

Motivations for, and barriers to, landowner participation in Argentina's payments for ecosystem services program

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Abstract

Payments for ecosystem services (PES) programs are a common policy tool to conserve forests. Effective PES programs attain conservation and social equity outcomes by actively engaging diverse landowners in long-term land stewardship and meeting landowners' needs. In 2017–2018, we conducted 32 in-depth interviews with landowners, technicians, and government officials to attain insights into how the PES program in Salta province, Argentina, has performed in terms of (1) motivating landowners to enroll in PES, and (2) ensuring their satisfaction with the design and performance of the program, a necessary precondition to ensure long-term forest stewardship. Interviewees suggested that landowners enroll in PES because they are restricted from engaging in more profitable land uses, they are not reliant on income from their land, they need PES payments to cover their land management costs, they are unable or unwilling to sell their land because their property values have been adversely impacted by land-use restrictions, they want to sustainably manage forested land, and/or they want to protect their property rights. Interviewees stated that land title requirements, conflicts over user rights, and high transaction costs hinder PES enrollment and exacerbate social conflicts between landowners and indigenous communities. Finally, interviewees questioned the conservation effectiveness of the PES program, owing to the program design and inadequate funding. Our findings suggest that engaging technicians, landowners, and indigenous communities in discussions on how the structure of the PES program could be improved might allow for shared learning, improved institutional trust, and the design of more flexible contracts that would facilitate sustained conservation and improved social equity.

KEYWORDS

administration, Chaco forest, conservation policy, incentive-based programs, indigenous communities, land tenure, qualitative analysis, regulations, rules, voluntary enrollment

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1 | INTRODUCTION

Payments for ecosystem services (PES) programs have been implemented across the globe to prevent deforestation and incentivize ecosystem services conservation on private and communal lands (Sorice et al., 2018). These voluntary programs aim to encourage private landowners and communities to conserve and sustainably manage forested ecosystems by providing direct financial incentives for forest stewardship. The effectiveness of PES programs depends on conserving ecosystem services and biodiversity and ensuring long-term participation of private and communal landowners (hereafter, landowners) by aligning with landowners' motivations and needs (Agrawal et al., 2015; Rode et al., 2015; Selinske et al., 2015, 2017). Although the underlying logic of PES is that financial incentives are essential to avoid loss of ecosystem services (Sorice et al., 2018), critics suggest that fixed-term financial incentives are implemented because they align with existing governance structures, rather than because they are the most effective means to attain long-term conservation outcomes and improved social equity (Bremer et al., 2014; Cortés-Capano et al., 2020; Lute et al., 2018; Selinske et al., 2017). To improve the performance of PES programs, both landowners' initial motivations for enrolling in PES and program features that would encourage long-term engagement in land stewardship and conservation must be considered.

Research shows that landowners' initial enrollment in private lands conservation programs (including PES) depends on both their financial and non-financial motivations for stewardship (Figueroa et al., 2016; Lute et al., 2018; Selinske et al., 2015, 2017). Financial incentives may encourage enrollment by compensating landowners for stewardship costs or the opportunity costs of alternative land uses foregone (Lute et al., 2018; Selinske et al., 2017). However, monetary benefits are unlikely to attract landowners who are economically dependent on their properties or who have already transformed their properties to intensive uses (Cortés-Capano et al., 2021). Moreover, PES payments may be insufficient to meet local subsistence needs, thereby failing to address issues of social justice (Alves-Pinto et al., 2018).

Financial incentives may crowd out existing stewardship motivations by teaching landowners to expect payment for conservation actions (Cortés-Capano et al., 2021; Selinske et al., 2017). Thus, PES programs are more likely to be effective if they enhance non-financial motivations for stewardship. For example, landowners may enroll in PES programs because (1) they value the conservation of ecosystem services, (2) out of a strong emotional attachment to their land, pro-environmental worldviews, or a sense of moral duty, and (3) their

socio-economic characteristics (e.g., land tenure, residency, financial security) allow them to enroll (Bremer et al., 2014; Cortés-Capano et al., 2020, 2021; Lute et al., 2018; Selinske et al., 2015, 2017). PES programs that align with landowners' existing stewardship actions, cultural values, and rural development goals are more likely to elicit voluntary enrollment (Cortés-Capano et al., 2020, 2021). Landowners may also enroll in PES to increase land security by protecting land boundaries or preventing outsiders from degrading their land (Bremer et al., 2014). Unfortunately, land titles and tenure insecurity are often major barriers to PES performance, potentially generating fears of land expropriation (Alves-Pinto et al., 2018; Bremer et al., 2014). Lack of social capital (e.g., social networks, community organization) may also undermine landowners' awareness of PES programs and their ability to meet enrollment requirements (e.g., documentation, investment plans, community support; Bremer et al., 2014). Legal, or biophysical (e.g., topography and accessibility) land use restrictions and social, human, or financial capital constraints may favor enrollment by larger and wealthier landowners, landowners with alternative, off-farm sources of income, and landowners with less accessible or productive properties (Bremer et al., 2014).

Irrespective of their motivations for PES enrollment, retaining landowners in PES programs depends on their satisfaction with the program (Lute et al., 2018; Selinske et al., 2015, 2017). Landowners' post-enrollment satisfaction with PES is dynamic and depends on program design, benefits, and efficiency (e.g., program structure, administration, and implementation), technical support, capacity building, institutional trust, and the degree to which the program meets their needs (Bremer et al., 2014; Cortés-Capano et al., 2020, 2021; Lute et al., 2018; Selinske et al., 2015, 2017; Sorice et al., 2018). Landowners are likely to prefer PES programs that have simple rules and are flexible in design (Lute et al., 2018). Programs with strict regulations that limit property rights or current activities undermine institutional trust and landowners' long-term engagement in PES (Alves-Pinto et al., 2018; Bremer et al., 2014; Lute et al., 2018). Programs that increase landowners' capacity to implement sustainable production and conservation on their properties may enhance landowners' autonomy, competence, and intrinsic motivations to engage in long-term land stewardship (Cortés-Capano et al., 2020, 2021). Technical assistance and capacity building are particularly attractive to landowners with less formal education and smaller properties (Alves-Pinto et al., 2018; Cortés-Capano et al., 2021).

Although there is substantial research on PES programs globally, landowners' motivations for participating

in PES are contextual and vary between landscapes and communities (Cortés-Capano et al., 2020, 2021; Selinske et al., 2015). Different factors may influence PES participation in different regions. Accordingly, we focused on the Argentine National Fund for the Enrichment and Preservation of Native Forests, a national publicly-funded PES program. We conducted in-depth semi-structured interviews with PES participants, intermediaries, and government officials to investigate (1) what motivates participants to enroll in the program, and (2) which program features may encourage or undermine long-term engagement in forest stewardship by landowners.

2 | ARGENTINE PES PROGRAM

Argentina's PES program operates within the framework of Act 26331 Minimum Standards for the Environmental Protection of Native Forests, commonly referred to as the (Native) Forest Law. The Forest Law (which was sanctioned in 2007, and came into effect in 2009) establishes the legal and institutional basis to protect native forests and ecosystem services provision in Argentina through a combination of land-use regulations and monetary incentives for forest stewardship (Gisclard, 2015). Under the Forest Law, native forests are classified into three zoning categories that stipulate permitted land uses:

- Category I (red zone): areas of high conservation value that should not be transformed or deforested. Only activities that guarantee forest preservation are allowed.
- Category II (yellow zone): areas of medium conservation value that should not be deforested. Activities with low environmental impact (e.g., harvesting non-timber forest products, selective logging, ecotourism, and silvopasture) are allowed.
- Category III (green zone): areas of low conservation value that may be partially or totally cleared of forest (Gisclard, 2015).

Although the Forest Law is national, individual provinces zoned the lands within the province and defined which land uses are allowed in each zoning category (Piquer-Rodríguez et al., 2015).

The Forest Law stipulates that government approval is required to conserve, sustainably use or convert native forests to other uses. Landowners must obtain government-approved formulation plans that contain baseline information about their property (e.g., a census of trees) before obtaining government-approved conservation plans, sustainable management plans, or land-use change plans for their property, collectively referred to as

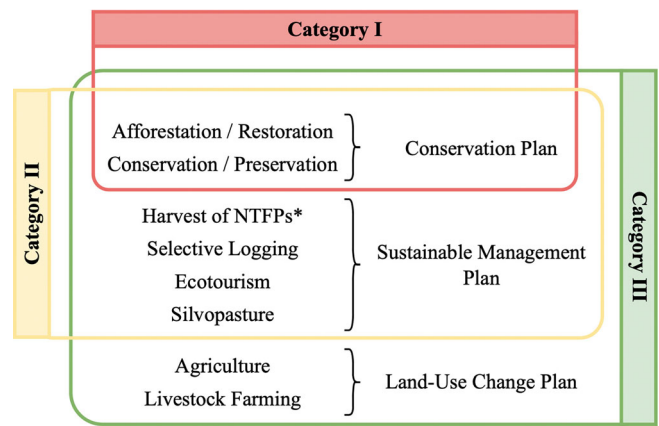


FIGURE 1 Type of intervention plans permitted based on conservation category. Category I (red zone) includes areas of high conservation value that should not be transformed or deforested. Only activities that guarantee forest preservation are allowed. Category II (yellow zone) includes areas of medium conservation value that should not be deforested. Activities with low environmental impact are allowed. Category III (green zone) includes areas of low conservation value that may be partially or totally cleared of forest. *NTFPs: Non-timber forest products

‘intervention plans’ (Gisclard, 2015). The type of intervention plan that landowners may implement (and the forest-use activities permitted by that plan) depends on information contained in formulation plans and the zoning category for landowners’ properties (Figure 1; Gisclard, 2015).

Landowners must hold clear property rights to their land to submit formulation and intervention plans in some provinces. However, the law also recognizes informal property rights (long and continuous occupation of land with the consent of landowners) of indigenous communities and criollos (individuals who descend from Spanish immigrants who settled the forest during the 16th and 17th centuries and married indigenous community members; Dasso, 2010). The Forest Law mandates that all formulation and intervention plans must be endorsed by intermediaries, often called technicians. These intermediaries are professionals (e.g., biologists, natural resources engineers, and foresters), who are registered with a professional association.

Argentina's PES program constitutes the incentive-based component of the nation's Forest Law and is intended to compensate landowners for forest stewardship (Gisclard, 2015). The Forest Law explicitly recognizes six environmental services provided by native forests: water regulation; biodiversity conservation; soil and water quality conservation; greenhouse gas sequestration; landscape diversification and esthetics; and defense of the cultural identity of criollos and indigenous communities. The PES program compensates forest

owners who submit conservation and sustainable management plans. Sustainable management plans can include major alterations of the environment such as reduced tree cover and the introduction of exotic grasses to support cattle grazing. Conservation and sustainable management plans range from 1 to ≥ 15 years (Núñez-Regueiro et al., 2020). Higher payments per hectare are provided for conservation on red-zoned lands compared to yellow- and green-zoned lands. Private forest owners (e.g., individuals, indigenous communities, companies, and non-profit organizations) may enroll in the PES program. PES funds are also used to compensate provincial and local governments for public land stewardship in both protected and non-protected areas. Although various studies concluded that the Forest Law's zoning policy has been ineffective in reducing deforestation rates (Camba Sans et al., 2018; Ceddia & Zepharovich, 2017; Nolte et al., 2017; Volante & Seghezzi, 2018), recent research suggests that the PES program has helped to mitigate deforestation (Alcañiz & Gutierrez, 2020).

The federal government finances Argentina's PES program (Schomers & Matzdorf, 2013). By law, PES funding should come from (1) $\geq 0.3\%$ of the annual national budget (Gisclard, 2015); (2) 2% of export retention taxes from natural resource sectors (agriculture, livestock, and timber); (3) profits generated by sales of publications or other services from the forestry sector; (4) contributions from private donors; (5) loans and subsidies granted by national or international agencies; and (6) unexpended government finances from previous years. However, most funds stipulated by law for protecting native forests have not been paid since the program's inception because funds are reassigned to other budget categories. Between 2010 and 2017, the federal government paid ARG\$2481 million pesos (\sim US\$134 million, ARG \$18.51 = US\$1 in December 2017) for PES rather than the ARG\$27,440 million pesos (\sim US\$1483 million) that should have been allocated (Roget, 2017). Despite low funding levels, the number of voluntary PES plans increased between 2012 and 2016 (Ministro de Ambiente y Desarrollo Sustentable, 2017).

3 | METHODS

3.1 | Study area

We conducted this research in the Chaco forest of Salta province in northwestern Argentina. Salta (155,488 km²) contains the largest area of native forest in Argentina (82,802 km²; Ministro de Ambiente y Desarrollo Sustentable, 2017) and faces substantial pressure related to cattle production and agricultural expansion in the

Chaco region (Gasparri & Grau, 2009). Salta province complied with the Forest Law by enacting law No 7543 in December 2008, which took effect in 2009. Only landowners with legal property titles are allowed to participate in the PES program because of Salta's legislation on property rights. This requirement excludes individuals that have occupied private or federal lands de facto or with landowners' permission for several years (Provincial Law 7543/2008, n.d.; Aguiar et al., 2018). In many cases, criollos and indigenous communities do not have property rights over the land where they live and farm (Barbarán & Arias, 2001). Sixty-five percent of Salta's native forests are in the yellow zone and the rest are split between the red (16%) and green (19%) zones (Ministro de Ambiente y Desarrollo Sustentable, 2017). To date, landowners have implemented conservation or sustainable management plans on <3% of Salta's forested lands (Ministro de Ambiente y Desarrollo Sustentable, 2017). PES enrollment for Salta province comprises individuals (58%), companies (22%), government organizations (11%), indigenous and criollo communities with clear property rights (7%), and non-government organizations (2%) (Ministro de Ambiente y Desarrollo Sustentable, 2017).

3.2 | Data collection and analysis

We conducted in-depth semi-structured interviews with program participants, intermediaries, and government officials from June to August 2017 and October to December 2018. The Argentine Ministry of Environment provided us with a list of the 130 enrollees from Salta province. We interviewed landowners who lived in Salta province at the time of this research, for whom we were able to obtain contact information (71% of the individuals we invited to participate in this study agreed). We used referral-based (snowball) sampling and recommendations by professional contacts and local NGOs to identify additional landowners, PES technicians, and government officials to interview.

In total, we conducted 32 in-depth semi-structured interviews with PES enrollees ($n = 17$), intermediaries ($n = 8$, three interviewed on behalf of enrollees), government officials from the Environmental Office ($n = 5$), and individuals who were both PES enrollees and intermediaries ($n = 2$). PES enrollees consisted of two indigenous communities, two government agencies, four non-profit organizations, 10 individual landowners, and four corporate landowners. Enrollees engaged in row crop agriculture, cattle ranching, silviculture, and other non-agricultural activities (e.g., real estate) as their primary sources of income.

We conducted in-depth semi-structured interviews with research participants because the flexible structure of interviews allows for an enhanced understanding of responses. We used a list of open-ended questions to guide the conversation while also following topical trajectories raised by interviewees. We asked PES enrollees to describe their properties, their motivations for enrolling in PES, the structure of their PES plans, and their opinions about the performance of the PES program (see Data S1). We adapted the questions for intermediaries and government officials. We conducted the interviews in person in Spanish. Interviews ranged from 30 to 90 min (average of 46 min).

We audio-recorded, verbatim transcribed, and translated the interviews into English prior to analysis. We verified the accuracy of transcripts against the original recordings before data analysis. We conducted qualitative content analysis following Cohen et al. (2007) and using computer-assisted coding (NVivo 12.0). We read through the transcripts to understand the data holistically and identified the meaning of ideas and sentences as units of analysis. We then labeled the units of analysis with codes (i.e., open coding process). We did not use a coding list; rather we created codes throughout the coding process. We then grouped the codes into categories and sorted them into common themes that were developed inductively. Unlike positivist, quantitative studies, the purpose of qualitative research is to provide in-depth explanations and meanings, rather than generalizable findings (Carminati, 2018). This study was approved by the University of Florida Institutional Review Board (IRB-201701159).

4 | RESULTS

Three main themes emerged from our analysis: (1) financial and non-financial objectives motivate PES enrollment; (2) land title requirements, conflicts over user rights, and high transaction costs hinder enrollment in PES; and (3) PES fails to attain social equity or conservation outcomes (Figure 1, Table 1).

4.1 | Theme 1: Financial and non-financial objectives motivate PES enrollment

4.1.1 | Financial motivations for enrolling in PES

Interviewees suggested that landowners enroll in PES because: (1) they are precluded from engaging in

more profitable land uses, (2) their income is not derived from utilizing their land, (3) they need to cover their land management costs, and/or (4) they are unable or unwilling to sell their land because their property values have been adversely impacted by the Forest Law. Interviewees ($n = 23$) stated that participation in the PES program was the “only option” available to many landowners because land-use restrictions prevent agriculture and extensive ranching on red- and yellow-zone lands, for example: “there is no other alternative because [landowners are not authorized to use] rural properties for sustainable agriculture or livestock... You cannot engage in new land clearings or a system of selective clearings that allow you to engage in agriculture.” Landowners whose income was not derived from the use of their land were also willing to enroll in PES to receive payments ($n = 4$). As noted by one technician, “I [am not working with] any landowners who want to engage in economic activities and live exclusively from [the income].”

Landowners also enrolled in PES to cover fixed costs such as maintenance of their land and property taxes, especially for red-zoned lands ($n = 5$). Finally, the lower market value of properties in red and yellow zones owing to land-use restrictions has reduced the price at which owners can sell this land ($n = 3$), thereby motivating landowners to enroll in PES. As noted by one landowner, “if [landowners] wanted to sell a property categorized as a green zone... [they] get US\$ 300 per hectare. But being yellow, we could only get ARG\$ 200, \$180, or \$150 (~US\$8-11) because it has use restrictions.”

4.1.2 | Stewardship motivations for enrolling in PES

Interviewees ($n = 18$) also indicated that landowners enrolled in PES out of a desire to conserve or sustainably manage resources. These enrollees were aware of the ecological value of their lands in terms of biodiversity conservation, water provision to towns, and habitat protection. Although landowners with conservation objectives considered PES payments to be low, the payments helped to fund conservation on their lands, for example: “I had been preserving the forest before the program, paying [for it] out of my pocket. Imagine being told that they give you money just to do that. For me, it was like winning the lottery.” Some individuals saw PES participation as an opportunity to generate income by sustainably utilizing natural resources on their properties (e.g., tourism or sustainable timber harvesting). Local governments used PES funds to manage public forested areas.

TABLE 1 Identified themes regarding motivations for, and barriers to, landowner participation in Argentina's PES program.

Themes	Categories	Sub-categories
Financial and non-financial objectives motivate PES enrollment.	Financial motivations for enrolling in PES.	Landowners enroll in PES because they are precluded from engaging in more profitable land uses. Landowners who enroll in PES do not rely on income generated by their land. PES payments help to offset land management costs. Landowners enroll in PES because they are unable or unwilling to sell their land, owing to reductions in their property values caused by land use regulations.
	Stewardship motivations for enrolling in PES.	Landowners want to conserve or sustainably manage natural resources.
	Enrollment in PES to secure property rights.	Landowners enroll in PES to protect their land tenure. Indigenous communities view PES as an opportunity to affirm land rights. Landowners invest PES funds in fences and security guards to protect their property boundaries, contain and protect their livestock, prevent unauthorized timber harvesting, and preclude wildlife poaching and trespassing.
Land title requirements, conflicts over user rights, and high transaction costs hinder enrollment in PES.	Land titles and user rights as barriers to PES enrollment.	A clear, legal title to land is required to enroll in PES. Social conflicts over de facto access to resources on private lands prevent landowners enrolling their land in PES.
	Complex administrative rules and procedures generate high transaction costs for PES enrollment.	Administrative procedures required to participate in PES are unreasonably complex. Excessive bureaucracy has slowed approvals of PES documents and PES payments. Delays in PES payments make it difficult to execute PES activities in a timely and continuous manner.
PES fails to attain social equity or conservation outcomes.	Unequal distribution of benefits and costs across program participants.	PES payments are insufficient to fully compensate landowners for land use restrictions in the yellow and red zones. Financial benefits are higher for sustainable management plans (PES payments + income from timber/cattle production) than conservation plans (PES payments only). Unfair distribution of benefits between small and large landowners and private and public landowners. PES payments are variable.
	Limited conservation actions.	Funds are used to finance formulation plans and improvements to infrastructure, rather than conservation activities. Low PES payments prevent conservation of lands that are at risk of conversion to other uses.

4.1.3 | Enrollment in PES to secure property rights

Interviewees stated that landowners enrolled in PES to protect their land tenure and to secure the boundaries of their properties, thereby enforcing property rights. Three interviewees enrolled in the PES program because they did not understand the Forest Law and were concerned that they would lose their property rights, for example: “We decided to submit a plan because we did not know

the law well. It caused a lot of fear in producers, ‘if you do not enter [PES] this and that is going to happen to you’. And because of ignorance, we decided to enter.” Indigenous communities viewed the PES program as an opportunity to affirm land rights.

Interviewees ($n = 10$) stated that landowners invest PES funds in fences and security guards to protect their property boundaries, contain and protect their livestock, prevent unauthorized timber harvesting, and preclude wildlife poaching and trespassing. In part, landowners

invested in fences and guards because they were less likely to visit properties that cannot be used to generate income. Because “the rural police have trucks that are not functional, no fuel for their trucks, [and] no means of communication” landowners cannot rely on the police to protect their properties. As explained by decision-makers and technicians, “[landowners] always ask for money to build fences. It is what the majority request... You saw that there are many cases of timber theft or poaching. So, they request [funds] for a person who guards the property... [and] to build a small guardhouse for the guard. Especially in conservation plans, it is very common.” Since fences are expensive to construct, landowners valued the use of PES funds to cover their fencing costs, for example: “Today, fencing 1,000 meters costs 100,000 pesos [USD 5,848] in materials and labor, etc. [...] If you submit a plan asking to build fences, it is a great help.”

4.2 | Theme 2: Land title requirements, conflicts over user rights, and high transaction costs hinder enrollment in PES

4.2.1 | Land titles and user rights as barriers to PES enrollment

Interviewees ($n = 12$) stated that one of the key restrictions to PES enrollment is land titles. Specifically, interviewees distinguished between landowners (people with clear legal titles to land) and possessors (customary users of land and resources who have no legal title to land) when discussing barriers to enrollment. Lack of land title is a common eligibility issue in northern Argentina for two groups of people: individuals that have occupied the land for several years without formal title to that land, and rightful heirs waiting for the resolution of succession acts to formally inherit the land. Interviewees stated ($n = 8$) that enrollment in PES is possible only if land titles are “perfect,” meaning that “there should be no litigation” pertaining to the land. As examples of such litigation, they mentioned conflicts with neighbors related to boundary limits or with criollos and indigenous communities related to access to resources on private lands. People occupying land de facto or living near privately-owned properties may prevent landowners from converting their land to other uses or conserving it by lodging a complaint with the government. A landowner noted, “the government did not want to approve my conservation project because there was a criollo's house attached to the fences. And I told them, ‘it is conservation, what can I do so that the community does not feel affected? I'm conserving. I do not touch anything. I fence it. And if they want to hunt or use slingshots, or whatever, they

can do it’.” This issue was echoed by a government official who explained, “Social conflicts are most difficult [to resolve]... We ask landowners to report if there are indigenous communities in the area or not... PES plans are approved [and] when implementation begins the problems begin. When ancestral occupants... see that landowners are going to fence [the property], they come and complain. Thus, PES plans have been suspended. [Landowners] do not receive funding until they resolve the social conflict.” Interviewees also stated that landowners' eligibility to enroll in PES was hindered by unpaid real estate taxes, lack of legal descriptions of formally owned land, and embargoes on transferring land owing to outstanding debts.

4.2.2 | Complex administrative rules and procedures generate high transaction costs for PES enrollment

Interviewees ($n = 19$) repeatedly described the administrative procedures required to participate in PES as (1) unreasonably complex, (2) excessively delayed and bureaucratic, and (3) high in transaction costs. Interviewees complained that enrollment in PES requires approval of an “infinite” number of documents, and the amount of paperwork and delays in approving documents undermine the transparency and predictability of the PES enrollment process. For example: “the cadaster certificate [for a property] is valid for 30 days... And we enter a vicious cycle. Today you submit [the documents]. The procedure is delayed for administrative, technical, or legal reasons, ... and six months more of official processing is required. [The government] asks you to update the documents again...cadaster certificate, provincial income tax report, rural property tax report, etc., which makes the process tedious.”

According to interviewees ($n = 16$), excessive bureaucracy has also slowed approvals of PES documents and PES payments. They explained that PES plans are reviewed by several government offices to obtain legal, technical, and financial approval. High rates of turnover in government officials and inadequate government resources undermine the capacity and administrative knowledge required to efficiently review and approve PES plans. Delays in the approval of PES plans were also partly attributable to difficulties in obtaining paperwork from other government agencies. Even after a PES plan has been approved, interviewees stated that the deposit of PES payments into people's bank accounts may be delayed 1–4 years. Typically, interviewees waited 2 years for payments ($n = 14$). In part, delayed payment was attributable to fraud prevention

measures by the government. Interviewees ($n = 13$) noted that these delays decreased the value of payments due to inflation and made it difficult for participants to ensure that PES activities were executed in a timely and continuous manner. Interviewees ($n = 18$) stated that excessive bureaucracy and the related time and energy spent on administrative tasks have discouraged landowners from entering PES or continuing their participation in the PES program. Transaction costs associated with PES enrollment appeared to be higher for people living in rural areas because they must travel to the capital of Salta in person to obtain and submit the required documents.

4.3 | Theme 3: PES fails to attain social equity or conservation outcomes

4.3.1 | Unequal distribution of benefits and costs across program participants

Interviewees argued that the distribution of benefits and costs associated with the Forest Law and PES program is unfair. Most interviewees ($n = 25$) stated that PES payments are insufficient to fully compensate landowners for forgoing land conversion. In large part, low payment levels were attributed to the government's failure to allocate the total amount of funds stipulated by the Forest Law to the PES program. According to interviewees, some landowners expected PES payments to be competitive with returns from agricultural land uses to compensate them for agricultural income foregone, especially in the red zone. Interviewees ($n = 13$) considered low payments combined with higher land-use restrictions for properties in the red and yellow zones to be unfair because "if the collective decision is to conserve, it has to be done at the expense of everybody" and not only forest landowners who are required to engage in activities that are not economically viable. As pointed out by one respondent, "We have a farm that we did not deforest. We did not exploit it. And next to [our farm] there is a producer who has been deforesting for more than five, 10 years, and today he makes a profit between 200 and 500 dollars per year per hectare, and we cannot do anything at all. We must pay taxes, make sure that nobody steals timber, prevent intruders, usurpation of the land, claims on the land by aboriginal peoples or new social groups, while [our neighbor] has a really important [source of] income."

Second, interviewees ($n = 5$) pointed out that financial benefits are higher for landowners who submit sustainable management plans than for landowners who submit conservation plans because landowners profit

from both PES payments and the activities identified in their plan (timber and cattle production). By contrast, conservation plans only allow landowners to obtain PES payments because landowners are limited to forest conservation activities (reforestation), for example, "if you have a livestock management plan, you earn money from the sale of meat and have high income. If you have a conservation plan, exclusively conservation, you will not have other income."

Third, interviewees ($n = 8$) argued that the distribution of benefits between small and large landowners and private and public landowners is unfair. PES payments are allocated per hectare, which means that landowners with large landholdings receive higher aggregate payments while "small producers, those with fewer hectares, are marginalized." Because the scale of an activity may determine profitability, smaller landowners who were required to conserve a substantial share of their land were unable to earn a viable income from their remaining land. One interviewee suggested that there should be a special PES fund for small landowners. Interviewees further stated that competition for PES funds between the provincial government and private landowners is unequal because public plans are approved faster than private plans, with few objections regarding the amount requested, and larger amounts granted.

Finally, although the Forest Law mandates PES program participants should receive an annual payment per hectare from the provincial government, interviewees ($n = 10$) claimed that payments were "a mystery" and "not a fixed amount." Payments are variable for two reasons: (1) the amount of money that the federal government allocates to provinces to fund the PES program varies each year, and (2) payments depend on the number of approved PES plans each year. One technician suggested that low levels of federal funding for the PES program have caused landowners, who might have been willing to enroll more land, to only enroll a few hectares to increase their chances of obtaining PES funding, for example: "If you [submit a plan for] 34,000 hectares and ask for five and a half million pesos to do the work, it is more likely that [the project will not be] approved." Although landowners objected to low PES payments, interviewees ($n = 6$) still considered "any help [to be] good" since these payments represented financial aid from the government and were preferable to "having nothing."

4.3.2 | Limited conservation actions

According to interviewees ($n = 20$), most PES funds are used to finance formulation plans and improvements to

infrastructure rather than conservation activities. They explained that the provincial government prioritizes the allocation of PES funds to financing formulation plans to encourage new participants in PES. However, fewer funds are allocated to the implementation of conservation plans or sustainable management plans, that is, to financing long-term conservation and sustainable use of the forest. As such, PES funds are primarily used to pay for biodiversity surveys and forest inventories, to hire technicians to develop and submit formulation plans, and to construct fences (which do prevent land degradation but do not qualify as active land stewardship). Other less common uses of PES funds included electrifying fences, constructing firebreaks, and investing in training programs for local people.

Interviewees ($n = 10$) argued that low PES payments prevent the implementation of plans and activities that result in real conservation outcomes, for example: “After eight years there is a huge negative balance and nobody, nobody, went to the congress and said, ‘the federal government should invest the billions that are needed to implement serious conservation plans.’” However, not all interviewees agreed that increased payments for conserving forests would be an effective conservation intervention. Rather, they suggested that financing increased environmental awareness would be more effective, for example: “if we raise awareness and change the thinking of people, that will be much more effective than forcing people to [enroll in PES] for one year... Because next year if you do not give them money, they will engage in barbarity.” Regardless of payment levels, interviewees suggested that the PES program is enrolling lands that would not have been converted to alternative uses, either because owners live in other provinces or because these lands are not suitable for agriculture. As such, funds are not being invested in conserving lands that are at risk for conversion to other uses.

5 | DISCUSSION

Effective PES programs conserve ecosystem services and improve social equity by actively engaging diverse landowners (including low-income and marginalized landowners) in long-term land stewardship and meeting landowners’ needs (Agrawal et al., 2015; Bremer et al., 2014; Rode et al., 2015; Rosa et al., 2004). This is a two-part process. First, landowners’ decision to enroll in PES depends on their financial and non-financial motivations for land stewardship (Figueroa et al., 2016; Lute et al., 2018; Selinske et al., 2015, 2017). Second, landowners’ decision to engage in long-term land stewardship depends on their satisfaction with the design and

performance of the program (Bremer et al., 2014; Selinske et al., 2015, 2017; Lute et al., 2018; Sorice et al., 2018; Cortés-Capano et al., 2020, 2021). Here, we used in-depth interviews to assess how the PES program in Salta province, Argentina, has performed in terms of motivating landowners to enroll in PES and ensuring their satisfaction with the program. Our findings provide insights into potential amendments to Argentina’s PES program, which may improve the performance of the program (Table 2).

Consistent with previous studies (Lute et al., 2018; Selinske et al., 2017), financial incentives motivated research participants to enroll in PES to offset stewardship and opportunity costs, as well as property taxes. However, our findings suggest that PES payments are insufficient to offset foregone income and lower property values from land-use restrictions under the Forest Law or to persuade landowners with yellow- or green-zoned land to engage in stewardship if they are economically dependent on their properties (Gisclard, 2015). Consistent with interviewees’ assertions, research shows that lands that have been cleared of forest for other uses are sold at higher prices than forested land (Mónaco et al., 2020). At current payment levels, landowners with red-zoned properties were considered more likely to enroll in PES, that is, legal land-use restrictions influenced landowners’ motivations to enroll in PES (Bremer et al., 2014).

Research participants’ decision to enroll in PES also depended on non-financial motivations. We found evidence that landowners enrolled in PES because it was consistent with their existing stewardship actions and they recognized the importance of sustainable development (Cortés-Capano et al., 2020, 2021). Landowners also enrolled in PES out of fears of land expropriation and to increase their land security by investing in fences and guards to protect their property boundaries and prevent timber theft, poaching, and illegal livestock grazing on their land (Alves-Pinto et al., 2018; Bremer et al., 2014). Interviewees further suggested that landowners’ socio-economic characteristics (clear land title, land productivity, level of financial security), social capital (i.e., their ability to provide the necessary documentation for PES enrollment), and the biophysical characteristics of their properties (i.e., accessibility) influenced their decision to enroll in PES. Social and financial constraints may favor PES enrollment by landowners with alternative, off-farm sources of income, and/or less accessible or productive properties (Bremer et al., 2014).

Although the current PES program does motivate enrollment, our findings suggest that there is considerable dissatisfaction with the structure of the program, which has negative implications for the long-term performance of the program (Lute et al., 2018;

TABLE 2 Potential solutions to resolve current limitations of Argentina's PES program.

Objective	Potential solutions
Secure adequate funding to finance the PES program.	<ul style="list-style-type: none"> Funds that are stipulated by law for protecting native forests should be allocated to the PES program. Contributions from private donors or international agencies may secure short-term funding while federal funding is appropriately directed to the PES program (per the Forest Law).
Improve institutional trust by reducing the social and transaction costs of PES enrollment.	<ul style="list-style-type: none"> Refine administrative procedures to reduce the paperwork, time, and costs associated with PES enrollment. Identify how government institutions can improve their capacity and administrative knowledge, in order to efficiently review and approve PES plans. Reduce delays in PES payments. Evaluate program participants' post-enrollment satisfaction with the program, in order to identify how the performance of the PES program may be improved. Engage technicians, landowners, criollos and indigenous communities in discussions on how the structure of the PES program could be altered to better align with landowners' and communities' existing stewardship actions, cultural values, and conservation/stewardship/development goals, while securing customary user rights to resources (e.g., community access to enrolled lands for subsistence activities). For example, landowners and communities may prefer more contract flexibility, simplified program rules, or assurances that communities will not lose their access to natural resources.
Enhance the conservation performance of the PES program.	<ul style="list-style-type: none"> Ensure that intervention (land use) plans submitted after formulation plans have been approved focus on conservation outcomes. Identify how PES contracts may be redesigned to encourage long-term engagement in land stewardship and conservation. For example, workshops, extension services, or technical assistance could increase landowners' and communities' capacity to implement sustainable production and conservation practices. Identify non-financial motivations for conservation, in order to design strategies/policies/programs that reinforce existing conservation beliefs and behaviors (e.g., through public or stakeholder recognition). Engage in spatial targeting of PES payments to secure landscape connectivity. Consider alternative conservation incentives (e.g., land acquisition or conservation easements) to augment PES.
Improve equity	<ul style="list-style-type: none"> Identify how smaller landowners may benefit from the PES program, for example, by allocating a portion of PES funds to financing conservation on smaller properties, or identifying whether PES payments should depend on landowners' property size and/or other financial resources. Ensure that PES funds are equitably distributed between public and private landowners. Enhance transparency about how PES payments are calculated and distributed. Engage government officials, technicians, landowners, criollos and indigenous communities in discussions on how the structure of the PES program could be altered to facilitate landowner participation in PES while still securing customary user rights to resources (e.g., community access to enrolled lands for subsistence activities).

Selinske et al., 2015, 2017). Interviewees criticized the high transaction costs associated with complex and delayed administrative processes and suggested that the program structure is undermining institutional trust. Institutional trust is further undermined by strict regulations that limit property rights and current activities, which may adversely affect landowners' long-term engagement in PES (Alves-Pinto et al., 2018; Bremer et al., 2014; Lute et al., 2018).

Unfortunately, multiple PES programs have reinforced social conflicts through unfair procedural decision-making and distribution of payments and conservation benefits (Corbera et al., 2019; Rodríguez de Francisco et al., 2013). As currently structured, PES in Salta province appears to generate conflicts over land tenure and land use and reinforce existing social inequalities

(Cotroneo et al., 2021; Del Giorgio et al., 2021; Gisclard, 2015; Seghezze et al., 2011). Interviewees criticized the program for reinforcing social conflicts pertaining to customary user rights by criollos or indigenous communities. Criollos and indigenous communities who do not own land receive little benefit from PES in Salta province (Aguiar et al., 2018; Del Giorgio et al., 2021), and they may block participation by private landowners by protesting landowners' enrollment in PES. Interviewees further criticized the unequal distribution of benefits and costs under the current program, owing to low and uncertain PES payments and limits on income-generating activities (e.g., timber and cattle production) based on land-use zones (Aguiar et al., 2018). They perceived that larger landowners and government entities receive larger payments because PES payments are

allocated per hectare, and government entities receive preferential approval of their plans. In part, this issue has arisen because the federal government has not provided the total amount of funding that should be allocated to the PES program (Gisclard, 2015).

Finally, interviewees questioned the program's conservation performance. They suggested that PES funds are largely allocated to writing formulation plans (i.e., hiring technicians to conduct biodiversity surveys and forest inventories) and infrastructure improvements (e.g., fences), rather than active, long-term forest stewardship (Gisclard, 2015). Spatial targeting for landscape connectivity, ensuring that intervention plans actually target sustainable use and conservation activities, and enrollment of green-zoned lands may help to improve the conservation performance of PES in Salta province.

We caution that we did not obtain non-participant opinions of the PES program, nor did we ask participants if they would have enrolled in PES in the absence of the Forest Law, which would have helped to better elucidate how the PES program in Salta province may be restructured. Nonetheless, our findings are consistent with other studies that highlight that retaining landowners in PES programs depends on landowners' satisfaction with the program, specifically: program design, benefits, and efficiency; institutional trust; and the degree to which the program meets their needs (Bremer et al., 2014; Selinske et al., 2015, 2017; Lute et al., 2018; Sorice et al., 2018; Cortés-Capano et al., 2020, 2021). The administrative burden, contractual complexity, and logistical problems associated with the PES program in Salta need to be addressed to facilitate long-term conservation by landowners and social equity (Aguiar et al., 2018). We recognize that this is not an easy task to accomplish and that Argentina's PES program arose from the efforts of dedicated individuals who sought to balance conservation, economic, and social welfare objectives. Our intention is not to disparage the efforts of individuals who were trying to address the wicked problem of deforestation in Argentina. However, there is increasing evidence that the performance of private land conservation programs would be improved by introducing more contract flexibility and simplifying program rules to reduce the costs of enrollment and build stronger collaborative conservation relationships between the government and landowners (Jack & Jayachandran, 2019; Lute et al., 2018; Messick et al., 2021). Stringent rules and regulations that limit property rights reinforce landowner distrust of the government and may undermine landowners' existing conservation attitudes and norms (Lute et al., 2018; Messick et al., 2021). The delineation of green-, yellow- and red-zoned lands in Salta serves an important conservation purpose. However, engaging landowners, criollos, and

indigenous communities in discussions on how the structure of the PES program could be improved might allow for shared learning and improved institutional trust that would facilitate sustained conservation on private lands in all zones (Lute et al., 2018). A structured decision-making approach could be used to improve the performance of Argentina's PES program by identifying appropriate objectives and actions to attain landscape-level conservation.

As currently structured, the PES program will likely enroll lands that are at low risk of conversion to other uses (Aguiar et al., 2018; Núñez-Regueiro et al., 2020). Recent research suggests that criollos and indigenous communities would prefer alternative conservation incentives (e.g., land acquisition or conservation easements) over PES, likely to secure their access to forest resources by preventing land conversion (Núñez-Godoy et al., 2022). Núñez-Godoy et al. (2022) also found that the amount of compensation needed to keep native forests on private lands in Argentina exceeds current PES payments. If Argentina's PES program cannot be restructured then directing payments to critical conservation areas such as ecological corridors and buffer zones may be a good approach to secure improved conservation outcomes.

However, our research suggests that the performance of the PES program may be improved by ensuring that funds stipulated by law for protecting native forests are allocated to the PES program (Table 2). Contributions from private donors or international agencies may secure funding in the short term to enhance program participation while flaws in the program, including funding levels, are being addressed. Conservation performance may also be improved by engaging in spatial targeting of PES payments and engaging with landowners and communities to identify additional interventions (e.g., workshops, technical assistance) that may increase landowners' and communities' capacity to implement sustainable production and conservation practices (Alves-Pinto et al., 2018; Cortés-Capano et al., 2020, 2021). Improved institutional trust may be attained by ensuring that PES funds are equitably distributed between public and private landowners, reducing delays in PES payments, enhancing transparency in how PES payments are calculated and distributed, improving administrative procedures to reduce transaction costs, evaluating post-enrollment satisfaction with the program, and engaging government officials, technicians, landowners, criollos and indigenous communities in discussions on how the structure of the PES program could be improved.

AUTHOR CONTRIBUTIONS

Cristina Cecilia Nuñez Godoy: Conceptualization, Methodology, Software, Validation, Formal analysis,

Investigation, Resources, Writing—Original Draft, Writing—Review & Editing, Visualization, Project administration, Funding acquisition. **Elizabeth Frances Pienaar**: Conceptualization, Methodology, Validation, Formal analysis, Resources, Writing—Original Draft, Writing—Review & Editing, Supervision, Project administration, Funding acquisition.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy restrictions.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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