Original article http://dx.doi.org/10.18623/rvd.v21.2734-ing

ESSENTIAL ELEMENTS OF PAYMENT FOR ENVIRONMENTAL SERVICES[1]

ELEMENTOS ESSENCIAIS DO PAGAMENTO POR SERVIÇOS AMBIENTAIS

Article received in: 04/28/2024
Article accepted in: 06/19/2024

Nayra Rosa Coelho*
* Universidade Estadual de Santa Cruz (UESC), Ilhéus/BA, Brazil
Lattes: http://lattes.cnpq.br/3158338375899699
Orcid: https://orcid.org/0000-0001-9844-8388
nayracoelho@hotmail.com

Andréa da Silva Gomes*
* Universidade Estadual de Santa Cruz (UESC), Ilhéus/BA, Brazil
Lattes: http://lattes.cnpq.br/8998580012215576
Orcid: https://orcid.org/0000-0001-9645-0898
asgomes@uesc.br

Natália Jodas**
** Instituto Tecnológico da Aeronáutica (ITA), São José dos Campos/SP, Brazil
Lattes: http://lattes.cnpq.br/1837664238865270
Orcid: https://orcid.org/0000-0002-1649-9606
najodas@ita.br

The authors declare no conflict of interest

Abstract
Payment for Environmental Services (PES) has emerged as a strategic policy approach that promises to increase efforts to conserve and/or restore ecosystems and its associated services. In recent decades, scientific literature has provided guidelines, based on the lessons learned from experiences, especially international ones, which can be used improve the design of the instrument. This study aims to identify the essential elements pointed out in the selected literature that can be considered for the

Resumo
O Pagamento por Serviços Ambientais (PSA) tem se delineado uma abordagem política estratégica que promete promover um incremento nos esforços de conservação e/ou restauração de ecossistemas e seus serviços associados. Nas últimas décadas, a literatura científica vem fornecendo orientações, a partir dos aprendizados acumulados das experiências, sobretudo internacionais, que podem ser consideradas para uma melhor concepção do instrumento. Este trabalho propõe-se a identificar os elementos essenciais, apontados pela

1 This article is the result of research funded by Fundação de Amparo à Pesquisa do Estado da Bahia (FAPESB), as a doctoral scholarship, and was supported by Universidade Estadual de Santa Cruz (UESC).

legal regulation of PES, as well as assessing whether Bahia's state and municipal legal norms comply with these scientific guidelines. To achieve this, a narrative review of the literature on PES was conducted, with content analysis selected from references that indicate operational guidelines, criteria and approaches to the effectiveness and planning of successful PES schemes. Subsequently, the adequacy of the legislation investigated was checked for compliance with the mentioned literature. It was found that the laws (federal, state, and municipal) meet more than 60% of the essential elements indicated by the selected doctrine.
Keywords: benchmarking; economic instrument; environmental legislation; payment for environmental services.

literatura selecionada, que podem ser considerados para o regramento jurídico do PSA, além de avaliar o atendimento das normas jurídicas estaduais e municipais baianas às referidas diretrizes científicas. Para tanto, realizou-se uma revisão narrativa da literatura sobre o PSA, com análise de conteúdo selecionado a partir das referências que indicam diretrizes operacionais, critérios e abordagens sobre a eficácia e o planejamento de esquemas PSA bem-sucedidos. Posteriormente, verificou-se a adequação da legislação investigada quanto ao atendimento à referida literatura. Constatou-se que as leis (federal, estadual e municipais) atendem a mais de 60% dos elementos essenciais indicados pela doutrina selecionada.
Palavras-chave: *avaliação comparativa; instrumento econômico; legislação ambiental; pagamento por serviços ambientais.*

Introduction

The 21st century has witnessed an increase in the use of economic instruments aimed at promoting efforts to conserve and/or restore ecosystems and their associated services, such as Payment for Environmental Services (PES).

A vast literature addresses PES design strategies that seek to provide guidelines for dealing with the complexities of the instrument. In general, the literature highlights that, in order to achieve the objectives, PES planning must be based on a careful understanding of the specificities and contextual dimensions (political, institutional, ecological, and socio-economic). Experience shows that PES initiatives are based on institutional structures requiring strong coordination among stakeholders—the state, the community, private initiative, and intermediaries—to implement the policy and governance. Thus, PES has emerged as a complementary policy approach to traditional command and control measures.

In Brazil, there has been a growing number of regulatory frameworks on economic incentives for the provision of environmental services, at national and sub-national levels. The country has been following this trend and incorporating mixed approaches of command-and-control policies and economic instruments, such as the creation of legal rules to encourage the provision of environmental services, for example. There has been a clear increase in the number of rules related

to the concept of environmental services (ES) from 2000 on, spearheaded by states and municipalities, in the face of a federal legislative vacuum that only became more widely present[2] in 2021. The PES regulations were created to support the implementation of pilot programs and projects, mostly related to hydrological services, followed by carbon services and, to a lesser extent, biodiversity services, which spread throughout Brazil.

It is therefore important to understand what the literature says, i.e., based on the accumulated experiences of PES, to compare this learning with the normative guidelines regulated by the public policies instituted at municipal and state level in Bahia and at federal level (Law No. 14,119/2021). Thus, this article is aimed at reviewing the main aspects or elements regarded as essential for a PES legal regime, in addition to evaluating the compliance of Brazilian legislation with these academic guidelines.

The first topic presents the essential elements considered by the authors, outlining their characteristics and nuances. The second presents a comparative analysis of the legislation studied, based on an investigation of the essential elements contained in their legal texts. Finally, the third part of the article summarizes some recommendations to strengthen the propositional nature of this work, whose methodology involves bibliographical and documentary research, with a narrative literature review in the first section. The next section is a documentary survey of federal, state, and municipal legislation on PES, in order to enable a comparative and cross-checked assessment of the elements previously chosen.

1 Essential elements for PES regulation

The narrative literature review gathered English-language scientific articles by the main authors on the subject, which provided operational guidelines, approaches and recommendations on the design, effectiveness and planning of successful PES schemes based on the criterion of relevance of the text. It should be noted that the narrative review does not use systematic criteria for the literature search and analysis, and the selection and interpretation of the materials was made according to the subjectivity of the authors.

We emphasize that the filtering considered mostly scientific texts published internationally, since foreign literature has presented a greater number of studies

2 Federal Law No. 12,651/12, which deals with native vegetation in Brazil, provides for PES in its Article 41, I. Until 2021, this was the main federal legal reference regarding PES within Brazilian territory.

summarizing successful PES designs. The application of international criteria to the national legal reality seeks to encourage initial reflection on ways to further improve PES in Brazilian legal texts.

From this analysis, the main learned lessons and central points were chosen as "essential elements". A total of 22 articles were selected[3], and 23 essential elements were structured to be considered when drawing up a legal regime for PES, as follows: (1) the concept of PES; (2) voluntariness; (3) additionality; (4) conditionality; (5) segmentation and eligibility: (6) social equity; (7) property rights; (8) involved actors; (9) objectives; (10) considered ES; (11) management practices; (12) type of incentive; (13) source of payment; (14) cost of PES; (15) monitoring; (16) spatial scale; (17) temporal scale; (18) externalities; (19) adaptive improvement; (20) transparency; (21) governance; (22) policy synergy; and (23) institutional structure.

Scientific works generally highlighted the importance of observing the used PES concept (Yan *et al.*, 2022). Wunder (2005, p. 3) brings the most widespread definition of PES:

> A voluntary transaction where a well-defined ES (or a land-use likely to secure that service) is being 'bought' by a (minimum one) ES buyer from a (minimum one) ES provider if and only if the ES provider secures ES provision (conditionality).

This definition is considered narrow, and, in practice, PES initiatives manifest themselves in different ways and contexts, be it social, political, or economic. This has led other authors to propose alternative and broader definitions, such as: "transfer of resources between social actors, which aims to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources" (Muradian *et al.*, 2010, p. 1205).

The *actors involved* in PES schemes are the providers/sellers/beneficiaries and buyers/payers/users; in other words, the parties involved in negotiating the environmental service (ES), which can be public or private, individual, or collective entities (Grima *et al.*, 2016). The literature also foresees the figure of the *intermediary* in PES schemes, suggesting that negotiations can be facilitated (depending on the limit of institutional organization) by the presence of a mediator between PES providers and payers (Huber-Stearns *et al.*, 2017).

3 Selected literature: Ferraro (2008); Farley e Costanza (2010); Kemkes, Farley e Koliba (2010); Kolinjivadi e Sunderland (2012); Adhikari e Boag (2013); Banerjee *et al.* (2013); Sattler *et al.* (2013); Muradian *et al.* (2013); Hejnowicz *et al.* (2014); Wegner (2016); Bremer *et al.* (2016); Engel (2016); Grima *et al.* (2016); Börner *et al.* (2017); Chan *et al.* (2017); Huber-Stearns *et al.* (2017); Kaczan *et al.* (2017); Wunder *et al.* (2018); Campanhão e Ranieri (2019); James e Sills (2019); Ola *et al.* (2019); Yan *et al.* (2022).

Generally, the number of potential ES providers exceeds the available budget (Engel, 2016). Therefore, *segmentation and eligibility* strategies are adopted to select them, as well as priority areas, based on cost-effectiveness in relation to the potential for ES provision (Kaczan *et al.*, 2017). *Eligibility* for participation can prioritize social equity and favor the participation of disadvantaged social groups (e.g., traditional populations, small producers, family farmers, poor families) in order to meet the environmental and social *objectives* of PES (James; Sills, 2019). *Land tenure* appears as a segmentation criterion in PES, as well-defined property rights or guaranteed land tenure are indicated as a crucial factor in the schemes and sometimes create barriers to social equity (Adhikari; Boag, 2013).

The assumption of *voluntariness* differs from command-and-control instruments, as it is a desirable precondition for involved actors to participate (providers and buyers). This is because it is an important element reflecting the willingness to participate and the motivation of stakeholders, which guarantees better performance and success for PES (Sattler *et al.*, 2013). Once there is interest from providers and support from buyers, *conditionality*, an element that assesses the degree of compliance with PES rules, becomes easier (Huber-Stearns *et al.*, 2017). There are PES initiatives that advocate strict *additionality* requirements as a measure of efficiency between investment and conservation return; however, some authors question the consequences of this obsession in relation to equity and intrinsic motivation (Chan *et al.*, 2017).

Conditionality and *additionality* are elements that measure PES compliance and the effective provision of ES, so they require measurement, monitoring, and managerial evaluation (Börner *et al.*, 2017). *Monitoring* can be based on the *management practice contracted* (input-based) or on measuring the provided ES (output-based) (Sattler *et al.*, 2013). Its aim is to assess the additional gains from implementing PES and therefore presupposes knowledge of the previous conditions (ex-ante), of the local context, through the historical baseline (Banerjee *et al.*, 2013). Only with knowledge of the *previous context* and monitoring is it possible to understand the *externalities* of PES, whether negative or positive. *Externalities*, also known as side effects, leakage, overflow, rebound, or feedback (Börner *et al.*, 2017), are factors occurring outside the spatial and contractual scope of the PES, whether they have beneficial or undesirable repercussions, of economic, social, ecological, or institutional origin (Sattler *et al.*, 2013). For this reason, PES requires continuous management for adaptive improvement, as there is a degree of uncertainty on the generated *externalities* (Farley; Costanza, 2010). Furthermore, it is recommended that it be treated as a context-specific tool for such assessment (Wunder *et al.*, 2018; Ola *et al.*, 2019).

PES differ in terms of the focus of the *objectives* involved, and can both simultaneously list multiple objectives, or have a single objective or priority goal to be pursued (Campanhão; Ranieri, 2019). In some cases, PES is used as a solution to various types of conflicts and trade-offs between environmental development objectives and poverty alleviation, which risks reducing its effectiveness (Börner *et al*., 2017).

The ES most commonly incentivized by PES are watershed conservation, carbon stocks, biodiversity, and scenic beauty (Campanhão; Ranieri, 2019). PES can be individually transacted or grouped together, and when the payment combines multiple services, the value is more likely to exceed the opportunity cost associated with land use and generate incentives for conservation (Banerjee *et al*., 2013). PES is provided by land use or the adoption of *management practices* that guarantee the provision of that service (e.g., forest restoration, reduced deforestation, reduced agricultural intensity, changes in agricultural practices, among others) (Hejnowicz *et al*., 2014). PES should catalyze positive and lasting change when the initiative promotes sustainable management practices that are desirable to those providing the service (Kemkes; Farley; Koliba, 2010).

The determination of a priority area for the provision of ES is coordinated by the spatial scale (e.g., local, regional, national, international); the choice of a heterogeneous environment allowing for the agglomeration of ES is indicated for greater achievement of environmental benefits (Engel, 2016). For Sattler *et al*. (2013), the duration of contracts or payments is determined by the time scale (e.g., short term < 10 years; or long term > 10 years). While long-term contracts generate greater security and contribute to the provider's additional income, short-term payments are indicated in unstable political/budgetary scenarios and because they permit *adaptive improvement* in a shorter time (Sattler *et al*., 2013). In general, the ES elements *management practice, spatial and temporal scale* appear as *segmentation and eligibility* strategies in PES schemes.

Among the barriers to the success and continuity of PES mentioned in the literature there are the high transaction costs involved and the insecure source of payments (James; Sills, 2019). Payments are *types of incentives* that can take the form of financial resources, non-financial resources (e.g., seeds, seedlings, technical assistance, among others), or both; to be agreed among the *involved actors* (Sattler *et al*., 2013). *Sources of payment* are classified as private sector (for-profit), NGO/civil society foundation (including private foundations), public sources, voluntary contributions, and multilateral/bilateral organizations (Bremer *et al*., 2016). The literature indicates composing the PES fund with a diverse mix of

funding sources to provide greater long-term security and transparency to the PES (Engel, 2016). The *cost of PES* involves opportunity, implementation, and management costs, which together reflect the transaction costs of the program. It is the combination of incentive modalities, funding sources and costs incurred that determine the cost-effectiveness of the socio-environmental gain and legitimize the effectiveness of PES (Börner *et al*., 2017).

PES schemes are not created in an institutional and administrative vacuum (Vatn, 2010). Effective and efficient PES implementation is directly linked to the involvement of a broad, stable, and robust institutional framework that increases policy automation by involving local institutions to ensure the flow of information, the capillarity of actions and the internalization of costs and benefits (Kolinjivadi; Sunderland, 2012). The formation of a broad *institutional structure* (e.g., market, government, civil society, intersectoral, among others) makes it possible to overcome the logistical, technical, and financing challenges associated with PES operation (Sattler *et al*., 2013). The involvement of providers and stakeholders in governance spaces (e.g., collegiate bodies, councils, PMU – Project Management Unit) allows for greater capillarization of actions and information flow (Bremer *et al*., 2016). Building multi-level governance ensures certainty and transparency in decisions and payments, facilitates the decentralization of policy, allows building trust, and reduces barriers to participation, while also generating motivation, involvement, and knowledge (Hejnowicz *et al*., 2014). Knowledge on PES and political will are two fundamental limiting factors for the success of the initiative (Farley; Costanza, 2010). Finally, the *synergy and coherence* between PES and other incentive and/or disincentive policies (*policy mix*) must be explored in order to achieve the proposed objectives, be they ecosystem management or broader socio-economic development (Wegner, 2016).

Table 1 summarizes aspects highlighted in the literature and selected by the research as "essential elements" to be considered as a guiding parameter for the success of PES projects and programs.

Table 1. Aspects identified in the literature consulted as priorities, called essential elements for PES regulation

Essential elements	**References**
The concept of PES	Farley and Costanza (2010); Sattler *et al.* (2013); Huber-Stearns *et al.* (2017); and Yan *et al.* (2022).
Voluntariness	Farley and Costanza (2010); Sattler *et al.* (2013); and Yan *et al.* (2022).
Additionality;	Farley and Costanza (2010); Banerjee *et al.* (2013); Engel (2016); Kaczan *et al.* (2017); and James and Sills (2019).
Conditionality	Farley and Costanza (2010); Banerjee *et al.* (2013); Sattler *et al.* (2013); Engel (2016); Wunder *et al.* (2018); and James and Sills (2019).
Segmentation and eligibility	Adhikari and Boag (2013); Banerjee *et al.* (2013); Sattler *et al.* (2013); Engel (2016); Börner *et al.* (2017); Chan *et al.* (2017); Campanhão and Ranieri (2019); and James and Sills (2019).
Social equity	Farley and Costanza (2010); Adhikari and Boag (2013); Hejnowicz *et al.* (2014); Engel (2016); Grima *et al.* (2016); Wunder *et al.* (2018); Campanhão and Ranieri (2019); and James and Sills (2019).
Property rights	Farley and Costanza (2010); Kolinjivadi and Sunderland (2012); Adhikari and Boag (2013); Hejnowicz *et al.* (2014); Huber-Stearns *et al.* (2017); and James and Sills (2019).
Involved actors	Kemkes, Farley and Koliba (2010); Sattler *et al.* (2013); Wegner (2016); Grima *et al.* (2016); Engel (2016); Kaczan *et al.* (2017); Huber-Stearns *et al.* (2017); and James and Sills (2019).
Objectives	Adhikari and Boag (2013); Sattler *et al.* (2013); Hejnowicz *et al.* (2014); Wegner (2016); Engel (2016); Huber-Stearns *et al.* (2017); Wunder *et al.* (2018); Campanhão and Ranieri (2019); and James and Sills (2019).
Considered Environmetal Services	Farley and Costanza (2010); Kemkes, Farley and Koliba (2010); Banerjee *et al.* (2013); Sattler *et al.* (2013); Grima *et al.* (2016); Hejnowicz *et al.* (2014); Bremer *et al.* (2016); Börner *et al.* (2017); Huber-Stearns *et al.* (2017); and Campanhão and Ranieri (2019).
Management practices	Kemkes, Farley and Koliba (2010); Hejnowicz *et al.* (2014); Bremer *et al.* (2016); Huber-Stearns *et al.* (2017); and James and Sills (2019).
Type of incentive	Farley and Costanza (2010); Kemkes, Farley and Koliba (2010); Kolinjivadi and Sunderland (2012); Adhikari and Boag (2013); Banerjee *et al.* (2013); Sattler *et al.* (2013); Hejnowicz *et al.* (2014); Bremer *et al.* (2016); Engel (2016); Grima *et al.* (2016); Chan *et al.* (2017); Huber-Stearns *et al.* (2017); Kaczan *et al.* (2017); and Wunder *et al.* (2018).
Source of payment	Farley and Costanza (2010); Kemkes, Farley and Koliba (2010); Kolinjivadi and Sunderland (2012); Adhikari and Boag (2013); Banerjee *et al.* (2013); Sattler *et al.* (2013); Hejnowicz *et al.* (2014); Engel (2016); Grima *et al.* (2016); Börner *et al.* (2017); Chan *et al.* (2017); Wunder *et al.* (2018); James and Sills (2019); and Ola *et al.* (2019).

Cost of PES	Ferraro (2008); Kemkes, Farley and Koliba (2010); Bremer *et al.* (2016); Engel (2016); Börner *et al.* (2017); Huber-Stearns *et al.* (2017); Wunder *et al.* (2018); Campanhão and Ranieri (2019); and James and Sills (2019).
Monitoring	Farley and Costanza (2010); Sattler *et al.* (2013); Hejnowicz *et al.* (2014); Bremer *et al.* (2016); Engel (2016); Börner *et al.* (2017); Chan *et al.* (2017); Huber-Stearns *et al.* (2017); Wunder *et al.* (2018); Campanhão and Ranieri (2019); and James and Sills (2019).
Spatial scale	Farley and Costanza (2010); Kemkes, Farley and Koliba (2010); Banerjee *et al.* (2013); Sattler *et al.* (2013); Engel (2016); Grima *et al.* (2016); Börner *et al.* (2017); Huber-Stearns *et al.* (2017); and Wunder *et al.* (2018).
Temporal scale	Farley and Costanza (2010); Banerjee *et al.* (2013); Sattler *et al.* (2013); Bremer *et al.* (2016); Engel (2016); Grima *et al.* (2016); Börner *et al.* (2017); Chan *et al.* (2017); Wunder *et al.* (2018); Campanhão and Ranieri (2019); and Ola *et al.* (2019).
Externalities	Sattler *et al.* (2013); Bremer *et al.* (2016); Engel (2016); Börner *et al.* (2017); Chan *et al.* (2017); Campanhão and Ranieri (2019); and James and Sills (2019).
Adaptive improvement	Farley and Costanza (2010); and Sattler *et al.* (2013).
Transparency	Hejnowicz *et al.* (2014); Huber-Stearns *et al.* (2017).
Governance	Farley and Costanza (2010); Muradian *et al.* (2013); Bremer *et al.* (2016); Engel (2016); Chan *et al.* (2017); and Huber-Stearns *et al.* (2017).
Policy synergy	Farley and Costanza (2010); Muradian *et al.* (2013); Wegner (2016); Grima *et al.* (2016).
Institutional structure	Farley and Costanza (2010); Kemkes, Farley and Koliba (2010); Kolinjivadi and Sunderland (2012); Adhikari and Boag (2013); Muradian *et al.* (2013); Sattler *et al.* (2013); Hejnowicz *et al.* (2014); Bremer *et al.* (2016); Chan *et al.* (2017); Huber-Stearns *et al.* (2017); Wunder *et al.* (2018); and Campanhão and Ranieri (2019).

Source: the authors.

2 Analysis of the laws in terms of their compliance with the essential elements of PES

Table 2 summarizes the essential elements, as well as the PES laws evaluated, including: the federal regulatory framework (Law No. 14,119/2021), the state

law of Bahia (Law No. 13,223/2015) and the municipal laws of the state of Bahia (19 laws[4]). Municipal laws[5] were researched on the official websites of the city halls, official gazette, and city councils, in search of normative acts of the public administration related to the topic of PES or a related subject. When necessary, the official institutions were contacted by telephone and e-mail to confirm that they had a law on the subject and to ask them to forward it to us.

The degree of adequacy of laws to the essential elements and the approach recommended by the literature was assessed using a color scale ranging from dark grey (fully adequate) to light grey (partially adequate) to white (does not mention, i.e., does not meet the recommendations). In addition, the location of the essential element in the law was indicated using the abbreviation "Art.".

4 Ibirapitanga (Law No. 864/2014), Tuberá (Law No. 1,629/2014), Ilhéus (Law No. 3,820/2016), Piraí do Norte (Law No. 319/2017), Uruçuca (Law No. 577/2017), Nilo Peçanha (Law No. 370/2017), Wenceslau Guimarães (Law No. 367/2017), Nova Ibiá (Law No. 441/2017), Igrapiúna (Law No. 420/2017), Presidente Tancredo Neves (Law No. 325/2017), Almadina (Law No. 473/2017), Floresta Azul (Law No. 494/2017), Ibicaraí (Law No. 1,019/2017), Alagoinhas (Law No. 2,477/2019), Vitória da Conquista (Law No. 2,452/20210), Jussari (Law No. 448/2021), Iaçu (Law No. 07/2022), Itaberaba (Law No. 1,682/2022), Piatã (Complementary Law no. 346/2022).

5 This set of municipal laws may represent all of Bahia's municipal regulations instituted on PES until 2022, given the wide-ranging exploratory research carried out. However, it is possible that a smaller number of municipalities were not included in the survey as a result of the low level of publicity and transparency of the data on official websites of the municipal governments, which made it difficult to find these initiatives.

Table 2. Adequacy of the national and Bahia's PES laws in terms of the essential elements for a PES legal regime

Essential elements	Federal law	State law	Municipal laws (19)				
	Law No. 14,119/2021	Law No. 13,223/2015	8 (42%)	6 (31%)	2 (11%)	1 (5%)	2 (11%)
The concept of PES	Art. 2, IV	Art. 2, XIX	Art. 2, V	Art. 2º, VII			
Voluntariness	Art. 2, IV	Art. 1, Paragraph 1; Art. 2, XVII; Art. 6, V		Art. 2º, VIII			
Additionality:	Art. 9, sole paragraph	Art. 2, I, XVII; Art. 20, V; Art. 36	Art. 5, III		Art. 4, V		
Conditionality	Art. 2, IV; Art. 3, Paragraph 2; Art. 6, III Paragraphs 5 e 6; Section IV; Art. 22	Art. 2, XII; Art. 5, I; Art. 9, II; Art. 13, Sole paragraph; Art. 15; Art. 20, VI	Art. 2, V; Art. 8, III			Art. 163, I	
Segmentation and eligibility	Art. 5, III; Art. 6, Pagragraph 2; Art. 8; Art. 9; Art. 10	Art. 5, IV, V; art. 6; art. 15, Paragraph 1	Art. 5, V; Art. 8		Art. 4, VII; Art. 8	Art. 163, IV	
Social equity	Art. 5, III, XII; Art. 8, IV; Art. 15, Paragraph 4	Art. 4, III, IX; Art. 5, IV; Art. 6, VII; Art. 15, Paragraph 1	Art. 3, VI, Art. 5, V		Art. 2, VI; Art. 5, Paragraph 1		
Property rights	Art. 6, II; Art. 12, Sole paragraph; Art. 22	Art. 6, I; Art. 20, IV	Art. 8, II		Art. 5, Paragraph 1, I; Art. 8, II		
Involved actors	Art. 2, V, VI; Art. 5, VII; Art. 15, Paragraph 1	Art. 1, Paragraph 1; Art. 2, III, X, XI, XV; Art. 6	Art. 2, II, III, IV	Art. 2, IV, V, VI, IX			
Objectives	Art. 4	Art. 4	Art. 3		Art. 2	Art. 162	
Considered Environmental Services	Art. 1, III, Art. 7; Art. 8	Art. 2, XVIII, Art. 8, art. 15, Paragraph 2	Art. 2, I / Art. 2, III		Art. 5		
Management practices	Art. 7	Art. 8	Art. 8, I				Art. 3
Type of incentive	Art. 3; Art. 17	Art. 2, XII; Art. 9, II; Art. 11; Art. 14, IV	Art. 6, III, IV, V	Art. 6, IV, V, VI	Art. 6, III, IV, V	Art. 164, I, II, III	Art. 2
Source of payment	Art. 4, XIII; Art. 6, Paragraph 7; art. 21	Art. 28; Art. 31	Art. 11	Art. 12		Art. 166	Art. 7
Cost of PES		Art. 28, Paragraph 3					
Monitoring	Art. 4, IX, XI; Art. 5, X; Art. 11; Art. 12, III; Art. 14, sole paragraph; Art. 15, II	Art. 5, VI; Art. 6, IV; Art. 9, IV; Art. 13; Art. 14	Art. 8, Sole paragraph		Art. 2, XI	Art. 164, V	
Spatial scale	Art. 4, I; Art. 5, IX; Art. 6, Paragraph 3; Art. 8; Art. 9	Art. 8	Art. 5, I, II, III		Art. 4, II, III, V	Art. 163, IV	Art. 4
Temporal scale							Art. 2, Sole paragraph
Externalities		Art. 14					
Adaptive improvement	Art. 5, X; Art. 6, Paragraph 8; Art. 15, II, III	Art. 5, VI; Art. 23, V	Art. 5, VI		Art. 4, VIII	Art. 163, V	
Transparency	Art. 4, X; Art. 5, VIII; Art. 11; Art. 13; Art. 16	Art. 5, IV; Art. 6, III, VI; Art. 9, VI; Art. 29; Art. 32; Art. 33	Art. 6, VIII	Art. 6, IX	Art. 1, X; Art. 6, VIII	Art. 162, VI; Art. 164, IV; Art. 167	
Governance	Art. 5, VI; Art. 15	Art. 2, VI; Art. 6, II; Art. 22; Art. 23	Art. 12	Art. 14	Art. 5, Paragraph 1, II, Art. 13	Art. 168	Art. 5
Policy synergy	Art. 4, Paragraph 1; Art. 5, IV, V; Art. 9; Art. 10; art. 16, Paragraph 2	Art. 1, Paragraph 2; art. 20, Paragraph 2	Art. 5, IV	Art. 5, III	Art. 4, VI		
Institutional structure	Art. 4, Paragraph 2; Art. 15, Paragraph 1; Art. 20	Art. 4, XIII; Art. 21; Art. 23, III	Art. 5, VII	Art. 5, VII, Art. 13	Art. 4, IX	Art. 162, I; Art. 168	Art. 6
Recommendations							
Previous conditions (*ex-ante*)		Art. 14					
Specific context	Art. 6, Paragraph 1; Art. 6, IV; Art. 15, Paragraph 3	Art. 15, Paragraph 2					
Motivation	Art. 4, Paragraph 1; Art. 11	Art. 4, VIII; Art. 8, XII; Art. 35	Art. 6, VI	Art. 6, VII	Art. 6, VI	Art. 164, III	
Scale of adherence to literature recommendations							
Fully adequate		Partially adequate			Does not mention		

Source: the authors (2024).

A total of 21 laws were evaluated (1 federal, 1 state and 19 municipal). The municipal laws were organized and grouped according to the content of their wording. It was observed that, in general, the municipal PES laws are worded similarly and because of that, they were grouped and analyzed together.

Analysis of the content of the laws in terms of the degree of compliance with the essential elements identified in the literature review resulted in the following: fully adequate (federal: 15 out of 23, 65%; state: 18 out of 23, 78%; municipal: ranged from 1 to 17 out of 23, 4% to 74%); partially adequate (federal: 5 out of 23, 22%; state: 4 out of 23, 18%; municipal: ranged from 2 to 8 out of 23, 9% to 35%); do not mention (federal: 3 out of 23, 13%; state: 1 out of 23, 4%; municipal: ranged from 4 to 16 out of 23, 17% to 70%).

The first essential element assessed was the *concept of PES*. The federal law fully meets the recommendations and covers the *concept* of voluntariness, the provider and the payer, the provision of financial incentives or not, and conditionality, according to the widely accepted definition (Wunder, 2005). The state law adopted a similar approach but did not mention the *voluntariness* element; this is also the case in the wording of eight municipal laws (42%). However, the state law itself corrects the conceptual gap by including the element of voluntariness in other parts of its wording. Ten municipalities (53%) do not mention the *voluntariness* aspect of PES, and five municipalities (27%) do not mention the *concept* of *PES* in their laws.

The federal law provides for PES for Permanent Preservation Areas (PPA) and Legal Reserves (LR) exclusively located in priority areas or critical watersheds, thus comprising a reductionist view of the *additionality* element; therefore, it partially fits this question. It should be noted that this restriction is only within the scope of the Federal PES Program (FPES), which does not prevent states and municipalities from adopting a broader approach. This is what happens in Bahia's state law investigated and in eight municipal laws (42%), which allow PES in PPA, LR and Restricted Use Areas, configuring *additionality* for national and international market purposes (Art. 36 of Law No. 13,223/2015). Two municipalities (11%) have similar wording, but they are slightly more simplified and partially meets, as it does not use the term *additionality*; and 11 municipalities (58%) do not mention this element.

Conditionality deals with the conditions agreed for transactions to occur, i.e., the contractual nature of the PES, which in turn is closely related to monitoring, inspection, and technical additionality[6]. Federal, state, and 84% of municipal

6 Dimensions of *additionality*: (i) *technical additionality* refers to an improvement in the provision of

laws address *conditionality* in a broad and comprehensive manner, meeting the recommendations in the literature. One municipal law (5%) only mentions the term incentives or conditional payments. Finally, two municipalities (11%) do not mention the conditionality element or the contractual nature of the PES, which runs the risk of becoming a merely welfare-based resource transfer policy.

Segmentation and eligibility determine whether the PES will be widely adopted (horizontality) or it will target certain groups and specific contexts. The federal standard meets the recommendations, as it provides for PES in urban and rural areas and chooses as a priority group "traditional communities, Indigenous peoples, family farmers and rural family entrepreneurs"[7] (Brasil, 2021; free translation)[8]. Bahia state law elects the same priority group as the federal law; however, increments introduced in the wording of the federal law (e.g., Art. 6, Paragraph 4, II) are not addressed, therefore, it was classified as "partially". In 84% of cases, municipal regulations choose "family farmers" as the priority audience and address general requirements for participation, including: (i) compliance with the specific project; (ii) regular occupation of the property; and (iii) formalization of the contract. A municipal law assumes the same priority public wording as the state law; and two municipalities (11%) do not mention such elements.

Social equity is closely related to segmentation and eligibility, i.e., the PES has greater potential if designed to guarantee the inclusion of vulnerable social groups. Both federal and state laws meet the recommendations in the literature and refer to Convention 169 of the International Labor Organization (ILO), which protects Indigenous and tribal peoples. The PNPES's guidelines are "socioeconomic inclusion and environmental regularization of rural populations in vulnerable situations"[9] (Brasil, 2021; free translation)[10], as well as guaranteeing the representation of these groups in the composition of the collegiate body (governance)[11]. The Bahia's regulation adopts as one of the objectives of the PES State Policy the reduction of poverty, the fair and equitable distribution of the implementation of

the environmental service as a result of the effective realization with which it is associated; (ii) *behavioral additionality* is a positive change in the behavior of an individual motivated by the incentive scheme; and (iii) *legal additionality* is conduct that goes beyond the determination required by command and control, behavior that creates a bonus for conservation (Siqueira, 2018).

7 From the original: "comunidades tradicionais, povos indígenas, agricultores familiares e empreendedores familiares rurais".

8 Art. 6, Paragraph 2, Federal Law No. 14,119/2021.

9 From the original: "inclusão socioeconômica e a regularização ambiental de populações rurais em situação de vulnerabilidade".

10 Art. 5, XII, Federal Law No. 14,119/2021.

11 Art. 8, IV, Federal Law No. 14,119/2021.

the PES Policy, elects priority groups, access to information in accessible language and guarantees the participation of representations in the Council Deliberative. Approximately 73% of municipal laws partially meet, as they include among the objectives "promoting alternative work and income for populations in vulnerable situations"[12][13] (Ibirapitanga, 2014; free translation) and define family farmers as a priority target audience; however, they do not address further details. Two municipal laws (11%) meet social equity and advance by incorporating traditional peoples and communities or family farmers and rural family entrepreneurs[14] (Iaçu, 2022; Itaberaba, 2022), in addition to providing for respect for property rights, customary practices, self-determination, guaranteeing participation and social control in governance. Three municipalities (16%) do not mention this essential element.

As for *property rights*, this applies to private areas; secure possession and clearly defined property rights facilitate the contractual nature, according to the doctrine analyzed. Federal, state, and 84% of municipal laws meet the recommendations in the literature; three municipalities (16%) do not mention it. Both federal and state law stipulate as a general requirement for participation in the PES that proof of regular use and occupation of the property through registration in the Rural Environmental Registry (CAR), with exceptions for "Indigenous lands, quilombola territories and other legitimately occupied areas by traditional populations"[15] (Brasil, 2021; free translation)[16], ensuring *social equity*. Federal law also provides for the *propter rem* nature of the PES[17], i.e., the obligations are passed on to the purchaser of the property since the areas will assume the environmental easement regime. That said, it is recommended that this strategy be followed when regulating state law.

The term *involved actors* refers to payers, ES providers, beneficiaries of the PES Program and the involvement of intermediaries or transaction mediators. The actors involved can be individuals or legal entities, under public or private law or both. Bahia's law meets the breadth of the essential element and addresses the definitions of payer, provider, beneficiary, and mediator; The federal framework

12 From the original: "promover alternativas de trabalho e renda para populações em situação de vulnerabilidade".

13 Art. 3, VI, Municipal Law No. 864/2014.

14 Art. 5, Paragraph 1, Municipal Law No. 07/2022 and Municipal Law No. 1,682/2022.

15 From the original: "terras indígenas, territórios quilombolas e outras áreas legitimamente ocupada por populações tradicionais".

16 Art. 8, IV, Federal Law No. 14,119/2021.

17 Art. 22, Federal Law No. 14,119/2021.

does not explicitly identify the figure of the mediator or intermediary, nor that of the Program beneficiary, therefore, it was classified as "partially"[18]. Approximately 73% of municipal laws address all actors involved, therefore, meet the recommendations; five municipalities (27%) do not mention the aforementioned element.

All laws evaluated contain a specific article with the *objectives* of the law, therefore, they meet the recommendations; except for two municipalities[19] (11%) that do not mention them. In general, these are comprehensive *objectives* that involve environmental, economic, and social dimensions, as recommended at the public policy level.

The *considered ES* and *management practices* elements were versed in the laws in an associated manner. The state standard makes the types of recognized services explicit, as well as defining three categories of ES subprograms, without prejudice to the creation of other necessary ones. Federal law is less emphatic on this point and the ES information is not clearly detailed in an article, but implicit in the wording of the management practices to be promoted and in the areas covered by the FPES and is therefore classified as partially adequate. This also occurs in 14 municipal laws (73%) that address the element in a less obvious way; three municipalities (16%) do not mention ES and two of them partially address management practices. On the other hand, two other municipalities treat ES accurately and appropriately, while management practices are classified as partially adequate.

The *type of incentive* to be promoted by the PES is addressed in all laws evaluated. However, the range of possibilities suggested differs from each other, which directly implies favoring the implementation and success of the PES. In general, laws meet the recommendations by presenting very diverse types of incentives for PES[20]. Two municipal laws were classified as partially adequate, as they authorize a single type of financial support from the executive branch to fund the PES, which limits, burdens, and disadvantages the implementation of the instrument.

The *sources of payment* element are directly linked to the type of incentive, representing benefits arising from them that will incur a wide range of possibilities for attracting investors. The federal framework was classified as "partially", since some vetoes relating to the incentives chapter, relating to tax benefits and tax

18 The literature recommends the involvement of the intermediary as a mediator and facilitator in the negotiations, in the administration of payments, in support of monitoring and inspection activities and useful for strengthening trust among parties. (Sattler *et al.*, 2013).

19 Municipalities of Ituberá (Law No. 1,629/2014) and Ilhéus (Law No. 3,820/2016).

20 Examples of this diversification: (i) monetary and non-monetary payments; (ii) tax incentives; (iii) seals, certifications, and awards; (iv) technical assistance, rural extension, training, and environmental education activities; and (v) provision of inputs, labor, and social improvements to the community.

incentives, reduced the opportunity to attract new sources of financial investment and limited the capture of resources, especially from the private sector, which affects the creation of an ES market[21]. A serious situation that harms the implementation of the PNPES is the fact that the rule excludes the participation of the National Treasury in the allocation of resources allocated to the FPES[22], which signals low involvement of the federal public authorities in implementing the PES. On the other hand, state law and municipal laws, in addition to providing for other opportunities for financing sources, provided for the allocation of resources from the Annual Budget Law (LOA – *Lei Orçamentária Anual*) and the Municipal Environment Fund (FMMA – *Fundo Municipal de Meio Ambiente*), which indicates commitment and interest on the part of the public administration to implement these policies. Furthermore, state law provides for revenue from charges for water concessions and vehicle inspection fees[23], sources of continuous revenue that allow for the PES's financial sustainability; a percentage of this resource can be taxed via decree to guarantee the allocation.

Regarding *costs of PES*, this element does not necessarily appear in the law, as it may appear in other subsequent normative acts, such as decrees and ordinances. However, the literature mentions the limitations incurred with high transaction costs, which result in the inefficiency of the mechanism and generate criticism of the PES (Ferraro, 2008). Therefore, it would be relevant to consider this element whenever possible. Bahia's law is the only one that provides for a spending ceiling (7.5%) to cover implementation, operation, and maintenance expenses of the PEPES executing body[24].

Monitoring is in fact an essential element for verifying *additionality* and the results obtained with the PES mechanism. Without monitoring and verifying results, there is a risk of the PES becoming an inefficient policy in environmental terms. The federal law provides for monitoring, continuous scientific research to improve methodologies, the publication of information (*transparency*) and determines that the collegiate body monitors compliance with the Programs and the PNPES. However, it does not establish the creation of the Monitoring and Verification Plan, as brought by the state standard and a municipal law[25], which is why it was framed as "partially". Bahia's regulation reserves a section to regulate

21 Art. 4, XIII, Federal Law No. 14,119/2021.

22 Art. 6, Paragraph 7, Federal Law No. 14,119/2021.

23 Art. 28, Paragraph 1, item VI e VII, State Law No. 13,223/2015.

24 Art. 28, Paragraph 3, State Law No. 13,223/2015.

25 Musicality of Piatã (Ancillary legislation No. 346/2022).

the Monitoring and Verification Plan for PES Projects and regulates the minimum content provided, providing detailed guidelines. On the other hand, 84% of municipal laws provide for monitoring, but send the necessary definitions to subsequent regulation; therefore, it was classified as "partially".

The *spatial scale* of the Policy and Program can be regulated by laws, regarding the geographic reach, priority areas (*eligibility*) and the expected scaling of actions. The federal standard states that the PNPES applies to the entire national territory, to rural and urban properties, details information on the profile of eligible areas, priority conditions and provides for an escalation mechanism[26], therefore "meeting" the recommendations. State law, in turn, does not explicitly regulate this aspect, it only addresses it, implicitly, when dealing with ES modalities; therefore, it is classified as "partially". Approximately 89% of municipal regulations define priority areas for PES actions and "meet" the recommendations.

In general, the laws do not address the PES's *temporal scale*, given that this temporal detail is customary in legal norms that establish a certain PES program or project, which is not expected for general laws, such as the PNPES and from PEPES. Only two municipal laws (11%), which deal with the establishment of a PES pilot project, provide a minimum duration of 18 months.

Predicting, monitoring, and managing PES *externalities* are actions that demonstrate, according to the literature consulted, a degree of appropriation of knowledge on the context in which it is applied. The state law, despite not specifically addressing this essential element, allows *externalities* to be monitored through the Monitoring and Verification Plan, therefore meeting the recommendations; in relation to the others, they do not mention this item.

Regarding *adaptive improvement*, the federal standard mentions the improvement of monitoring and verification methods and determines that the FPES be evaluated by the collegiate body every four years to check the compliance of investments and propose necessary adjustments, which meets the recommendations. The Bahia's regulations and 89% of municipal laws provide for the improvement of monitoring methods and the responsibility of the deliberative council to monitor the results and propose periodic improvements, however, they do not mention the time interval for this. As this is a more generalist and superficial wording, it is understood that, when regulating it, the guidelines set out in the federal standard must be observed. Two municipal laws do not mention this aspect.

In relation to *transparency*, federal law established the PES National Registry

26 Art. 3, Paragraph 6, Federal Law No. 14,119/2021.

(CNPSA – *Cadastro Nacional de Pagamento de Serviços Ambientais*)[27], which consists of a public database for access to PES contracts, assisted areas, ES provided and monitored results. Bahia's regulation provided for a PES Information System[28], therefore, federal and state standards meet the recommendations. Among municipal laws, 89% of them provide for the Municipal PES Registry, but do not regulate its minimum content; only one municipality includes the information that must be included in this system; and two municipalities do not mention the element in question.

Governance, in turn, adds to *political synergy* and institutional structure to achieve maximum potential success, which would be to guarantee the formulation of a multi-level governance strategy, adjustable to scale and regional differences, finding solution paths. The federal law provided as one of its guidelines the coordination of the PES integrating the Union, DF, municipalities, River Basin Committees, private initiative, OSCIP, and non-governmental organizations, which infers the possibility of strengthening governance, political synergy and institutional structure of the PES, in order to increase adherence, policy automation and efficiency of technical and financial resources. Governance includes the institution of a collegiate body (federal law), a deliberative council (state law), and a management committee (89% of municipal laws). Two municipalities partially meet this item, as they do not provide for the creation of specific councils and bodies for the PES but assign this function to the municipal environmental council.

Policy synergy can be deduced by the presence of a greater willingness of the PES to connect to other environmental management instruments, such as command and control mechanisms, whose potential is to guarantee greater efficiency in managing and safeguarding ecosystems. The federal standard provided as one of its guidelines the integration of the PES with other sectoral and environmental policies, in addition to the command-and-control instruments[29]. In this vein, the same law provided for the integration of information from the PES National Registry with other national environmental information systems, such as Sinima, SiBBr, and SICAR. The state standard provided fewer guidelines for promoting PEPES's *policy synergy* and is therefore classified as "partially". This is also true for 84% of municipal regulations, which were also classified as "partially" and 16% "do not mention".

Finally, all laws evaluated with an appropriate approach addressed the

27 Art. 16, Federal Law No. 14,119/2021.

28 Art. 29, State Law No. 13,223/2015.

29 Art. 5, items IV and V, Federal Law No. 14,119/2021.

institutional structure element, i.e., they meet the recommendations. In general, the established standards define the functional structure of the PES Program with equal input from representatives of public authorities, the productive sector and civil society. Institutions must compose governance through bodies: deliberative and consultative; executor, technical advice, and monitoring; support entities; financial agent, among others.

To conclude, laws are analyzed regarding the *preconditions* of the location, the *specific context* relationship with the PES design and the motivation of the beneficiaries; not as essential elements, but as recommendations, given the importance of these aspects in the design of the PES. In general, these were elements not mentioned or partially addressed. Taking these recommendations into account, whether in regulating laws or planning programs and projects, can influence the success of the PES and the reduction of negative side effects.

Final considerations

Based on the narrative literary review, this work proposed to identify which elements could be considered essential to guarantee greater potential for success in PES projects and programs. The visited doctrine was largely international, was selected because it brings greater empirical framework on successful PES schemes and explicitly contains operational guidelines, criteria and levels relating to the effectiveness and planning of PES.

The narrative review allowed the structuring of 23 "essential elements" that confer greater or lesser success to PSE arrangements: (1) concept of PSE; (2) voluntariness; (3) additionality; (4) conditionality; (5) segmentation and eligibility; (6) social equity; (7) property rights; (8) actors involved; (9) objectives; (10) considered ES; (11) management practices; (12) type of incentive; (13) sources of payment; (14) cost of PES; (15) monitoring; (16) spatial scale; (17) temporal scale; (18) externalities; (19) adaptive improvement; (20) transparency; (21) governance; (22) political synergy; and (23) institutional structure. These elements were sought and studied in the main municipal and state regulatory frameworks in the state of Bahia and in the National PES Policy, the federal law of reference on the subject (Law No. 14,119/2021).

It was possible to infer that the laws investigated meet more than 60% of the notes indicated in the literature. In some respects, the wording of Bahia's state law (Law No. 13,223/2015) showed a more appropriate approach to the literature's recommendations than the federal law itself, however, in general terms, there is

coherence between them. At the municipal level, a greater degree of similarity was noted among the wording of regulations, including legal texts reproduced in full. Despite being a common practice in the legislative process, this exercise makes it impossible to customize the law to local specificities, preventing broad debate and the collective construction of public policy.

Some municipal laws had a meeting rate of less than 10%, which may indicate the legislator's lack of clarity regarding the minimum guideline criteria to guide the PES's conceptual and operational framework. Poorly drafted laws run the risk of inadequate implementation of the policy, greater scope for subjective interpretation by operating agents and greater chance of inefficient application of public resources, impacting the socio-environmental gains pursued by the PES.

In terms of recommendations, five main ones stand out, with a view to expanding the debate and improving legal standards and public policies regarding the PSE.

Additionality could be observed not so much from a strictly technical point of view (paying for practices that would not have been adopted without the incentive offer), but also considering the legal and behavioral approach. To achieve this, it is necessary to know the context prior to the implementation of the PES, through assessments of *ex-ante* preconditions, the intrinsic motivations, and the demands of the target audience.

The leverage of information in a *specific context* can be favored with the presence of institutions or intermediary figures or mediators for the process. These actors can contribute to the formation of governance, mediating interests between institutions and contributing to greater social participation.

As it is a relatively new instrument, and especially practiced by single service projects, generally water, it is interesting to choose actions/activities that are recognized for the provision of multiple ecosystem services, with the aim of encouraging multi-target PSE or SE package.

Other points that constitute bottlenecks and constant criticism are *monitoring*, the prediction of *adaptive improvement* strategies and further study on possible *externalities* related to the impacts of the PES, aspects that could be more present in the texts and legal contracts referring to projects and programs.

Finally, it is reinforced that this analysis sought to encourage greater reflection on the degree of compliance with the federal regulatory framework and the state and municipal legislation in Bahia, concerning the PES regarding the criteria and guidelines arising from the selected specialized doctrine. Furthermore, we sought to present a more concrete and contextualized investigation on this topic,

to improve legal standards that already exist or are to be created. This proposal is far from exhausting other equally relevant parameters and guidelines to be considered by bodies and institutions in charge of implementing the instrument.

References

ADHIKARI, B.; BOAG, G. Designing payments for ecosystem services schemes: some considerations. *Current Opinion in Environmental Sustainability*, [*S. l.*], v. 5, n. 1, p. 72-77, 2013. Available from: https://doi.org/10.1016/j.cosust.2012.11.001. Access on: June 15, 2024.

ALTMANN, A.; STANTON, M. S. The densification normative of the ecosystem services concept in Brazil: Analyses from legislation and jurisprudence. *Ecosystem Services*, [*S. l.*], v. 29, p. 282-293, 2018. Available from: https://doi.org/10.1016/j.ecoser.2017.10.013. Access on: June 15, 2024.

BAHIA. Lei n. 13.223 de 12 de janeiro de 2015. Institui a Política Estadual de Pagamento por Serviços Ambientais, o Programa Estadual de Pagamento por Serviços Ambientais e dá outras providências. *Diário Oficial do Estado da Bahia*, Salvador, BA, ano XCIL, n. 21.615, 13 jan. 2015. Available from: https://dool.egba.ba.gov.br/ver-pdf/6818/#/p:1/e:6818. Access on: June 16, 2024.

BANERJEE, S. *et al*. How to sell ecosystem services: a guide for designing new markets. *Frontiers in Ecology and the Environment*, [*S. l.*], v. 11, n. 6, p. 297-304, 2013. Available from: http://dx.doi.org/10.2307/23470481. Access on: June 15, 2024.

BÖRNER, J. *et al*. The effectiveness of payments for environmental services. *World Development*, [*S. l.*], v. 96, p. 359-374, 2017. Available from: https://doi.org/10.1016/j.worlddev.2017.03.020. Access on: June 15, 2024.

BRASIL. Lei Federal n. 14.119, de 13 de janeiro de 2021. Institui a Política Nacional de Pagamento por Serviços Ambientais; e altera as Leis n os 8.212, de 24 de julho de1991, 8.629, de 25 de fevereiro de 1993, e 6.015, de 31de dezembro de 1973, para adequá-las à nova política. *Diário Oficial da União:* seção 1, Brasília, DF, n. 9, p. 7, 14 jan. 2021. Available from: https://www.in.gov.br/en/web/dou/-/lei-n-14.119-de-13-de-janeiro-de-2021-298899394. Access on: June 15, 2024.

BREMER, L. L. *et al*. One size does not fit all: natural infrastructure investments within the Latin American Water Funds Partnership. *Ecosystem Services*, [*S. l.*], v. 17, p. 217-236, 2016. Available from: https://www.sciencedirect.com/science/article/abs/pii/S2212041615300681. Access on: June 16, 2024.

CAMPANHÃO, L. M. B.; RANIERI, V. E. L. Guideline framework for effective targeting of payments for watershed services. *Forest policy and economics*, Amsterdã, v. 104, p. 93-109, 2019. Available from: https://doi.org/10.1016/j.forpol.2019.04.002. Access on: June 15, 2024.

CHAN, K. M. *et al*. Payments for ecosystem services: Rife with problems and potential – for transformation towards sustainability. *Ecological Economics*, [*S. l.*], v. 140, p. 110-122, 2017. Available from: https://doi.org/10.1016/j.ecolecon.2017.04.029. Access on: June 15, 2024.

ENGEL, S. The devil in the detail: a practical guide on designing payments for environmental services. *International Review of Environmental and Resource Economics*, Altamonte Springs, v. 9, n. 1-2, p. 131-177, 2016. Available from: http://dx.doi.org/10.1561/101.00000076. Access on: June 16, 2024.

FARLEY, J.; COSTANZA, R. Payments for ecosystem services: from local to global. *Ecological Economics*, [*S. l.*], v. 69, n. 11, p. 2060-2068, 2010. Available from: https://doi.org/10.1016/j.ecolecon.2010.06.010. Access on: June 16, 2024.

FERRARO, P. J. Asymmetric information and contract design for payments for environmental services. *Ecological Economics*, [*S. l.*], v. 65, n. 4, p. 810-821, 2008. Available from: https://doi.org/10.1016/j.ecolecon.2007.07.029. Access on: June 16, 2024.

GRIMA, N. *et al*. Payment for Ecosystem Services (PES) in Latin America: Analysing the performance of 40 case studies. *Ecosystem Services*, [*S. l.*], v. 17, p. 24-32, 2016. Available from: https://doi.org/10.1016/j.ecoser.2015.11.010. Access on: June 16, 2024.

HEJNOWICZ, A. P. *et al*. Evaluating the outcomes of payments for ecosystem services programmes using a capital asset framework. *Ecosystem Services*, [*S. l.*], v. 9, p. 83-97, 2014. Available from: https://doi.org/10.1016/j.ecoser.2014.05.001. Access on: June 16, 2024.

HUBER-STEARNS, H. R. *et al*. Social-ecological enabling conditions for payments for ecosystem services. *Ecology and Society*, v. 22, n. 1, 2017. Available from: https://www.jstor.org/stable/26270112. Access on: June 16, 2024.

IAÇU. *Lei n. 07, de 26 de abril de 2022*. Institui a Política Municipal de Pagamento por Serviços Ambientais, cria o Programa Municipal de Pagamento por Serviços Ambientais e cria o Fundo Municipal de Pagamento por Serviços Ambientais do Município de Iaçu e dá outras providências. Iaçu: Câmara Municipal, 2022. Available from: https://www.camaraiacu.ba.gov.br/Handler.ashx?f=f&query=bac44bc2-ba16-47a5-9f0e-3a3b5e1b0da1.pdf. Access on: June 18, 2024.

IBIRAPITANGA. Lei n. 864, 16 de outubro de 2014. Institui a Política Municipal de Pagamento por Serviços Ambientais, cria o Programa Municipal de Pagamento por Serviços Ambientais e o Fundo Municipal de Pagamento por Serviços Ambientais e dá outras providências. *Diário Oficial do Município*, Ibirapitanga, BA, Ano X, n. 663, 16 out. 2014. Available from: https://www.ibirapitanga.ba.gov.br/Handler.ashx?f=diario&query=663&c=307&m=0. Access on: June 18, 2024.

ILHÉUS. *Lei n. 3.806, de 20 de julho de 2016*. Dispõe sobre a criação e atribuições do Conselho Municipal de Turismo – COMTUR, cria o Fundo Municipal de Turismo – FUMTUR e dá outras providências. Ilhéus, BA: Prefeitura Municipal, 2016. Available from: https://www.ilheus.ba.gov.br/abrir_arquivo.aspx/Lei_Ordinaria_3806_2016?cdLocal=5&arquivo=%7BE74AC83B-BD-BC-4E7C-A6DD-EC1C2E0DAABD%7D.pdf. Access on: June 19, 2024.

ITABERABA. *Lei n. 1.682, de 28 de março de 2022*. Institui a Política Municipal de Pagamento por Serviços Ambientais, cria o Programa Municipal de Pagamento por Serviços Ambientais e cria o Fundo Municipal de Pagamento por Serviços Ambientais do Município de Itaberaba e dá outras providências. Itaberaba, BA: Prefeitura Municipal, 2022. Available from: https://sapl.itaberaba.ba.leg.br/media/sapl/public/normajuridica/2022/1512/lei-no_1682-2022_1809.pdf. Access on: June 18, 2024.

ITUBERÁ. *Lei Municipal n. 1.629/2014, de 17 de outubro de 2014*. Cria o Projeto Piloto de Pagamento Por Serviços Ambientais Para Produtores Rurais, autorizando o executivo a prestar apoio financeiro aos proprietários rurais e dá outras providências. Ituberá, BA: Prefeitura Municipal, 2014. Available from: https://www.itubera.ba.gov.br/site/LeiMunicipal/234. Access on: June 19, 2024.

JAMES, N.; SILLS, E. O. O. Payments for ecosystem services: program design and participation. *Oxford Research Encyclopedia of Environmental Science*, Oxford, 28 ago. 2019. Available from: https://doi.org/10.1093/acrefore/9780199389414.013.580. Access on: June 16, 2024.

JODAS, N. *Pagamento por serviços ambientais*: diretrizes de sustentabilidade para projetos de PSA no Brasil: atualizado de acordo com a Lei n. 14.119/2021 (Política Nacional de Pagamento por Serviços Ambientais). Rio de Janeiro: Lumen Juris, 2021.

KACZAN, D. *et al*. Increasing the impact of collective incentives in payments for ecosystem services. *Journal of Environmental Economics and Management*, [*S. l.*], v. 86, p. 48-67, 2017. Available from: https://doi.org/10.1016/j.jeem.2017.06.007. Access on: June 16, 2024.

KEMKES, R. J.; FARLEY, J.; KOLIBA, C. J. Determining when payments are an effective policy approach to ecosystem service provision. *Ecological Economics*, [*S. l.*], v. 69, n. 11, p. 2.069-2.074, 2010. Available from: https://doi.org/10.1016/j.ecolecon.2009.11.032. Access on: June 16, 2024.

KOLINJIVADI, V. K.; SUNDERLAND, T. A review of two payment schemes for watershed services from China and Vietnam: the interface of government control and PES theory. *Ecology and Society*, [*S. l.*], v. 17, n. 4, 2012. Available from: https://doi.org/10.5751/ES-05057-170410. Access on: June 16, 2024.

MURADIAN, R. *et al*. Payments for ecosystem services and the fatal attraction of win-win solutions. *Conservation Letters*, [*S. l.*], v. 6, n. 4, p. 274-279, 2013. Available from: https://doi.org/10.1111/j.1755-263X.2012.00309.x. Access on: June 16, 2024.

MURADIAN, R. *et al*. Reconciling Theory and Practice: An Alternative Conceptual Framework for Understanding Payments for Environmental Services. *Ecological Economic*, [*S. l.*], v. 69, n. 6, p. 1202-1208, 2010. Available from: https://doi.org/10.1016/j.ecolecon.2009.11.006. Access on: June 16, 2024.

OLA, O. *et al*. Determinants of the environmental conservation and poverty alleviation objectives of Payments for Ecosystem Services (PES) programs. *Ecosystem Services*, [*S. l.*], v. 35, p. 52-66, 2019. Available from: https://doi.org/10.1016/j.ecoser.2018.10.011. Access on: June 16, 2024.

PIATÃ. Lei Complementar n. 346, de 25 de julho de 2022. Institui o Código Municipal de Meio Ambiente, e dá outras providências. No Capítulo XVI, Artigo 158, institui a Política Municipal de Pagamento por Serviços Ambientais (PMPSA), cria o Programa Municipal de Pagamento por Serviços Ambientais (PROMPSA) e estabelece formas de controle e financiamento deste programa. *Diário Oficial do Município*, seção I, Piatã, BA, ano VII, n. 2131, 31 ago. 2022.

RUHL, J. B.; SALZMAN, J. A global assessment of the law and policy of ecosystem services. *The University of Queensland Law Journal*, St. Lucia, v. 39, n. 3, p. 503-523, 2020. Available from: https://doi.org/10.38127/uqlj.v39i3.5661. Access on: June 16, 2024.

SALZMAN, J. *et al*. The global status and trends of Payments for Ecosystem Services. *Nature Sustainability*, London, v. 1, n. 3, p. 136-144, 2018. Available from: https://www.nature.com/articles/s41893-018-0033-0. Access on: June 16, 2024.

SATTLER, C. *et al*. Multi-classification of payments for ecosystem services: How do classification characteristics relate to overall PES success? *Ecosystem Services*, [*S. l.*], v. 6, p. 31-45, 2013. Available from: https://doi.org/10.1016/j.ecoser.2013.09.007. Access on: June 16, 2024.

SIQUEIRA, R. P. S. *Pagamento por serviços ambientais:* conceitos, regime jurídico e o princípio do protetor-beneficiário. Curitiba: Juruá, 2018.

VATN, A. An institutional analysis of payments for environmental services. *Ecological Economics*, [*S. l.*], v. 69, n. 6, p. 1.245-1.252, 2010. Available from: https://doi.org/10.1016/j.ecolecon.2009.11.018. Access on: June 16, 2024.

WEGNER, G. I. Payments for ecosystem services (PES): a flexible, participatory, and integrated approach for improved conservation and equity outcomes. *Environment, Development and Sustainability*, [*S. l.*], v. 18, n. 3, p. 617-644, 2016.

WUNDER, S. Payments for Environmental Services: Some Nuts and Bolts. *CIFOR*, Bogor, Occasional Paper n. 42, 2005. Available from: https://www.cifor-icraf.org/publications/pdf_files/OccPapers/OP-42.pdf. Access on: June 16, 2024.

WUNDER, S. Revisiting the concept of payments for environmental services. *Ecological Economics*, [*S. l.*], v. 117, p. 234-243, 2015. Available from: https://doi.org/10.1016/j.ecolecon.2014.08.016. Access on: June 16, 2024.

WUNDER, S. *et al*. From principles to practice in paying for nature's services. *Nature Sustainability*, London, n. 1, p. 145-150, 2018. Available from: https://doi.org/10.1038/s41893-018-0036-x. Access on: June 14, 2024.

YAN, H. *et al*. Payments for ecosystem services as an essential approach to improving ecosystem services: A review. *Ecological Economics*, [*S. l.*], v. 201, e107591, 2022. Available from: https://doi.org/10.1016/j.ecolecon.2022.107591. Access on: June 16, 2024.

ABOUT THE AUTHORS

Nayra Rosa Coelho
PhD and Master in Development and Environment from Universidade Estadual de Santa Cruz (UESC), Ilhéus/BA, Brazil. Major in Biological Sciences from Universidade Federal dos Vales do Jequitinhonha e Mucuri (UFVJM), Diamantina/MG, Brazil. Specialist Analyst in Payment for Environmental Services at Organização de Conservação da Terra (OCT), Ibirapitanga/BA, Brazil.

Andréa da Silva Gomes
PhD in Rural Development from the Institut National Agronomique Paris Grignon (INA-PG), Paris, France. Master in Economics from Universidade Federal da Bahia (UFBA), Salvador/BA, Brazil. Major in Economics from Universidade Santa Úrsula (USU), Rio de Janeiro/RJ, Brazil. Full Professor in the Departmento de Ciências Econômicas at UESC. Vice-coordinator of the Master's Program for Regional Economy and Public Policies (MERPP) at UESC.

Natália Jodas
PhD in Environmental Law from Faculdade de Direito da Universidade de São Paulo (FDUSP), São Paulo/SP, Brazil. Master in Environmental Law from Universidade Federal de Santa Catarina (UFSC), Florianópolis/SC, Brazil. Law Graduate from Universidade Estadual de Londrina (UEL), Londrina/PR, Brazil. Adjunct Professor of Law at Instituto Tecnológico de Aeronáutica (ITA), São José dos Campos/SP, Brazil. Scientific coordinator of Associação dos Professores de Direito Ambiental do Brasil (APRODAB), São Paulo/SP, Brazil. Member of Instituto o Direito por um Planeta Verde (IDPV), São Paulo/SP, Brazil.

Authors's participation
All authors took an active part in drafting and improving the article. Nayra Rosa Coelho was responsible for conceptualizing and writing the original version of the manuscript. Natália Jodas proofread and edited the article, ensuring clarity and coherence and contributing her knowledge and experience on the subject. Andréa da Silva Gomes acted as supervisor, ensuring the quality of the research and the final approval of the work.

How to cite this article (ABNT):
COELHO, N. R.; GOMES, A. da S.; JODAS, N. Essential elements of payment for environmental services. *Veredas do Direito*, Belo Horizonte, v. 21, e212734, 2024. Available from: http://www.domhelder.edu.br/revista/index.php/veredas/article/view/2734. Access on: Month. day, year.