

Understanding the diversity of private conservation in the Peruvian Amazon

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Abstract

Global awareness about the threats of ecosystem degradation in the Amazon is growing. While state-managed protected areas remain key instruments for forest conservation, private actors are increasingly funding and implementing a broad range of conservation initiatives. Private actors are transforming the Amazonian conservation landscape and its governance, however, many aspects of private conservation, especially the diversity of local practitioners and the challenges they face, remain understudied. Drawing on a case study of Madre de Dios in the Peruvian Amazon, we aim to generate a better understanding of private conservation practitioners and their various approaches to conservation on private and public land. We used an extensive review of literature and databases, in addition to 13 semi-structured interviews with various private conservation practitioners, to map privately conserved areas, and to gather perceptions about challenges, opportunities, and future pathways for private conservation. A total of 590 privately conserved areas, covering over one million hectares, were identified and mapped in Madre de Dios. We find that, while most initiatives are managed by individuals and families, for-profit companies manage half of the total area privately protected. Furthermore, we find that private conservation initiatives face significant barriers and pressures. These barriers include complex bureaucratic processes, legal contradictions and incoherencies, corruption, weak law enforcement, and financial insecurity. Conservation policies largely favor national and international actors and less so local, grassroots initiatives run by individuals and communities. Finally, we highlight the need for more accessible and inclusive policies that recognize the contribution of less powerful actors, to foster more effective conservation efforts for the future of the Amazon.

KEYWORDS

conservation, governance, Madre de Dios, mapping, Peru, privately protected areas

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1 | INTRODUCTION

Decades of research with alarming results have increased global awareness about the threat of ecosystem degradation in the Amazon. Protected areas (PAs), defined by the IUCN as “clearly defined geographical space[s], recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values” (Bingham et al., 2021; Dudley, 2008), have been recognized as key tools to slow down deforestation and associated carbon emissions and biodiversity loss (Vuohelainen et al., 2012). State-governed PAs have long dominated global conservation initiatives and are the most widespread conservation mechanism in the Amazon, covering almost a quarter of the biome (Maretti, 2014; Riveros et al., 2014). Alongside the increased rate of State-governed PA creation since the 2000s, criticism has grown about the negative consequences that these areas can have on local communities (Andrade & Rhodes, 2012). Consequently, more inclusive governance approaches have emerged that recognize the outsized role of local communities and indigenous peoples in managing and protecting over a third of Amazonian forests (Walker et al., 2014; WRI & Climate Focus, 2022).

Privately protected areas (PPAs), understood as PAs under private governance, have also gained momentum in recent years (Bingham et al., 2021; Stolton et al., 2014). While the total number of PPAs is difficult to determine and likely significantly underestimated (Palfrey et al., 2021), most recent estimates report 18,580 established PPAs, representing 6.55% of the number of protected areas world-wide (Lewis et al., 2023). In Latin America, PPAs reported in the World Database on Protected Areas (WDPA) cover an estimated two million hectares across eight countries (IUCN, 2018; López de la Lama et al., 2023). In addition to PAs, other effective area-based conservation measures (OECMs), defined as “sites outside protected areas that deliver effective and long-term in situ conservation of biodiversity” can also be governed by private entities (Jonas et al., 2023). Regardless of their protection, there is increasing recognition that areas governed by private entities can play important roles in biodiversity conservation (Jonas et al., 2023; Stolton et al., 2014); and in complementing state-owned PA networks (Bingham et al., 2017; Cardoso da Silva et al., 2021; Clements et al., 2019). For example, non-timber forest product (NTFP) concessions, indigenous lands and to a lesser extent logging concessions have been shown to reduce expected forest loss in the Peruvian Amazon (Negret et al., 2024). However, private approaches to conservation have also been criticized for their neoliberal

character, a tendency to commodify natural resources, and the appropriation of land by foreign and/or wealthy actors that perpetuates social injustice and neo-colonial structures (Gooden & 't Sas-Rolfes, 2020; Louder & Bosak, 2019). To date, global research on the role of private actors in conservation has largely focused on transnational corporations, international NGOs and market-based mechanisms (Holmes & Cavanagh, 2016; Louder & Bosak, 2019). Grassroots initiatives of communities and individuals have received less attention, as their key role in conservation is still broadly overlooked (Horwich & Lyon, 2007; Palfrey et al., 2021; Shanee et al., 2020), despite evidence that local Amazonian landowners dominate the private conservation landscape (López de la Lama et al., 2024). Private conservation encompasses the efforts of a multitude of actors, individual and communal, non-governmental and for-profit, and research-oriented institutions (Bingham et al., 2021; Mitchell et al., 2018), however, current policy and legal mechanisms ignore this diversity, thereby jeopardizing private contributions to conservation (López de la Lama et al., 2023). As a result, ongoing work to map diverse private conservation initiatives is still needed (Bingham et al., 2017). Finally, private conservation studies have largely focused on defining PPAs and motivations for establishment, meanwhile, mechanisms influencing the success of private conservation, including challenges and constraints have received little attention (Fitzsimons & Mitchell, 2024; Palfrey et al., 2021). In-depth studies critically assessing both the potential and difficulties associated with conservation on private land are lacking (Drescher & Brenner, 2018).

While the importance of conservation on PAs and indigenous lands is evident, the role of different private conservation actors and management regimes remains poorly understood in the Amazon, thereby undermining the opportunity to recognize and foster conservation efforts of local individuals and communities (Clements et al., 2019; Walker et al., 2014).

This paper aims to contribute to a better understanding of the diversity of private actors and their various approaches to conservation. We draw on a case study of the department of Madre de Dios in the Peruvian Amazon, which has witnessed a recent boom in conservation initiatives brought by a plethora of private actors. Our objectives are threefold: (1) to trace the evolution of private conservation in the Peruvian Amazon; (2) to map and characterize the diversity of private conservation areas, actors, and practices; and (3) to explore local perspectives on the barriers and opportunities for private conservation in the Amazon.

We begin by providing an overview of the conservation history of Madre de Dios and the private

conservation areas and actors that have emerged in this landscape mosaic. We discuss the current pressures, challenges and opportunities for private conservation in Madre de Dios, and conclude by providing a set of observations and policy recommendations to support and increase the effectiveness of private conservation in the Amazon.

2 | METHODS

2.1 | Study area

The Peruvian department of Madre de Dios is located in the Andes Amazon, bordering Brazil and Bolivia. It is Peru's third largest department in size (85,300 km²) with 141,070 habitants and a low population density (1.7 habitant/km²) (INEI, 2017).

With 94% of the region covered by forest, including 15.3% of Peru's total forests (MINAM, 2020), Madre de Dios has become globally renowned as a biodiversity hotspot (Jenkins et al., 2013; Myers et al., 2000) and the official Peruvian "capital of biodiversity" (Law 26311). It is the Peruvian department with the largest area of protected land, with almost half (46%) of its forested area contained within a network of six national PAs spread across territorial reserves for indigenous peoples, biosphere reserves, national reserves, communal reserves, a national park, and an increasing number of small-scale private conservation areas (ACPs). The region has 36 indigenous communities composed of seven ethnic groups, as well as indigenous people in voluntary isolation (SPDA, 2022).

The region's economy is based on the extraction of natural resources, principally gold mining, logging, and Brazil nut gathering, with emerging agriculture and tourism sectors. Since the construction of the Interoceanic Highway in 2010, Madre de Dios has seen an influx of migrants and the growth of an economy largely based on illicit activities (Caballero Espejo et al., 2018; Rodríguez-Ward et al., 2018). The department faces increasing deforestation rates due to agro-extractive frontier expansion and gold mining activities (Puzzi Nicolau et al., 2019), which also fuel social conflict through land tenure issues, overlapping land use rights and livelihood activities, with potential destabilizing consequences (Chávez et al., 2012; Froese et al., 2021, 2023).

2.2 | Tracing the evolution of private conservation in the Peruvian Amazon

We extensively reviewed literature on environmental conservation history in Madre de Dios, using the Ecosia,

Google Web and Google Scholar databases. These platforms were chosen for including both scientific and local, secondary historical literature. Search terms included "Madre de Dios", "private conservation" and "history", in both English and Spanish. We researched specific dates and laws when relevant to previous findings. We interviewed an expert on the history of private conservation in Peru, and used the information provided to fill the gaps remaining from the literature review.

2.3 | Mapping and characterization of private conservation areas and actors

To map and characterize the diversity of private conservation initiatives, actors, and activities in Madre de Dios, we created a database of private conservation areas containing information on ownership, type, area, year of implementation, and conservation activities (Appendix S1).

We included both private conservation initiatives on land that is protected (i.e., PPA) and not protected (i.e., private OECM) (Mitchell et al., 2018). We selected initiatives that carry out at least one of the following activities: certified forest management, environmental monitoring, biodiversity research, ecotourism, payments for ecosystem services, reforestation, and wildlife rehabilitation. We included both initiatives that take place on private and public land, but only considered areas governed by private actors. Specifically, we followed the IUCN typology "private governance" that includes individuals, for-profit organizations, non-governmental organizations (NGOs), and other non-profit organizations (research or religious entities) (Dudley, 2008).

Based on these criteria, we identified the following six categories of privately conserved areas in Madre de Dios: private conservation areas (ACPs, *Áreas de Conservación Privadas*, i.e., individual or communal privately owned land officially recognized as a conservation area); conservation concessions;¹ ecotourism concessions certified timber concessions (i.e., timber concessions certified for carbon credits or forest management); NTFP concessions actively involved in conservation projects (i.e., REDD+ and other projects involving conservation activities); and non-ACP private lands where conservation activities are carried out, which we refer to as "other private conservation areas" (Table 1).

Our study did not include Indigenous territories per se, as these are part of a distinct governance system (Dudley, 2008), however, several ACPs and ecotourism concessions are managed by indigenous communities. Further, contracts between the National Service for Protected Areas (SERNANP) and private actors on PAs were

TABLE 1 Overview of the six types of privately conserved areas included in this research.

Category of privately conserved area	Type (PPA or private OEMC)	Characteristics
Private conservation area (ACP)	PPA	Legal recognition for a minimum of 10 years or indefinitely on individual or communal private property. ACPs are included in the national system of protected areas (SINANPE). Allows for research, ecotourism, carbon credit trading, and other conservation activities. Restrictions for use of resources.
Conservation concession	PPA	Granted for 40 years, renewable without size limit. Allows individuals or organizations to undertake conservation projects on public land. Includes conservation activities that contribute to the protection of flora and fauna and ecological restoration, like research, education, tourism, or carbon credit trading.
Ecotourism concession	PPA	Granted for up to 40 years, renewable with a maximum size of 10,000 ha. Allows private actors to sustainably use forest lands and resources for touristic purposes and secondary economic activities in public areas, as well as carbon credit trading.
Certified timber concession	Private OEMC	Rights granted for up to 40 years renewable with an area size between 5000 and 40,000 ha. Timber extraction in public production forest with sustainable management plans. Allows for FSC certification and carbon credit trading.
NTFP concession actively involved in conservation projects	Private OEMC	Rights granted for up to 40 years renewable with a maximum size of 10,000 ha. Non-timber forest products extraction for industrial or commercial use. Allows for conservation activities like research, education, tourism and carbon credit trading.
Non-ACP private land	Private OEMC	Not an official category. Conservation activities that are undertaken on private land by individuals or private organizations.

not included, as the PAs are managed by private actors but still governed by a public agency.

For each privately conserved area, we created the database by using information obtained from publicly available geospatial databases, online research, the author's previous research experience in and knowledge of the region, and informal contacts with local networks of conservation practitioners. We created a geospatial database of the conservation areas for which geospatial information was available.

For the category "ACP", which is legally recognized, we obtained shapefiles from the public SERNANP (2022) online repository. In addition, we identified three ACPs that were included in previous versions (2021) of the repository but not in the shapefiles downloaded in 2022 (Appendix S1).

Shapefiles for all concessions, including conservation concessions, ecotourism concessions, timber concessions and NTFP concessions were obtained from an online repository (Geogpsperu.com, Geogpsperu, 2020, containing georeferenced data from OSINFOR, the Peruvian Forestry and Wildlife Resources Supervision Agency) and later completed with some more recent concessions, from a public online repository (SERFOR, 2022). Within the categories "conservation concessions" and "ecotourism concessions", we identified three conservation and two

ecotourism concessions that were not included in the shapefile, based on a complementary database we received in-person at the Regional Agency of Flora and Wildlife (DFFS) in Puerto Maldonado in November 2021. For the category "certified timber concessions", we selected the corresponding polygons from the shapefiles based on information obtained from the Verra registry for the Jaguar Amazon REDD+ Project (<https://registry.verra.org/app/projectDetail/VCS/2278>) for REDD+ and from the FSC public repository for FSC (Forest Stewardship Council, 2022). We did not identify any timber concessions with REDD+ or FSC that were not included in the shapefile. For the category "NTFP concessions actively involved in conservation projects" we selected the corresponding polygons based on a database we received in-person in June 2022 from the regional representative of *Bosques Amazónicos*, the company leading the REDD+ Brazil-nut concession project in Madre de Dios. We did not identify any NTFP concessions with REDD+ that were not included in the shapefile. Other projects involving conservation activities taking place on NTFP concessions were identified based on interview data, online research and our own observations.

Privately conserved areas within the category "other private conservation areas" were identified through personal communication with conservation practitioners

and online research (via Google search, with search terms: “conservation Madre de Dios”, “Conservation Tambopata”, “wildlife protection Madre de Dios” and by searching the name of the conservation area or its managing organization). We did not obtain shapefiles of these activities, and only those were included in the geospatial database for which we were able to access coordinates, through online search and personal contact. Note that in cases in which separate land units had the same owner, we considered them separate conservation areas, as the areas were not always established at the same time and were not always adjacent. Further, note that since not all privately conserved areas were formally constituted or registered, our selection (particularly of “other private conservation areas”, for which there is no official record) is possibly incomplete.

For each of the identified privately conserved areas for which we obtained shapefiles, we determined the total area using the area function of the R raster package in R Studio (Hijmans, 2023; R Core Team, 2023; R Studio Team, 2016). For the areas that were not included in the geospatial database or for which we only had point coordinates, we obtained information on total area from the available databases (see above). For three areas in the category “other private conservation areas”, no area information was obtained (Appendix S1). We also identified the year of foundation for all conservation areas (based on shapefile attribute tables, and complemented with online research for non-REDD+ NTFP concessions to identify the beginning of the conservation activities in those areas). We were not able to identify the year of foundation for eight out of the 20 “other private conservation areas”, since for this category we relied exclusively on online research and personal contacts.

Further, for all identified privately conserved areas, we collected information on type of conservation activities, conservation practitioners, and funding strategies through online research (specifically, of the content of websites of public-facing conservation initiatives), scanning of legal documents and public, open-source databases, that is, records from SERNANP (2022), the regional forestry department (SERFOR, 2022) and other datasets of shapefiles (Geogpsperu, 2020). In addition, we included information gathered through participant observation and informal contacts, with all authors based in Madre de Dios at the time of data collection.

2.4 | Exploring local perspectives among private conservation actors

We carried out semi-structured interviews with 12 private conservation practitioners in Madre de Dios (see

questionnaire in Appendix S2), representing the identified categories of privately conserved areas. The interviewees were primarily managing ACPs (4 out of 12) or other private conservation areas (4) but also conservation (3), NTFP (3), ecotourism (2) and timber concessions (1). The activities of the practitioners within their areas included two REDD+ projects and one restoration initiative (i.e., natural resource management), three initiatives focused on land protection, two focused on voluntourism and research, and four focused on ecotourism (Table 2). We also interviewed two additional key informants on private conservation and ecotourism in Peru. The objective of the study was explained and oral informed consent was obtained from the informants before the interviews. The data was analyzed in Atlas.ti (2023) to identify the main types of challenges faced by conservation practitioners.

3 | RESULTS

3.1 | The evolution of private conservation in Madre de Dios

Over the past centuries, Madre de Dios experienced successive waves of natural resource extraction, including the commercialization of commodities such as rubber, fur, timber, Brazil nut and gold (Lagneaux et al., 2024). As in other Amazonian regions, the regional conservation movement started in opposition to agrarian and extractivist frontier expansion during the 1950s. The region's first PA, the Manu National Park, was created in 1973 (Dourojeanni, 2013; Huertas & García, 2003). Criticism of the park's restrictive measures led to the emergence of novel, less restrictive and more participative conservation approaches starting in the 1980s. This conservation movement was led by influential indigenous and grassroots organizations, individual environmental activists; and later by national and international NGOs (e.g., *Sociedad Peruana de Derecho Ambiental*—SPDA, *Conservación Amazónica*—ACCA, *Conservation International*, *Pronaturaleza*) (Douglas et al., 1997; Orihuela, 2017; Shepard Jr et al., 2010).

Around the turn of this century, important legislative changes allowed for the private conservation landscape to diversify and for private conservation initiatives—until then rendered invisible and/or informal—to become formalized. A legal basis for their recognition was established, first and foremost through the 1997 Law of Protected Areas (Law 26834, Art. 12) which recognized private lands as Private Conservation Areas (ACPs). ACPs are a legal recognition of the conservation value of a private property, requiring the owner to comply with

TABLE 2 Overview of the category and primary focus of the 12 conservation initiatives whose representatives were interviewed.

	1	2	3	4	5	6	7	8	9	10	11	12
Category												
Conservation concession								X	X	X		
Ecotourism concession							X		X			
Timber concession		X										
NTFP concession	X			X								X
ACP			X		X			X		X		
Other private conservation areas					X	X					X	X
Principal activities												
Ecotourism								X	X	X	X	
Voluntourism & research			(X)			X	X		(X)			(X)
Natural resource management	X	X			X							
Land protection			X	X				(X)				X

Note: Cells filled with (X) show secondary activities that are still part of the organization's mission and focus.

TABLE 3 Additional types of formal privately protected areas (PPAs) and conservation mechanisms in Peru.

Forest use and governance modality	Type of conservation activities	Size	Duration
Public land			
Administrative contracts	Co-management of protected areas by public and private actors (e.g., SERNANP and an NGO). Allows for carbon credit trading.	N/A	20 years, indefinite
Private land			
Civil conservation agreements	Voluntary legal agreements between two or more interested parties (individuals or legal entities) to achieve conservation results.	N/A	N/A
Agrobiodiversity zones	Development, management and conservation of the genetic resources of native agrobiodiversity	No limits	Indeterminate
Public and/or private land			
Conservation agreements	Agreements between private institutions and individual or communal landholders, legalized through public registration. These are often part of PA management and community development plans (e.g., <i>Planes de Vida</i> , Indigenous Communal Conservation Agreements)	N/A	N/A
Other modalities	Preservation of cultural landscapes (both created by humans and nature), preservation of “environmental conservation areas” at municipal-level, protection of highly vulnerable areas due to the origin of a watershed	N/A	N/A

Note: Own elaboration. Sources: MINAM (2020) and Benzaquén et al. (2009), p. 218.

certain restrictions regarding land use for a minimum period of 10 years (SERNANP, 2014). The 2000 Forestry and Wildlife Law (Law 27308) established different types of concessions (Table 3) on state-owned forest lands (about 70% of Peruvian forests) to be leased through long-term contracts to private actors for different land uses including conservation and sustainable natural resource management (Capella et al., 2007). In 2008, the creation of the Ministry of the Environment (MINAM) and the National Service of Natural Protected Areas (SERNANP) helped to upscale the effects of the new laws

by increasing the number of officially recognized PPAs throughout Peru (Monteferri, 2019). This wide range of novel conservation regimes and mechanisms provided official recognition of informal conservation activities, besides attracting a diverse group of conservation actors to Madre de Dios (Orihuela, 2017; Rico et al., 2018). In addition, different legal mechanisms allowed for the emergence and formalization of new conservation approaches, for example, co-management agreements (e.g., between SERNANP and the indigenous organization ECA Amarakaeri, jointly protecting

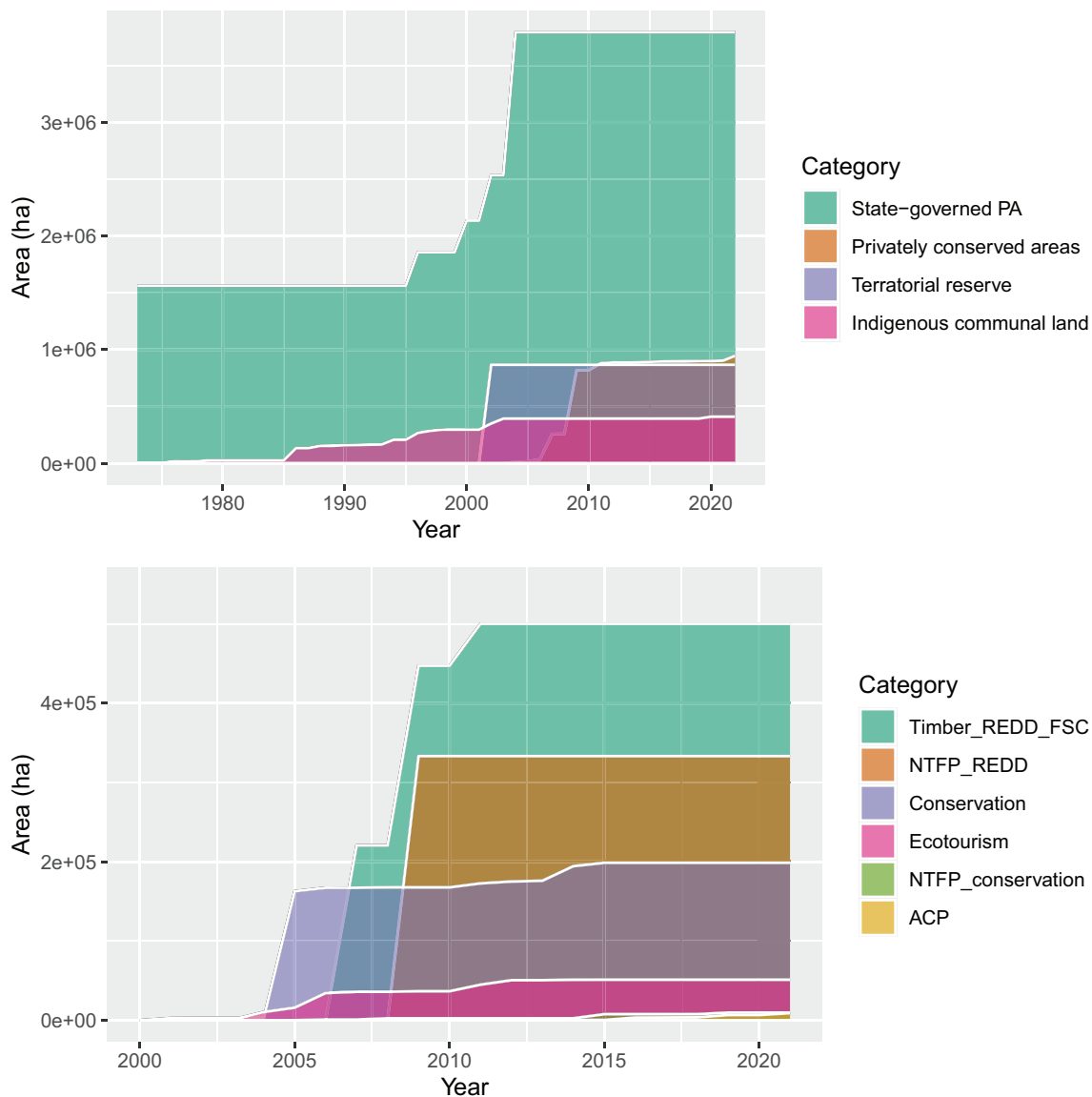


FIGURE 1 Increases in total area over time of Privately conserved areas compared to other land use categories (i.e., state-governed protected areas, territorial reserve and indigenous communal land, upper panel), and of different privately conserved areas categories (lower panel), based on year of implementation and legal recognition of the areas in Madre de Dios, Peruvian Amazon. Note that only privately conserved areas for which we obtained geospatial information are included in this graph. In addition, the category privately conserved areas includes some concessions and indigenous communal land, therefore partly overlapping with these categories.

420,335 ha), as well as market-oriented schemes, including forest management certification initiatives, payments for environmental services, and carbon credits (e.g., REDD+) (Hajek et al., 2011; Orihuela, 2017; Rico et al., 2018).

3.2 | Private conservation areas, activities, and actors in Madre de Dios

Based on our selection criteria, we identified a total of 590 privately conserved areas in Madre de Dios,

distributed across concessions and private lands, individually or communally owned (see list of privately conserved areas in Appendix S1). Most areas we identified were created after 2000, following the 1997 Law of Protected Areas and the 2000 Forestry and Wildlife Law that allowed for their legal recognition. After 2010, only few new privately conserved areas were created (Figure 1). In total, the areas cover more than one million hectares (Figure 1 and Table 4), which is about 12% of the departmental area. Although this is much smaller than the total area of publicly protected land, it is comparable in size to several other categories of land use (Table 4).

Privately conserved areas are concentrated near publicly governed PAs, particularly the Tambopata National Reserve, and along the Interoceanic Highway (Figure 2). We identified two important private conservation corridors along the Tambopata and Las Piedras rivers, which

are a mosaic of various concessions and ACPs, led by a diversity of national and international conservation practitioners.

We found that the largest share (79%) of the privately conserved areas we identified (in terms of number of initiatives) is held by individuals or families; mainly holders of NTFP concessions included in the REDD+ project, but also of various ACPs, ecotourism and conservation concessions. Note that some of those areas that are individually registered are likely to be for-profit companies (e.g., ecotourism companies whose concession is owned by a private individual). The second largest group (14%) are companies involved in ecotourism and sustainable timber harvesting activities. Non-profit organizations hold 5% of all identified privately conserved areas, including a mix of private lands (with and without ACP) and concessions (mainly ecotourism and NTFP). Indigenous communities and associations make a combined 2% and hold ACPs, conservation concessions and ecotourism concessions. One academic institution (the National University of

TABLE 4 Number, mean, and total area of privately conserved areas compared to various other land tenure categories.

Category	N	Mean area (ha)	Total area in 2021 (ha)
Privately conserved areas	562	2039	1,160,329
State governed PA	7	542,018	3,794,129
Indigenous communal land	53	8238	436,616
Territorial reserve	1	867,547	867,547
Concessions	1708	1594	2,716,928

Note: Only privately conserved areas for which we obtained geospatial information are included in this table. In addition, the category privately conserved areas includes some concessions and Indigenous communal lands, and are, therefore, partly overlapping with these categories.

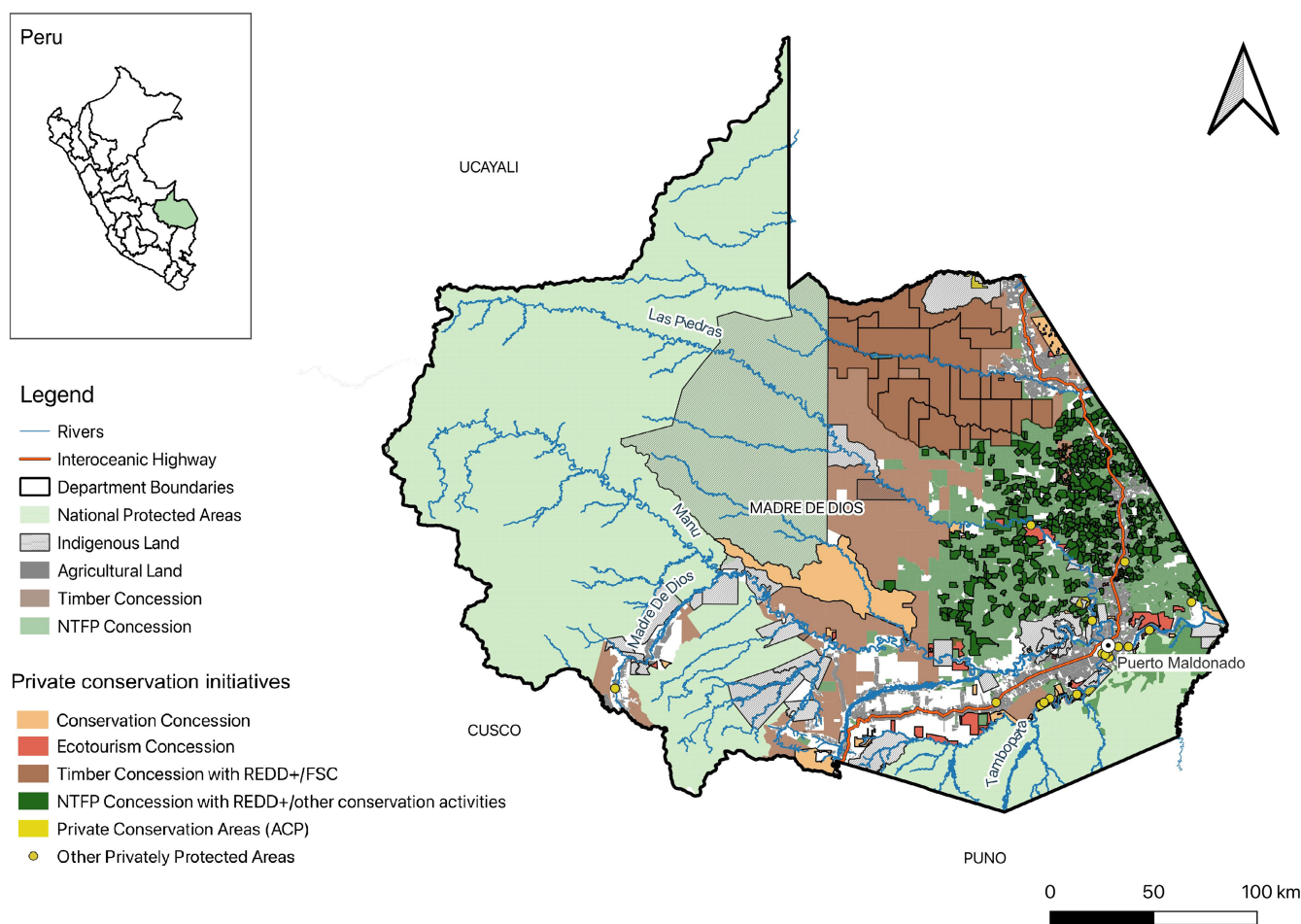


FIGURE 2 Location of private conservation initiatives by type. *Source:* SERNANP (2022), SERFOR (2022), and Geogpsperu (2020). This map was created using QGIS (QGIS Development Team, 2021).

TABLE 5 Overview of the number of privately conserved areas and associated surface area per types of conservation actors managing the area (based on our selection of privately conserved areas and information available) in Madre de Dios, Peruvian Amazon.

Category of private conservation actors	N	Relative number (percentage)	Total area (ha)	Relative area (percentage)
For-profit organization	83	14.1	579,371	49.9
Non-profit organization	30	5.1	186,821	16.1
Association/cooperative	5	0.8	19,748	1.7
Individual/family	465	78.8	363,016	31.3
University	1	0.2	2894	0.2
Community	6	1.0	8479	0.7
Total	590		1,160,329	

Madre de Dios, UNAMAD) holds a conservation concession (Table 5).

In terms of privately protected surface, half of the total identified area is held by for-profit actors (companies), followed by individuals and families (31%) and non-profit organizations (16%). The remaining 2% is managed by indigenous communities and associations (Table 5).

In the next sections, we present the different types of privately conserved areas, activities and actors that exist in Madre de Dios.

3.2.1 | Conservation concessions

We identified 32 conservation concessions in Madre de Dios, covering a total of 201,262 ha, with a mean size of 1949 ha (Table 6). They are scattered along the Madre de Dios, Tambopata, and Las Piedras rivers (Figure 2). The first conservation concession in Madre de Dios was granted to the NGO ACCA in 2001, while the newest was established in 2019 (Figure 1). Conservation concessions are mostly managed by individuals (44% of the conservation concessions we identified), followed by for-profit and nonprofit organizations (22% for both). Our analysis revealed that the conservation concessions that we identified host a variety of activities, among them environmental monitoring, research, education, and ecotourism. Many of the identified conservation concessions have collaborations with international and/or local universities and run volunteer programs to support their work. Mandatory monitoring activities are often carried out through field patrols and increasingly with the use of remote sensing technology. We also found that several of the identified concessions have a strong research component that focuses on biodiversity monitoring, in particular primates, felines, and reptiles. Restorative fauna management and wildlife rehabilitation programs are also implemented. About half of all identified conservation concessions in

TABLE 6 Mean, number, and total area of different privately conserved areas categories.

Category	N	Mean area (ha)	Total area (ha)
ACP	63	144	9050
Conservation	32	6289	201,262
Ecotourism	31	1658	51,389
NTFP_conservation	11	1845	20,290
NTFP_REDD	411	807	331,513
Timber_REDD_FSC	22	24,728	544,010

Note: Only privately conserved areas PPAs for which we obtained geospatial information are included in this table.

Madre de Dios are also engaged in ecotourism activities, an important part of their funding strategy.

3.2.2 | Ecotourism concessions

We identified 31 ecotourism concessions, covering a total of 51,389 ha, with a mean size of 1658 ha (Table 6). The identified ecotourism concessions were established between 2005 and 2018 (Figure 1). They are spread throughout the region, mainly along the principal rivers and the Tambopata National Reserve (Figure 2). We found that most (90%) of ecotourism concessions have been allocated to individuals and private companies, however some are granted to associations and we identified one ecotourism concession that was granted to an indigenous community. The activities we identified for each of the ecotourism concessions included touristic operations in the range from high-end to mid-range lodges, including volunteering projects and rural family homestays. Most of the ecotourism initiatives we identified rely on the presence of primary forest, with as little human intervention as possible. While ecotourism concessions are granted to develop recreational activities in

line with the natural environment, not all ecotourism concession holders actively engage in conservation activities.

3.2.3 | Timber concessions with a conservation purpose

We identified 22 timber concessions with REDD+ and/or FSC. Timber concessions cover 1.1 million hectares in Madre de Dios, of which about half are privately protected, making these the largest category of privately conserved area in the region in terms of area (Table 6). The timber concessions with REDD+ and/or FSC that we identified were established between 2002 and 2013 (Figure 1). All the timber concessions with REDD+ and/or FSC we identified are managed by for-profit organizations. Madre de Dios has six FSC forest management certifications, committing the concession holders (timber companies and one native community) to harvest timber sustainably, which implies reduced impact logging, monitoring and control activities, and improved forest management. As of October 2022, there were 21 timber concessions under such an agreement, covering a total of over 500,000 ha. The first concessions were certified in 2007 and the more recent ones in 2022. As of 2009, various timber companies (some of which are also under FSC contract) have merged to implement two large carbon credit (REDD+) projects, that is, the “Madre de Dios Amazon REDD” and “Jaguar Amazon REDD” projects, that cover 280,000 ha across 11 timber concessions.

3.2.4 | NTFP concessions with a conservation purpose

Madre de Dios is renowned for its vast areas of Brazil-nut (*Bertholletia excelsa*)-rich forests. There are 1264 NTFP concessions concentrated along Las Piedras and Tahuamanu rivers, and the easternmost stretch of the Interoceanic Highway. Brazil-nuts are the main type of NTFP extracted; others include aguaje (*Mauritia flexuosa*) and rubber (*Hevea* sp.). Since 2009, a third (32%) of all NTFP concessions participate in a Brazil-nut REDD+ project, covering a total of over 331,513 ha (Table 6). The REDD+ project started in 2010 with an agreement between the federation of Brazil-nut harvesters and the private company *Bosques Amazónicos* (BAM) responsible for trading carbon credits. More recently, additional concessions were joining the project, but our mapping only accounts for those already participating by 2020. Concessionaires (who are all individuals or families) are supported by different NGOs through capacity building, monitoring

networks and Brazil-nut forest regeneration. Some well-preserved NTFP concessions were transferred to foreign, philanthropic conservation initiatives that involve ecotourism, wildlife rehabilitation and voluntary research and monitoring projects, especially along the Las Piedras corridor (“NTFP_conservation” in Tables 3 and 4 and Figure 1). We identified 11 such NTFP concessions, mainly held by non-profit organizations (except for one foreign for-profit organization), covering a total of 20,290 ha.

3.2.5 | Private conservation areas

The first ACP in Madre de Dios was recognized in 2010 (Figure 1). Today, there are over 60 registered ACPs, divided among 25 individual or communal landowners, representing 16% of all of Peru's ACPs and covering a total of 9050 ha (SERNANP, 2022 and Table 6). ACPs range from over 2300 to less than 1 ha in size. On average, they are 144 ha in size, with the largest ones managed by indigenous communities. It is not uncommon for a landowner to have several ACPs (e.g., one ecotourism company owns 35 private land units with ACP recognition). Most ACPs are concentrated along the Tambopata National Reserve buffer zone, in between a 50-km stretch of the Tambopata River and the agricultural belt, expanding along the Interoceanic Highway (Figure 2). ACPs are held by a diversity of actors, including individuals and families (27% of all ACPs), indigenous communities (8%), non-profit organizations (5%), and a few for-profit organizations own most of the ACPs (60%). Conservation activities in ACPs are varied but tend to focus on forest monitoring activities, ecotourism, and research.

3.2.6 | Other private conservation areas

The region has several conservation initiatives on private lands that lack the official recognition of ACP. We identified 20 such initiatives, amounting to about 3000 ha. They are usually small-scale, ranging from 7 to 640 ha, often adjacent to ecotourism or conservation concessions.

Conservation actors who manage non-ACP private land are mainly non-profit organizations (45% of the areas we identified) and for-profit organizations (35%), but also include individuals. Conservation activities in non-ACP private land are varied and include “voluntourism” and ecotourism, but also agroforestry and reforestation of degraded areas. Several initiatives involve NGO-promoted sustainable agriculture, often including conservation agreements between farmers and

NGOs while using novel financial mechanisms. Such initiatives play a growing role in the conservation landscape and concentrate around the conservation corridors of the Tambopata and Las Piedras rivers (see Figure 2).

3.3 | Local perspectives on challenges among private conservation practitioners

Based on our interviews with private conservation practitioners, we found the principal barriers to conservation in Madre de Dios to be related to bureaucratic processes, policy incoherence, law enforcement and funding of activities.

Most (7 out of 12) of the conservation practitioners we interviewed point to the issue of complex bureaucratic processes. Despite the funding and legal assistance in starting formalization processes (e.g., seed funds from NGOs like SPDA), the administrative requirements to get a concession granted or to receive the ACP recognition over private land were indicated to be costly and complex, involving numerous agencies and legal hurdles. Unstable institutional and political situations were indicated to cause continuous turnover of personnel, with several interviewees mentioning that in some cases formal procedures must be started over from scratch. Further, issues of overlapping land uses and jurisdictions were mentioned, leading to even longer bureaucratic procedures. In one telling example, one organization waited 15 years to be allocated a conservation concession. A potential consequence of the legal costs and required knowledge could be that the gap between larger, well-funded initiatives and smaller grassroots projects is widened. During our interviews, a foreign conservation practitioner commented that: *“there is so much paperwork all the time! How can locals afford to have a concession and do everything correctly? (...) You need to work with someone to keep you on the curve, but they are expensive.”*

Another challenge that was mentioned by several (5) interviewees is related to legal contradictions and policy incoherence. In the words of an interviewee: *“The state (...) should be an organism that promotes conservation and development. But now they want to expand the agricultural frontier, so what are we talking about? It is necessary to define priorities.”* Overlapping land use rights, for example, gold mining or agriculture land-use designations in the same location, was mentioned by the interviewees to affect thousands of hectares and to be a serious threat for many conservation areas, causing regular invasions and land-tenure insecurity. Moreover, road construction was mentioned as an important regional

political priority, aimed at promoting access to regional markets and products but was indicated to pose serious challenges to managers of conservation areas. As an interviewee noted: *“The state made these rural roads, allowing invaders to enter concessions. They made these roads! This is the political part. The state says: ‘let the invaders in,’ because if they don’t, they would have a huge social problem.”* Systemic corruption in public institutions is also perceived by some of the interviewees to affect the acquisition of concessions.

Many of the conservation practitioners that we interviewed indicated that they struggle with law enforcement capacity. Concession holders have the legal responsibility to manage public forests sustainably and authorities carry out annual field audits and impose penalties in case of non-compliance. However, interviewees indicated that there is little supervision and support from authorities for dealing with land conflict and encroachment. Further, our interviews revealed that externally funded projects have access to special vigilance posts, satellite imagery, and special ranger programs; smaller, lesser funded initiatives do not always have the means to protect their land. Several (3) interviewees shared their frustration at the lack of governmental support in the case of land invasions and deforestation: *“When you’re trying to protect something, and you see the illegal activities that are happening and (...) each time [the government] asks you to obtain more evidence. Even when they go there and see it, they ask for more evidence. It’s challenging to get the government to help protect the land.”* Furthermore, interviewees indicated that field inspections must be paid for by concession holders, including transportation and food expenses for a team of public officials, with visits rarely resulting in perpetrators’ arrests. *“Even when you get an operation to go, everybody finds out about it and there’s nobody left when they arrive.”* Another practitioner said that *“within the contract, the state is obliged to help with enforcement activities. But so far, after all these years of filing complaints, we have not been able to get anyone arrested.”*

Finally, half (6) of the conservation practitioners we interviewed mentioned the difficulty of accessing funding, including for-profit actors. An actor of the ecotourism sector, generating income by charging visitors and researchers for stays in the protected area, commented *“Our approach to private conservation is sustainable, but very fragile. It relies on research and tourism, which are challenging activities to carry out right now.”* For local initiatives, establishing and maintaining privately conserved areas is complex and expensive, especially due to increased deforestation threats and administrative

processes that consume time and human resources. The costs associated with maintaining certain kinds of concessions was said to be a factor in changes in concession type and in non-renewal of concession contracts. In the particular case of ACPs, many small, non-perpetual contract holders are currently in the stage of contract renewal, demonstrating a larger abandonment trend. Actors we interviewed had high expectations around economic incentives (e.g., property tax exemption, possible involvement in voluntary carbon offset markets) and technical support (e.g., legal protection) as part of the conservation agreement with the Peruvian state. However, interviewees said that these benefits have to date not been experienced; meanwhile administrative costs have increased. “Everyone wanted an ACP based on the promised benefits. It was easy to apply. But in the end, there is no benefit, only bureaucratic burden.” Some of the private conservation practitioners that we interviewed (particularly NGOs, dependent on private donors), in search of new sources of income, are now involved in for-profit, market-oriented funding mechanisms, especially carbon offset schemes. Small, locally run initiatives have less access to such opportunities because of the long and costly carbon certification processes. Furthermore, our interviews revealed that the organization of smallholders to create larger conservation units is difficult to manage, and that this is a major barrier to accessing financial resources.

4 | DISCUSSION

This study highlights the diversity of private conservation approaches and mechanisms in Amazonian landscapes. We show that over the past decades, Peru has brought forth legal conservation mechanisms that have allowed for the formalization and emergence of private conservation initiatives. We find that in Madre de Dios, the total surface of privately conserved areas is nearing a third of that of publicly protected areas (PAs), mainly concentrating around areas with higher deforestation risk (e.g., along the interoceanic highway). While the grand majority of privately conserved areas are governed by individuals and families, for-profit companies, who only manage 14% of individual areas, govern at least half of their total surface area. We also find that private conservation initiatives face significant barriers and pressures, including complex bureaucratic processes, legal contradictions and incoherencies, corruption, weak law enforcement, and financial insecurity. In this section, we discuss the opportunities and challenges to private conservation in the Amazon, and we provide recommendations for the future of private conservation in the Amazon.

4.1 | Opportunities and challenges to private conservation

Over the past decades, Peru has ratified several international agreements such as the Convention of Biological Diversity, Nationally Determined Contributions (NDCs) under the Paris Agreement, and the Kunming-Montreal Global Biodiversity Framework in 2022. The promotion of privately conserved areas and other legal mechanisms that encourage private conservation are increasingly recognized as important strategies for meeting the climate and biodiversity objectives under these agreements (Castillo et al., 2021; Negret et al., 2024). Schlicher et al. (2017) even found that private conservation efforts are twice as effective against deforestation compared to PA, and Shanee et al. (2015) demonstrated the importance of citizens-led conservation initiatives to reduce land-use change (see also López de la Lama et al., 2023).

Our study further supports these efforts and adds to the evidence by showing that private actors generate important contributions to conservation efforts in the Amazon. Indeed, we show that most private conservation practitioners in Madre de Dios undertake necessary monitoring activities in their lands and surrounding buffer areas to support forest ecosystems and manage wildlife. Privately conserved areas are smaller than PAs (Figure 2), yet they are located in biodiversity-rich areas holding significant conservation value and at high risk of deforestation due to their location mostly near roads and areas with extractive activities. The monitoring of deforestation undertaken by private actors often allows for the reporting of illegal activities to public institutions. During our interviews, we found that some large-scale private conservation initiatives have even started to support regional authorities by establishing monitoring systems, training, and hiring local people to patrol forests and using drone and satellite technologies. Privately conserved areas also play an important role in forming corridors and networks (Shanee et al., 2020). These involve the alignment of multiple conservation initiatives to buffer against deforestation, as is seen in our case study along the Las Piedras and Tambopata rivers. Such connectivity among protected areas has been shown to be an effective conservation strategy (Castillo et al., 2021). In addition, NTFP concessions, particularly those located near PAs play a significant role in conservation efforts in the region (Quaedvlieg et al., 2014).

Our study revealed that opportunities to expand and support private conservation are growing with newly established laws and regulations that allow private actors to benefit from conservation activities, access state support and incentives. One of the main identified opportunities related to novel funding mechanisms, notably

carbon offset schemes, via voluntary carbon markets, which may play a major role in the future of private conservation. Our study revealed that involvement by private actors in voluntary carbon credit markets has been significant in recent years and has supported the ability to sustain many private conservation efforts, attracting new private actors to the region interested in buying private lands and forest concessions. It is becoming easier to set up carbon offset agreements, with carbon revenues expected to increase strongly in the coming years (DGB Group, 2023). However, entering the carbon market requires the ability to scale up with access to large areas of land. For example, in the case of the two REDD+ projects in Madre de Dios identified in this study, multiple timber or NTFP concessions were aggregated. Additional financing mechanisms with potential include eco-marketing initiatives rooted in consumer markets. Such mechanisms are successfully applied with forest landscape restoration (Bosshard et al., 2021), and could offer potential for addressing some of the financing barriers mentioned by the conservation actors we interviewed.

Despite the importance of private conservation, our study shows that privately conserved areas also face significant challenges. The COVID-19 pandemic and the consequential economic and political turmoil generated new pressures on private conservation actors (Waithaka et al., 2021). In 2020, Peru reached a historic high deforestation rate (Castillo et al., 2021) and several conservation initiatives found themselves unable to sell forest products or cater to tourism because of closed airports and a fall in market demand. More recently, post-COVID political changes and increased migration towards Amazonian regions have weakened the conservation agenda in the region. Laws are being proposed to promote resource extraction and relax environmental regulations, potentially further debilitating private conservation initiatives (Congreso de la República, 2022; Vale et al., 2021). In the case of Madre de Dios, while most deforestation occurs in the agrarian zone and mining corridor, forest clearing has increased in forest concessions, indigenous territories and PAs (Geobosque, 2022). Forest losses in concessions are mainly due to illegal land occupations for small-scale farming and gold mining activities (Moore, 2019). Notably, we identified several ecotourism concessions that are likely to have been deforested and mined for gold by the concession holders (see also SPDA, 2015). Although private conservation initiatives such as those identified could help counteract these trends of increased deforestation, their effectiveness in doing so has yet to be evaluated.

Beyond these external factors, particular barriers and challenges exist for the sustainability of private conservation in Peru and elsewhere in the Amazon. These center

for the most part around financing, which is a recurring barrier among private conservation actors elsewhere (Gooden & 't Sas-Rolfes, 2020). Our study found that the private conservation landscape in Madre de Dios is dominated by for-profit organizations (governing half of the total privately conserved area), mainly national (non-local) and international actors. For instance, the ecotourism sector and REDD+ projects are dominated by a few private companies. While increasing carbon market opportunities may form important financing mechanisms for private conservation, contested land use claims, legal hurdles and costs are only overcome by more powerful actors with the capacities to remove these barriers. In general, large, international conservation actors have the means and networks to finance successful conservation efforts and are better equipped to navigate the complex financial and political structures necessary to sustain their areas. This leaves small-scale, local practitioners much more susceptible to socio-economic changes in the region and facing major barriers when it comes to accessing financing and benefits from conservation policies. This vulnerability poses a direct threat to the areas they protect. A consequence of this is that resource rights, concessions, and private lands are being sold or transferred by locals to foreigners, most evident along the Las Piedras corridor, in what has, in other contexts, been referred to as "green-grabbing" (Holmes & Cavanagh, 2016). Indeed, the tendency of foreign enterprises to buy land for conservation can have detrimental impacts on local livelihoods, as was already demonstrated by various studies (see Holmes & Cavanagh, 2016; Louder & Bosak, 2019).

In Madre de Dios, the majority of non-local conservation practitioners we interviewed assured that their activities generate benefits to local communities, in the form of performance-based payments, investment in local capacity building, job opportunities, and the commercialization of forest products; however, failure to incorporate local communities due to intercultural barriers and disparate views on what conservation should entail were also mentioned. The lack of participation by local populations, and unequal access to and distribution of the benefits created by conservation have been highlighted elsewhere, for their risk of fomenting social-ecological conflicts (Roth & Dressler, 2012; Schleicher et al., 2017; Shanee et al., 2020).

4.2 | The future of private conservation in the Amazon

Private conservation initiatives have the potential to play a crucial role in protecting the Amazon region's forests

and biodiversity. As we show in this study, the Peruvian government has already created a number of important legal mechanisms to recognize the different conservation efforts of local actors. However, as our results show, local conservation practitioners continue to face significant barriers and challenges in obtaining legal recognition and carrying out their work. The principal barriers to conservation we encountered in Madre de Dios are related to the legal recognition, management, and funding of conservation areas, echoing similar studies in northern Peru (see Delgado et al., 2021; Shanee et al., 2020). All these are crucial obstacles that need to be addressed to increase the effectiveness of private conservation in the future.

Our findings suggest that a more supportive legal framework around private conservation with faster assessments could simplify administrative procedures, the creation of economic and legal incentives (e.g., property tax exemptions, capacity building and legal assistance) and a reduction of PPA-associated costs. Such improvements are understood to be key factors for creating the enabling conditions for private conservation (Leverkus et al., 2020). In addition, to support and strengthen private conservation efforts, policy makers should acknowledge the large diversity of conservation actors and approaches. Efforts to characterize actors based on complex governance schemes and diverse property rights are important in order to tackle their specific needs. Our study has sought to better understand the extent and characteristics of private conservation in the Peruvian Amazon, yet this information is still fragmented and poorly understood in other regions of the Amazon and beyond (Bingham et al., 2017; Monteferri & Coll, 2009). Greater documentation and improved understanding of these initiatives, could allow for more targeted, legal and enforcement support for small-scale grassroots initiatives and local conservation networks. Previous consultation with conservation practitioners are key to draw from their practical knowledge of challenges, and allow for truly inclusive and democratic decision-making processes.

In regions like Madre de Dios, the rise in land invasions and illegal resource extraction require national and regional governmental entities to prioritize law enforcement and support forest monitoring and control activities. This implies an increase (i.e., through budget, coordination) in the capacity of the regional forestry department and SERNANP. Addressing the issue of overlapping land-use rights, and integrating private conservation into regional land use planning and rural development strategies are also fundamental parts in

securing land tenure for conservation activities and illegal land use practices.

Similarly, while a lot of focus has been placed on conservation within PAs and indigenous territories, further research is needed to understand and track the impact and contributions of different private conservation approaches and activities in terms of social outcomes (Palfrey et al., 2021). This should ensure that socio-environmental safeguards are respected to mitigate potential risks and negative impacts of private conservation models, especially in a context in which large, often foreign, actors are increasingly defining the future of conservation in the Amazon.

Finally, we highlight the need for more accessible and inclusive approaches in order to maximize the contributions of private conservation actors. Supporting existing conservation networks of diverse privately conserved area holders, and increasing access to carbon markets for smaller actors would all be strategies that foster more effective monitoring and conservation work in the region. Such considerations will be paramount for the future of private conservation and that of the Amazon rainforest's unique and vital ecosystems.

AUTHOR CONTRIBUTIONS

All authors have contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article (Annex S1).

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ENDNOTE

ⁱ Forest are public lands by constitution. Concessions are State-granted rights to individuals for the sustainable use and management of forest resources and wildlife, and the right to use and enjoy said natural resources.

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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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