



*Oasis Project Coffee plantation in Apucarana, Brazil
Photo: Carlos Eduardo Frickmann Young*

CHAPTER 37

An Overview of State-level Initiatives of Payment for Ecosystem Services in Brazil¹

Biancca Scarpeline de Castro², Carlos Eduardo Frickmann Young³, Vanessa de Souza Pereira⁴

Highlights

- PES programs in Brazil vary considerably in order to adapt to local conditions
- Most projects focus on family farmers, paying in proportion to the conservation area
- Operational costs, including technical assistance, monitoring & surveillance, are high
- Most funding comes from public budget or donations, with no long term stability
- Innovative ways to finance PES are water charges and environmental fines and fees

37.1 Introduction

Brazil is the most biodiverse country in the world (OECD 2015), with most of its 8.5 million square kilometres covered by native forests. However, Brazil faces a wide range of environmental problems, mixing typical developed countries' problems, associated with a high degree of urbanization, waste and industrial pollution, with those of developing countries, such as deforestation and poor sanitation. To solve these problems, financial and human efforts will be required at levels that considerably exceed the resources that are currently designated for sustainable issues in Brazil (Young 2015).

In this context, payments for ecosystem services (PES) provide a possibility for win-win solutions, and there are already many experiences implemented or in design throughout the country. The vast majority of these experiences are managed under the control of sub-national entities, related either to state or municipal/county governments. This situation has resulted in a large number of laws and programs developed with the intention of using PES to enhance protection of different ecosystem services, related to climate, biodiversity and water resources. Each state or municipality has its own PES logic, lacking a central coordination

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² Federal Rural University of Rio de Janeiro (UFRRJ). Email: bianccastro2@gmail.com

³ Federal University of Rio de Janeiro (UFRJ). Email: young@ie.ufrj.br

⁴ Lawyer, independent consultant. Email: vspereira.2013@gmail.com

mechanism; there is an ongoing discussion aimed at the creation of a National PES Law and Policy, but the debate is far from finished.

The objective of this paper is to present an overview of PES initiatives implemented by state governments in Brazil. The methodology focused on bibliographic and documentary research, as well as interviews with technical staff involved in the issue. The next sections present the findings in terms of state-level legislation and programs, and main conclusions and recommendations from the Brazilian experience.

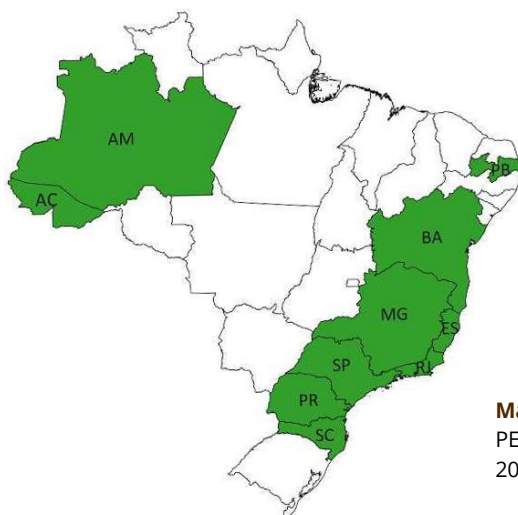
37.2 PES state-level legislation

In Brazil, states are autonomous entities within the Federal Republic, with the power of creating their own laws and budget allocation, as far as they respect the Federal Constitution. Therefore, state-level legislations differ a lot, with a State Constitution for each of the 26 states and the Federal District.

In order to survey the current status of PES legislations, an internet search was conducted on the websites of state assemblies using the following keywords: environment; ecosystem services; carbon; water resources; water; climate changes; biodiversity; environmental compensation; and environmental incentives. The internet search identified 105 laws and decrees in the legislation, but only 15 focused specifically on the establishment of PES policies and programs.

Component of the PES Law

Amazonas (AM) was the first state to approve a PES law, in 2007. Acre (AC) and Espírito Santo (ES) sanctioned their laws in 2008, followed by São Paulo (SP) and Santa Catarina (SC) in 2010, Rio de Janeiro (RJ) in 2011, Paraná (PR) in 2012, Minas Gerais (MG) and Paraíba (PB) in 2013, and Bahia (BA) in 2015 (Map 1). There are proposals for PES laws in other states, but they are still in the process of discussion.



Map 1 Brazilian States with approved PES laws and decrees (up to December 2015) Source: Authors

Many of these laws have changed over time. In Espírito Santo, the original PES law was approved in 2008 (Law 8995), but it was replaced in 2012 (Law 9864) in order to encompass

more categories of ES beneficiaries. In Santa Catarina, the original law was published in 2010, with the establishment of a PES system, and there further changes in the law were developed to adapt it to the needs of ongoing projects.

Laws and decrees for PES were analysed in order to identify information about:

- i) type/nature of the environmental service to be protected;
- ii) stakeholders and ES beneficiaries;
- iii) regulatory and supervisory bodies;
- iv) funding sources;
- v) resources allocation/budget;
- vi) Area under conservation.

The most mentioned ecosystem services are regulation and protection of water bodies, controlling greenhouse gases emissions, biodiversity conservation and protection against soil erosion. Many state laws refer to specific items, such as income generation through sustainable production (Acre Law No. 2025/2008), encouraging agroforestry systems (Minas Gerais Law 20922/2013) and the conservation and recovery of gallery forests (Rio de Janeiro Decree 42029/2011). All indicate that the providers of ecosystem services are volunteers and will receive monetary or non-monetary incentives.

Stakeholders and ES beneficiaries

The most quoted stakeholders are the designed ES beneficiaries and state governments, especially the environmental agency as the regulatory and supervisory body. Civil society is present through participation in regulation or supervision boards in the following states: Acre (Law 2308/2010), Bahia (Law 13223/2015), Paraíba (Law 10165/2013), and Santa Catarina (Laws 15133/2010 and 14675/2009).

Most state programs prioritize family farmers as the main ES beneficiaries – the exceptions are Espírito Santo, Rio de Janeiro and Paraná. Therefore, the objectives of the PES sub-national legislation go beyond environmental preservation, with a strong socioeconomic approach associated with small producers. PES objectives include both poverty alleviation and environmental degradation, identifying family farmers as providers of ecosystem services.

Properties under family farming are small, reducing the scope of these programs since they occupy a relatively small percentage of rural areas. However, the National Forest Legislation (Law 12651/2012) established that PES and similar incentives are primarily intended for family farmers. Moreover, the legal requirements for forest conservation in private areas are smaller in family agriculture properties; therefore, it makes sense to target these farmers in PES systems.

Bahia, Paraíba and Santa Catarina laws still mention indigenous and traditional populations as ES beneficiaries, under the condition that they should promote legitimate actions of preservation, conservation, restoration and sustainable use of natural resources.

All PES state laws focus on rural areas. But Bahia, Paraíba, Paraná and Minas Gerais allow for the possibility of their implementation in urban areas too. This is an important issue due to the necessity of implementing PES in urban areas: recycling solid waste, protection of riparian

forests, urban gardens or park protection, etc. However, to date, only Minas Gerais has implemented a PES program aimed specifically at farmers (Bolsa Verde); the other three states mentioned above have not effectively implemented any PES project.



Bolsa Floresta Project Terra Preta Community Amazonas (photo: Carlos Eduardo Frickmann Young)

Source of funding

The state laws refer to a great diversity of potential sources of funding. All consider the establishment of state funds for environmental protection (including water resources), and Paraíba and Santa Catarina envisioned the construction of specific PES funds. In Amazonas, the management of the PES Fund was transferred to Amazonas Sustainable Foundation (a non-governmental organization) with the responsibility for supporting state policies and programs concerning these issues. In all cases, budgetary resources from the state government and donations are always mentioned as sources of funding.

Other references to potential sources of funding include:

- Non-compliance charges and environmental fines;
- Charges for water use and disposal;
- Resources from international agreements, bilateral or multilateral;
- Private investment;
- Environmental monitoring and licensing fees;
- Oil and gas royalties, and other compensation for the use of natural resources;
- Interests from financial investments;
- Carbon credits and clean development mechanisms (CDM);
- Fees from vehicle pollution control;
- Loans;
- Revenues generated in protected areas.

Table 1 shows the main sources of PES funding foreseen in the legislation of each state.

Table 1 Financial sources identified in state PES legislation

Sources of funding	AC	AM	ES	MG	RJ	SC	SP	BA	PB	PR	TOTAL
State budgetary resources	X	X	X	X	X	X	X	X	X	X	10
Donations	X	X	X	X	X	X	X	X	X	X	10
Environmental fines and non-compliance charges	X	X	X	X	X	X	X			X	8
Charges for water use and disposal		X			X			X		X	4
Bilateral or multilateral agreements	X	X	X	X	X	X	X	X	X	X	10
Environmental monitoring and licensing fees						X		X			2
Carbon credits and CDM					X		X				2
Oil and gas royalties			X		X	X					3
Others	X	X	X	X	X	X	X	X	X	X	10

Source: Authors' calculations

The high expectation of budgetary resources from the government shows the hope of legislators that the executive power will be committed to the efforts of environmental conservation. However, Young et al (2012) shows that public budget allocations for environmental conservation have not increased over time in the 2002-2010 period, and there is a wide variance among states. There are many possible reasons for this heterogeneity, including the relative size of protected areas, the level of urbanization and per capita income level, and the institutional capacity of state governments to enforce environmental legislation. Moreover, the current economic crisis has worsened fiscal conditions in all Brazilian states, and the hypothesis that a good amount of financial resources from state budgets are earmarked for environmental projects seems very optimistic for the near future.

The high dependence on voluntary donations and international agreements is a problem since there is no guarantee that the flow of donations and transfers will be regular and frequent enough to assure continuity for the programs. These transfers and grants vary according to the financial situation and willingness of the donor's interests, jeopardizing their endurance.

This shows the importance of diversification of financial resources for PES. Three mentioned proposals must receive special attention: charges for water use; resources from environmental fines; and revenues from protected areas.

Charges for water consumption and disposal are widely considered as a promising way to obtain financial resources (OECD 2015). Indeed, in many river basins these charges are already in operation. The main advantage of this system is the direct connection between consumers and environmental service protectors. This facilitates the acceptance of the charges to the consumer and establishes a permanent source of fundraising for the PES programs.

Another alternative for PES is the use of revenues from environmental fines. This has the advantage of associating the source of financial resources (non-compliance of environmental legislation and standards) to its use (environmental conservation). However, there are two main problems with this approach. First, only a minor proportion of the fines imposed by the environmental control agencies are effectively paid: Souza and Lopes (2015) show that less than 2% of the fines are paid. There is strong resistance by offenders against paying the fine, and long delays through judicial disputes are common. The second problem is conceptual: non-compliance charges and fines are a consequence of acts against the environment. Therefore, in an ideal world, the revenues from this kind of action would be declining to zero.

On the other hand, in a more realistic scenario, the conversion of these revenues into financial resources to implement PES systems is, at least, a transitory solution to encourage PES experiences. Indeed, there is already one positive experience in the municipality of Brumadinho (MG) where revenues from environmental fines are imposed by the judicial power to finance a local PES system to protect gallery forests (Mendonça 2014).

Finally, revenues from protected areas (park entrance fees and other services) can be used to finance PES projects in their surrounding areas. Currently, entrance fees and other revenues from services sold in parks and other protected areas do not go to the administration of these conservation units, ending up in the treasury of the federal or state governments. If part of these revenues were allocated for PES projects, there could be a sustainable source of funding for these projects, improving their environmental quality and increasing the number of visitors. Medeiros and Young (2011) showed that increasing tourism in protected areas in Brazil would have the potential to generate billions of US dollars in the local economies where these parks are established.

Payment distribution

Most PES state laws are very generic, without details about how the PES will operate. This regulatory gap is usually left for the state environmental agency or the project managers to fulfil. Therefore, there is a wide heterogeneity of PES experiences even within the same state. Exceptions to this are the laws of Espírito Santo (Law 9864/2012), São Paulo (Decree 55947/2010) and Santa Catarina (Law 15133 /2010), where the state legislations establish limits in the value to pay to ES beneficiaries per hectare per year. In these states, payments are proportional to the services rendered, considering the extent and characteristics of the area involved.

In Espírito Santo and São Paulo, the payment values are indexed to the state fiscal reference unit, while in Santa Catarina payments are indexed to the monetary value equivalent to 30 bags of maize. In São Paulo, there are maximum values per participant, preventing a single agent from accumulating several benefits. In contrast, the state laws of Minas Gerais (Law 20922/2013) and Paraná (Law 17134/2012) only declare that the amounts to be paid shall be proportionate to the size of protected areas by landowners.

There are arguments in favour and against PES laws being too specific. Given the wide diversity of environmental, social, economic and cultural situations in Brazil, laws that are more generic may assure more flexibility in law enforcement. Flexible laws allow the implementation of projects with different objectives, stakeholders and priorities within the same state. On the other hand, the more lax the laws, the more difficult to make the people comply. The challenge for a national legislation on ecosystem services is to conciliate the

flexibility required by a general framework that creates conditions for sub-national environmental agencies to introduce PES in accordance with their specific interests with measures of protection and compliance to ensure they are effectively enforced.

37.3 PES projects implemented under state-level guidelines

Even though ten states have legislation concerning PES, only seven have projects already implemented – up to the conclusion of this research (December 2015), there were no ongoing projects in Bahia, Paraíba and Paraná. Therefore, this section concentrates on the analysis of eight experiences in the seven states that have active projects: Amazonas, Acre, Espírito Santo, São Paulo, Santa Catarina, Rio de Janeiro and Minas Gerais. Certainly new projects are being started currently, but it was not possible to obtain data and concrete results related to their implementation.

The following characteristics were considered in the analysis: characteristics of the projects, protected ecosystem services, forms of financing, ES beneficiaries and preserved areas. Table 2 summarizes the main results.



Oasis Project Rural property in Sao Paulo (photo: Carlos Eduardo Frickmann Young)

Table 2. Analysis of PES state programs in Brazil, accumulated values up to 2015

State	Program/Project	Period	Ecosystem services	Payments to ES providers	ES Beneficiaries (different units)	Total spending (R\$)	Preserved area (hectares)
Acre	Certification of Family Production Units	2009-2014	Sustainable use of natural resources- forests	Between R\$500 and R\$600 per year/property, regardless of the area	4,019 individuals	2,021,050	Not applicable
Amazonas	Bolsa Floresta (Forest Conservation Allowance)	2009-2015	Sustainable use of natural resources- forests	R\$ 600/month per family (independent of family size and area) plus direct payments to the community (average of R\$ 900/month/family)	40,106 individuals	38,596,000	Not applicable
Espirito Santo	Reflorestar	2011 (start of payments: 2013)-2015	Sustainable use of natural resources- forests	Between R\$ 340 and R\$ 2.866 per ha/yr	1,840 individuals	30,000,000	12,000
Minas Gerais	Bolsa Verde (Green Allowance)	2011-2014	Sustainable use of natural resources- forests	R\$ 200 per ha/yr	1,860 individuals	11,415,550	57,078
Rio de Janeiro	PRO-PSA GUANDU	2008-2015	Conservation of water resources	Between R\$ 10 and R\$ 60 per ha/yr	70 properties	5,283,722	5,126
São Paulo	CAP-RPPN	2013-2015	Conservation of native forest	Average R\$ 200 per ha/yr	11 private reserves (RPPNs)	1,900,000	1,860
	Mina D'água (Springs)	2013-2015	Conservation of water sources	Between R\$ 100 and R\$ 270 per ha/yr	51 properties	53,010	110 hectares (118 springs)
Santa Catarina	Corredores Ecológicos (Ecological Corridors)	2011-2015	Sustainable use of natural resources- forests	Between R\$ 87.50 and R\$ 350 per ha/yr	55 properties	466,076	169 hectares
Total	8 programs	2008-2015	Conservation of forests and water resources	Between R\$ 10 and R\$ 2.866 per ha/yr	47,895 individuals 117 proprieties	89,735,408	76,343 hectares

Source: Authors

Table 2 shows that the state programs of PES are recent, having started between 2008 and 2013. The sustainable use of natural resources and the conservation of forests are the concern of most PES active programs in the country. However, São Paulo and Rio de Janeiro are specifically concerned with the protection of water resources.

In São Paulo, the concern for preserving water supply became a public concern after the recent water crises. From 2013 to 2015, the amount of rainfall declined considerably and the reservoirs had water levels well below the recommended. Thus, government actions to preserve the springs and ensure water supply for the population are now considered essential, strengthening the potential role of PES in the state.

Rio de Janeiro state was also hit by the water crisis, although its metropolitan region has not suffered as much as São Paulo. In the Guandu watershed, the most important water source for the metropolitan region is a new project which directs revenues from water charges to invest in forest gallery restoration and conservation, preventing silting and water shortage for the population.

The identification of who is the 'provider' of the environmental service is also different in each program. Some programs identify individuals as ES beneficiaries of the PES projects, while others refer to the properties. Considering all projects, the minimum amount paid per hectare per year is R\$10 in Rio de Janeiro (PES for forest conservation) and the maximum value is R\$2,866 in Espírito Santo (PES for forest restoration).

However, not all programs pay per hectare or property. In Acre and Amazonas, payments are per family, and the values are between R\$500 and R\$600 per year, regardless of the number of hectares. The geographical and socioeconomic characteristics of the Amazonian biome impel these states to pay families who protect ecosystem services, rather than areas. In this region, family holdings are considerably larger than in the rest of the country: if the payments were done per hectare and not per family, the cost of the program would be much higher.

In all, excluding the Acre and Amazonas cases, PES state programs have preserved or restored more than 76,000 hectares. Most of this preserved area in PES programs is located in Minas Gerais (57,078 hectares). In contrast, Santa Catarina presents the smallest preserved area in PES projects (169 hectares). Nevertheless, the program there is still being implemented, and it is expected that it will expand to 950 hectares by the end of 2016.

The statistics above are not applicable to the Acre and Amazonas because of the different logic of their programs. Instead of focusing on private properties, their programs aim at residents in protected areas, which are much bigger but have special characteristics under Brazilian legislation. Protected areas are territorial spaces, legally instituted by the federal or state governments, which in some cases allow the sustainable use of resources, combining the human presence in the protected areas, and agriculture is allowed only for strict subsistence maintenance. Thus, it would not be appropriate to speak of hectares preserved since all the area of the conservation unit must be preserved, including where ES beneficiaries of the programs reside.

The cumulative amount spent on these programs until December 2015 was R\$89.8 million. This figure can be considered low and, despite the current economic crisis in Brazil, the total spending of the programs should increase, as well as the areas to protect.

Most projects focus on family farmers, and there are several difficulties making payments to this group of farmers. Many of them have no proper title to the land – they live on the land, but without proof of ownership. This is one of the great difficulties of the PES programs, because without a document proving official land ownership, the state has no legal basis to establish an agreement with the providers of ecosystem services. Some programs have relaxed this requirement, accepting other documents instead of land deeds, but this creates accountability and legal uncertainty about the validity of the payments, especially if public funds are used.

Similar problems relating to lack of documents, such as birth registration certificates, make it difficult to open bank accounts for the ES beneficiaries to receive payments for ecosystem services. These situations need to be considered beforehand by the program managers, especially in the poorest regions, because government transfers to individuals, as payment for ecosystem services, must meet the standards of accountability and transparency.

In general, the costs of monitoring and supervision of the areas are high, and in some cases more expensive than the direct payment to the ES beneficiaries. Periodical monitoring of the agreed activities is required, including the area to be preserved or restored. Given the territorial extent of the country, monitoring and enforcement are costly, as well as the effort for delivery and registration of documents, and other bureaucratic proceedings to validate the results, including the institutional relationship between the different agencies involved in the program. All these transaction costs and difficulties have to be considered in the project design and management.

Finally, programs require technical assistance, the costs of which should be included in the budget. This is particularly important when the targets are family farmers or extractive communities, since they have few resources by their own to implement the required changes in production and other activities.

37.4 Conclusion and Recommendations

State-level PES programs and projects implemented in Brazil vary considerably. This is a consequence of the diversity of environmental and socioeconomic conditions surrounding each program or project. Without flexibility, it would not be possible to enable these programs: there is no single formula for a PES scheme, and the institutional framework has to be adaptable to the specific circumstances of each PES proposal.

Consequently, there is a huge heterogeneity of proposals and results. In a few states, PES programs already include a large area or population, while in most states, PES programs are just starting, or have no operational programs yet. It is a relatively new issue (the first initiative began in 2007) and it is likely that every year there will be more people and hectares included in PES schemes.

On the other hand, excessive flexibility may result in a lack of political will and policy enforcement. Brazil has not yet found a balanced perspective, since there is no national policy and legislation to coordinate all PES efforts implemented in the country. The question is how to establish national guidelines and procedures without interfering in the autonomy of local governments to design specific programs according to their own needs.

Other lessons and recommendations from the Brazilian experience are:

- There is a clear intent to combine environmental and socioeconomic goals, as shown by the focus on family farmers and extractive communities.
- Simple bureaucratic procedures, including the necessity of proving land ownership;
- Clear goals and priority areas for implementation, considering feasible and realistic scenarios;
- Financial sustainability to guarantee the continuity of the program over time;
- Diverse funding sources (water charges, carbon credits, park entrance fees and services, etc.) in order to improve financial sustainability;
- Simple methodology for calculating the payments to be made;
- The definition of the type of ES beneficiaries (individuals, communities, private properties) must be thought about in a way to maximize the effectiveness and efficiency of the PES scheme;
- Synergy between the implementing agencies of the program, particularly with those responsible for technical assistance to farmers;
- Support of local leaders, to facilitate the community adherence to the program;
- Supervision and monitoring costs should be anticipated and included in the budget; if possible, local authorities and communities must be involved as partners in these tasks.

Finally we can say that the financial support for the PES schemes is very fragile. The high dependence on public budget and voluntary donations show that funding remains a major problem for the continuity of these programs. However, there are new possibilities, especially with revenues from water charges, environmental fines and collection of parks fees and services. These issues are complex and difficult but they need to be properly addressed for an effective implementation of a National PES Policy in Brazil.

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