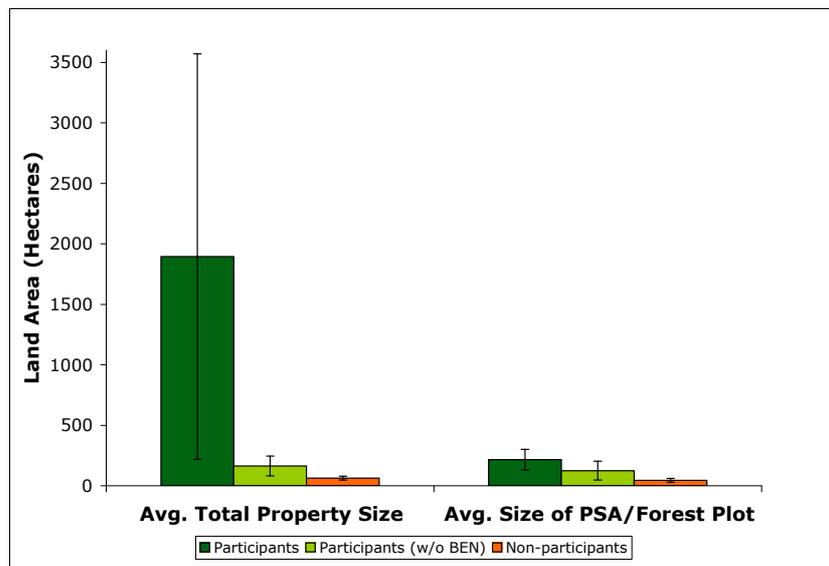


FIGURE 1. Average total property size and average size of actual or potential PSA plot for participants including BEN (dark green), participants not including BEN (light green), and non-participants (orange), with standard error bars.

Responses were mixed when landowners were asked whether they would participate in the program if they possessed less land. Most felt that it depended on the situation. One interviewee mentioned that with less land he would participate, but only if the process were easier. Another said he would participate regardless of size because any money is “a help.” Two representatives of conservation organizations suggested 10 hectares as a reasonable minimum, below which it would not be worth the trouble of applying. Finally, others said yes simply because their land was inside a protected area and thus other uses were prohibited. The only clear trend was that participation with less land is case-specific.

Demographic Contingency

Participation (now, in the past, or never) was affected by profession, but not by education level, whether the landowner lives on the actual or potential PSA property, or whether the landowner works on the property (see Table 2). No business people had participated in the PSA program, while four of five conservation organizations were currently participating and the fifth had recently submitted an application.

TABLE 2. Effect of (a) Occupation, (b) Education Level, (c) whether the landowner lives on the property, and (d) whether the landowner works on the property, on PSA participation (Now, In the Past, and Never). The significant p-value is italicized.

	PSA Participation			G-test (likelihood ratio)
	Now	Past	Never	
a. Occupation				
Farmer	3	4	2	$X^2 = 19.74$
Head of Conservation Org.	4	0	1	df = 3
Business Person	0	0	4	<i>p = 0.0031</i>
Other	0	2	0	
b. Education				
Did not complete elementary school	2	2	0	$X^2 = 8.65$
Elementary School Completed	1	3	3	df = 2
More than High School	4	1	4	p = 0.1943
c. Live on PSA plot?				
Yes	3	1	3	$X^2 = 1.37$
No	4	5	4	df = 1
				p = 0.5042
d. Work on PSA plot?				
Yes	4	4	6	$X^2 = 1.49$
No	3	2	1	df = 1
				p = 0.4738

Finding Out about the PSA Program

Two landowners first found out about the PSA program from MINAE, while 15 landowners first found out from other sources, including the Monteverde Conservation league (n

= 9), friends or neighbors (n = 5), or local cooperatives (n = 1), and three did not remember. A significant trend was that residents were not finding out about the PSA program from MINAE as much as from other sources ($X^2 = 17.75$, $df = 1$, $p < 0.00005$).

Suggestions for Improving the Program

Landowners mentioned, as their primary suggestion for improvement, that the application process be made easier (including allowing the submission of an alternate document in place of an official land deed), that information be disseminated more effectively, and that FONAFIFO adopt better and clearer priorities. Interviewees responded with a primary recommendation of an easier application process significantly more than the other two suggestions ($X^2 = 9.44$, $df = 2$, $p = 0.0089$). Some also mentioned that payments are small and that an increase would be helpful as stronger motivation.

Additional Observations

Seventeen of the interviewees responded that they felt the PSA program was useful for conserving forest on private land, although many indicated that it is necessary for the landowner to already have some conservation ethic. Of the 13 people not currently participating, lack of official deed was the reason for four. Three lacked interest (all businessmen), three had unsuccessfully pursued a contract renewal, one had recently submitted his first application, one felt others needed the money more, and one no longer owned the land. Interviewees' reasons for

TABLE 3. Reasons for conserving forest cited by landowners (n = 19).

Reason cited	# of landowners	%
Biodiversity/Flora/Fauna	13	68.4%
Air	11	57.9%
Water/Avoiding Dryness	11	57.9%
Economic Opportunity	3	15.8%
Contamination	3	15.8%
Global Warming	2	10.5%
Beauty	1	5.3%
Quality of Life	1	5.3%
Intrinsic Value	1	5.3%
Education	1	5.3%

conserving forest are reported in Table 3, the most common being the protection of biodiversity and preserving water resources and clean air.

DISCUSSION

The results suggest that in Monteverde, land size does not affect participation. While the average total property of participants was significantly larger than that of non-participants, this was due to the impact of the 22,000-hectare Bosque Eterno de los Niños property, administered by the Monteverde Conservation League. There was no significant difference for total property when BEN was taken out, nor for PSA-plot property size. This

is not consistent with a study conducted by Zbinden and Lee (2005) in Northeastern Costa Rica, which found that landowners participating in the PSA program there tended to have larger plots than those not participating. Having more land in the program makes the arduous application

process more worthwhile, especially given the per hectare yearly payment of \$64 USD, which is probably not often economically competitive with more 'intensive' land-uses like wood extraction (Pagiola 2006). It may be that with the strong conservation ethic and history in Monteverde, property size is not as strong a factor as in other places. Nevertheless, several landowners noted that one earns more money with larger property, which in turn provides a larger incentive, and thus property size probably plays some role in the decision-making.

Size of forest plot is, however, just one of many factors possibly influencing participation. For a program that requires the completion of a lengthy application, it was reasonable to expect that occupation and education level, as indicators of socioeconomic standing and perhaps of skills necessary to complete all application steps, would have an impact on whether certain landowners participated. The results indicate that only occupation was important. Specifically, representatives of conservation organizations were very likely to be participating, business people were not participating, and farmers showed no clear trends. Conservation organizations need sources of income to fund operations that protect the forests they administer. Given this, it makes sense that these organizations are taking advantage of a government program that pays them for their substantial forest plots. Farmers, on the other hand, have varying amounts of forest on their properties and may also be less connected to conservation circles. Their participation, then, likely depends on the particulars of their farm, who they know in the community, and perhaps where they live, all of which are quite variable. To determine what explains farmer participation, future studies should examine these sociological factors explicitly. The fact that no businessperson receives PSA payments suggests that the program is not a particularly lucrative endeavor, assuming that these landowners are more alert to economic opportunities. Other uses such as wood extraction, which may be hindered by PSA plot requirements, are more worth their time and resources. Several landowners mentioned that \$64 USD per hectare per year is not very much money, and is more a "help" than a driving factor for their conservation activities. These results appear to be in agreement with other studies that suggest the program is not sufficient as economic motivation for conservation (Pagiola 2006).

The fact that education level did not significantly impact participation in this study is not consistent with findings by Zbinden and Lee (2005) that PSA participants tended to be better educated. This could be explained by the fact that this study did not include landowners who had not heard of PSA contracts or by differences between Monteverde and the Northeastern lowlands near San Carlos. It could be that in a place like Monteverde, the ease of the application process is more mediated by networking than by skill set or ability to carry out the necessary administrative tasks, something affected by schooling. Indeed, many interviewees cited long wait times between application submission and FONAFIFO responses or contracts, and some felt that it was easier to obtain a contract or at least move an application along if one had a contact inside FONAFIFO or had experience dealing with the program. One conservation organization administrator described the PSA program as a "club" that anyone can join, but once one is a 'member,' understands the rules, and has contacts, the process becomes much easier. Given this character, education level is probably less important than experience with the process and rapport with officials. To gain further insight into the workings of the program, future studies should include interviews with FONAFIFO and MINAE officials. In addition, shadowing the application process from start to finish with several different landowners would be invaluable.

Whether or not the landowner lives or works on the farm may reflect how connected he or she feels to the property, and may also be a sign of how important the property is

economically. Living and working on the property could mean that its forest is providing daily benefits to the farmer, either by increasing crop or pasture success or by providing forest products or recreation for his or her family. This farmer may be less motivated to apply for PSAs, seeing as s/he is already receiving direct benefits, while for someone who lives and works far away, the property might be seen as pointless without it earning PSAs. Indeed, Zbinden and Lee (2005) found that PSA participants tended to be urban dwellers. On the other hand, working and living on the farm also indicates that it is an important part of the landowner's livelihood, and given that farmers tend to be relatively poor, people in this situation might be more in need of the extra money. The data showed no clear trends regarding this parameter, probably because living and working on the property are not very clear indicators, which makes corresponding patterns difficult to find and interpret. Future studies should obtain more specific and more exhaustive data on landowner lifestyle and socioeconomic status, which would better illuminate patterns.

In addition to identifying patterns of participation, an important finding of this study was that most landowners did not first find out about the program from MINAE. The PSA program was created to motivate farmers and other landowners to conserve forest and thus protect important ecosystem services it provides. Governments are typically stretched thin for funding, and it is likely that MINAE does not have many resources to devote to outreach activities (Rodríguez 2008), yet providing information to farmers effectively is crucial for attaining the goals of the program. Examining only landowners aware of the program, this study found that government outreach regarding PSAs was minimal in Monteverde. The most common source of information was the local Conservation League, and many of the friends from which other Monteverde landowners learned of the programs had themselves found out from the League. It is evident that this organization has a strong connection with the town; in fact, many of the landowners I interviewed had participated in a League reforestation program in the 1970s. These findings suggest that MINAE needs to work harder providing PSA information to landowners, but also show that well-connected local conservation organizations are quite effective at promoting the PSA program and should perhaps be utilized formally in the process in the future. If the government lacks resources to provide sufficient information and it is so difficult for landowners to learn how the system works and successfully put together an application, local conservation organizations could be a necessary middleman. Granted, not all communities have organizations like the League, but many do and if FONAFIFO officials were able to delegate tasks like information dissemination and application preparation help to conservation organizations (perhaps while providing some funds for support), it could result in a more efficient system.

More specifically, many interviewees felt that FONAFIFO should remove the strict property deed requirement if it wants to avoid frustrating potential participants. Landowners often found the complicated application process prohibitively difficult, and obtaining an official deed was often the biggest problem. Allowing landowners to submit documents such as testimony from neighboring property owners and historical evidence of ownership would remove a substantial barrier that currently prevents many applications from proceeding.

However, it is not clear that making the application process easier or more straightforward would result in better or more forest conservation. Pagiola (2006) and Steed (2007) suggest that the program is not funded nearly well enough to provide payments to all qualified applicants. There are lengthy waitlists at most regional FONAFIFO offices, and the PSA coffers are by no means overflowing (Rodríguez 2008). More importantly, Pagiola (2006)

suggests that the majority of PSA recipients are landowners for whom participating presents very low or negative opportunity costs and who would have protected their forest anyway. Furthermore, Sánchez-Azofeifa et al. (2007) found no significant difference between deforestation rates in areas receiving PSA payments and areas not receiving PSAs. While most interviewees in this study responded that PSA payments were useful for conserving forest on private property, further examination of their responses revealed that in most cases the trees would not be cut regardless of whether the landowners were receiving PSAs, a finding consistent with the studies cited above. In many cases, the forests are necessary elements of farms, protecting water resources and providing windbreaks. They are also desirable for preserving biodiversity (the reason for conserving most often cited by landowners) in a region where ecotourism is common and relatively lucrative. In some cases, the forests are already protected within the boundaries of a reserve, and the landowner is simply trying to earn some money with land s/he cannot use in any other way. Indeed, it seemed that in saying PSAs were useful, interviewees were really saying that the payments were merely helpful economically, not absolutely vital. Finally, the fact that businessmen are not receiving PSAs while conservation organizations are reliable participants reflects the likelihood that PSAs are not sufficient on their own to incentivize forest preservation over other use. It appears that the PSA program, rather than fully achieving its primary goal, instead acts today as (1) a social service helping small farmers survive, (2) a financial bonus for large farmers with large forest plots, or (3) a funding mechanism for conservation organizations to better protect the reserves they administer.

While its function as a social service to farmers may be an added bonus, the program exists to stimulate forest conservation by private landowners. Helping conservation organizations operate fulfills this goal. However, as an economically viable alternative to intensive land use, the program appears to be falling short. The best way to fix this would be to offer higher per hectare payments. This is difficult, particularly in light of steeply rising gas prices that have recently brought cuts in Costa Rica's fossil fuel tax onto the table in legislature discussions (Rodríguez 2008). If implemented, these cuts would diminish the PSA program's main source of funding (Pagiola 2006). Carbon credit payments were expected to be a large portion of PSA funding, but few substantial offset payments have been made to the program thus far, except for a one-time payment from the government of Norway in 1997 (Sánchez-Azofeifa 2007). This is largely because the international carbon market idea did not take hold as quickly as policymakers may have anticipated. However, offsetting travel and other carbon-emitting activities has become more popular in recent years, and the prospect of carbon neutrality is becoming a prominent goal of institutions around the world, as evidenced by the 546 signatories of the American College and University Presidents Climate Commitment, for example (Presidents Climate Commitment 2008). As the emissions market grows, it is reasonable to expect that more people will be interested in being donors for Costa Rica's PSA program. The Costa Rican government should take advantage of this situation by advertising the program aggressively around the world as a good destination for offset money. This would allow FONAFIFO to award larger payments that would actually make conservation an economically viable land use.

While the results of this study imply that the PSA program has struggled to provide a feasible conservation path for farmers, this does not mean the program has failed, nor does this diminish its potential as a mechanism for incentivizing conservation. Indeed, PSAs in Costa Rica have set an example for other nations by institutionalizing payments for environmental services, a crucial first step in the struggle to make our society more sustainable, and

furthermore, the program has the support of landowners. We are now in the phase of reexamination and adjustment with the aim of making this revolutionary program as effective as possible. It has already helped conservation organizations preserve forests. It should embrace this role and take advantage of such institutions to better connect with landowners. If FONAFIFO can make the program more accessible through more reasonable application requirements and more effective information dissemination while also aggressively advertising itself internationally as the perfect carbon offset project, it will become a sustainable and effective motivator of private forest conservation.

Future studies should continue to monitor the PSA application process and how potential and actual participants perceive it, and should do so in more depth. If policymakers remain flexible and receptive to feedback, it is likely that the program will remain popular. It is also important that future studies examine the development of the international carbon market, as this will become a very prominent source of PSA funds in coming years. Understanding how to situate the program favorably in this system will be important for future success. It would also be useful to compare similar programs between other countries to determine what strategies are most successful and why. If we want to benefit from the ecosystem services provided by intact forest in the future, and there is solid evidence we should want to (Costanza 1997), then we need to support, examine, and improve economic conservation schemes like Costa Rica's PSA program.

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APPENDIX

Las Preguntas de la Entrevista (Español)

1. ¿Cuál es su profesión?
2. ¿Cuántas personas viven en su casa?
3. ¿Vive usted en la finca?
4. ¿Trabaja en la finca?
5. ¿Tiene vehículo de finca, de su empresa, o personal?
6. ¿Qué tan grande es su finca? ¿Cuántas hectareas tiene de bosque, y cuántas hectareas tiene de bosque en regeneración (si existe)?
7. ¿Hace cuánto tiene esta finca? ¿Por cuánto tiempo ha sido el propietario usted?
8. ¿Cómo se usa el bosque o el area de regeneración actualmente?
 - a. Protección absoluta
 - b. Ecoturismo
 - c. Tala de bajo impacto
 - d. Tala intensiva
 - e. Cosechas de bosque (sin tala completa)
 - f. Otro: _____
9. ¿Cuál ha sido el uso de este terreno?
 - a. Bosque intacto (de impacto mínimo)
 - b. Ecoturismo
 - c. Tala de bajo impacto
 - d. Tala intensiva
 - e. Tala completa para ganado
 - f. Tala completa para cosechas

- g. Otro: _____
10. ¿Hace cuánto se pararon estas actividades?
11. ¿Qué contempla para el futuro uso?
- Protección absoluta
 - Ecoturismo
 - Tala de bajo impacto
 - Tala intensiva
 - Tala completa para ganado
 - Tala completa para cosechas
 - Tala no completa para cosechas (de bosque)
 - Otro: _____
12. ¿Sabe algo sobre el programa de los Pagos por Servicios Ambientales? (Sí o No)
13. ¿Cómo se enterró del programa?
14. ¿Está participando en el programa actualmente?
- No.
 - Sí, tengo contrato y ya he recibido pagos.
 - Sí, he solicitado participar en el programa, pero todavía no tengo contrato
15. (Si no está participando) ¿Porqué no?
- No sé cómo solicitar o no tengo suficiente información
 - No tengo el título u otros documentos requeridos de propiedad (planos)
 - No cumplo con los otros requisitos. (Cuáles? _____)
 - No vale la pena; es demasiado difícil.
 - Cuesta demasiado solicitar y satisfacer los requisitos
 - El programa no paga suficiente dinero
 - Quiero poder escoger lo que hago con mi terreno.
 - No creo que el programa sea una buena idea.
 - Otro: _____
16. (Si no está participando) ¿Qué se tendría que cambiar con el programa para que participara usted? ¿Qué recomendaciones tiene para mejorar los trámites?
- Facilitar los trámites de solicitar através de tener menos requisitos or requisitos más fácil.
 - Tener los formularios disponibles, explicar el proceso mejor, o hablar del programa en más lugares.
 - Ayuda o apoyo con el proceso de solicitar.
 - Bajar o cambiar los requisitos para comprobar que uno es propietario.
 - Bajar el costo para los trámites.
 - Recibir más dinero por hectarea.
 - Ofrecer un contrato que sea de plazo más largo.
 - Otro: _____
17. (Si está participando o ha participado) ¿Qué tenía que hacer para obtener un contrato?
- Gastó dinero... (en qué? _____)
 - Gastó tiempo... (haciendo qué? _____)
 - Tenía que arreglar o encontrar los documentos necesarios de propiedad.
 - Tenía que solicitar más que una vez.
 - Tenía que ponerme en contacto con FONAFIFO después de solicitar.

- f. Tenía que ir a una oficina de FONAFIFO y hablar con un encargado después de enviar la solicitud.
 - g. Otro: _____
18. (Si está participando o ha participado) ¿Cuánto dinero recibe usted cada año?
 19. (Si está participando o ha participado) ¿Cuáles otros beneficios le da a usted el programa?
 20. (Si está participando o ha participado) ¿Cuáles usos de terreno ya no puede realizar (porque está/estaba participando en el programa)?
 21. (Si está participando o ha participado) ¿Tiene sugerencias o recomendaciones para fomentar la participación de más personas?
 - a. Facilitar los trámites de solicitar através de tener menos requisitos, tener los formularios disponibles, explicar el proceso mejor, o hablar del programa en más lugares.
 - b. Ayuda o apoyo con el proceso de solicitar.
 - c. Bajar o cambiar los requisitos para comprobar que uno es propietario.
 - d. Bajar el costo para los trámites.
 - e. Recibir más dinero por hectarea.
 - f. Ofrecer un contrato que sea de plazo más largo.
 - g. Otro: _____
 22. (Si está participando o ha participado) ¿Si tuviera menos propiedad, participaría en este programa?
 23. ¿En su opinion, porqué es importante o no importante preservar el bosque en su finca?
 24. ¿Cree que el programa PSA es útil para conservar el bosque en propiedad privada?
 - a. Sí, porque...
 - b. No, porque...
 25. ¿Cuantos años tiene?
 - a. <25
 - b. 25-34
 - c. 35-44
 - d. 45-54
 - e. >55
 26. Indique su nivel de estudios, por favor.
 - a. Escuela
 - b. Colegio
 - c. Universidad
 - d. Estudios postgraduados
 27. ¿Cuál proporción de sus ingresos anuales es/era de los PSA?
 - a. 10%
 - b. 20%
 - c. 30%
 - d. 40%
 - e. 50%
 - f. 60%
 - g. 70%
 - h. 80%
 - i. 90%
 - j. 100%

Interview Questions (English Version)

1. What is your occupation?
2. How many people currently live in your house?
3. Do you live on the property?
4. Do you work on the property?
5. Do you have a personal, farm, or business vehicle?
6. How large is your property (in hectares) and how many hectares of forest do you have?
7. How long have you owned this property?
8. How are you using the forested or regenerating area now?
 - a. Protection
 - b. Ecotourism
 - c. Low-impact wood extraction
 - d. Intensive logging
 - e. Forest crops (without clearcutting)
 - f. Other: _____
9. What has it been used for in the past?
 - a. Protection
 - b. Ecotourism
 - c. Low-impact wood extraction
 - d. Intensive logging
 - e. Clearcut for cattle
 - f. Clearcut for crops
 - g. Other: _____
10. How many years ago was this use stopped?
11. How do you plan to use the area in the future?
 - a. Protection
 - b. Ecotourism
 - c. Low-impact wood extraction
 - d. Intensive logging
 - e. Forest crops (without clearcutting)
 - f. Clearcut for cattle
 - g. Clearcut for crops
 - h. Other: _____
12. Have you heard of the Pagos por Servicios Ambientales program? (Y / N)
13. How did you first find out about the program?
14. Are you currently participating in the PSA program?
 - a. No.
 - b. Yes, I am currently under contract and have received payments.
 - c. Yes, I have applied but have not yet been offered a contract.
15. (If you are not participating), why not?
 - a. Don't know how to apply/not enough information.
 - b. I don't have the title for my land.
 - c. I don't meet other requirements (which one(s)? _____)
 - d. It's not worth the trouble/ it's too hard.

- e. It's too expensive to apply and satisfy the requirements.
 - f. The payments aren't high enough.
 - g. I want to be free to choose how I use my land.
 - h. I don't think the PSA program is a good idea.
 - i. Other: _____
16. (If you are not participating), what would have to change in order for you to participate?
- a. Streamline the application process with fewer requirements or easier requirements.
 - b. Information more available, forms dispensed, or information disseminated to more places.
 - c. Change the requirements for proving ownership (i.e. deed requirement).
 - d. Lower costs for meeting requirements and/or applying.
 - e. Larger payments per hectare.
 - f. Longer contract duration.
 - g. Other: _____
17. (If you are participating or have participated), could you describe what it took to obtain a contract? What did you have to do to eventually succeed in receiving payments?
- a. Spend money (on what? _____)
 - b. Spend time (doing what? _____).
 - c. Fix or find property documents.
 - d. Apply multiple times.
 - e. Contact the government after your application was submitted.
 - f. Speak in person with a government official after your application was submitted.
 - g. Other: _____
18. (If you are participating or have participated), how much money do you receive each year?
19. (If you are participating or have participated), what other benefits do you feel the program provides you with?
20. (If you are participating or have participated), what sacrifices have you had to make? What are you unable to do on the property, now that you are participating in the program?
21. (If you are participating or have participated), how would you improve the PSA program to make it easier for more people to preserve more forest or more likely that they will participate?
- a. Streamline the application process with fewer requirements or easier requirements.
 - b. Information more available, forms dispensed, or information disseminated to more places.
 - c. Change the requirements for proving ownership (i.e. deed requirement).
 - d. Lower costs for meeting requirements and/or applying.
 - e. Larger payments per hectare.
 - f. Longer contract duration.
 - g. Other: _____
22. (If you are participating or have participated), if you had less property, would you still participate in the program?
23. In your opinion, why is it or is it not important to preserve the forest on your land?

24. Do you think the PSA program is useful for conserving forest on private land? Why or why not?
- a. Yes, because...
 - b. No, because...
25. What is your age?
26. What is your level of education?
27. What proportion of your annual income comes/came from the PSA program?
- a. 10%
 - b. 20%
 - c. 30%
 - d. 40%
 - e. 50%
 - f. 60%
 - g. 70%
 - h. 80%
 - i. 90%
 - j. 100%