



Innovative Mechanisms for Forest Compensation in Brazilian MATOPIBA

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About Climate Policy Initiative

CPI is an analysis and advisory organization with deep expertise in finance and policy. CPI has six offices around the world. In Brazil, CPI has a partnership with PUC-Rio. CPI/PUC-Rio supports public policies in Brazil through evidence-based research and strategic partnerships with members of the government and civil society.

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List of Abbreviations and Acronyms

ABEMA	Brazilian Association of State Environmental Entities (<i>Associação Brasileira de Entidades Estaduais de Meio Ambiente</i>)
ACRF	Forest Compensation Credit Authorization (<i>Autorização de Crédito de Reposição Florestal</i>)
APP	Permanent Preservation Area (<i>Área de Preservação Permanente</i>)
ASV	Authorization to Suppress Vegetation (<i>Autorização de Supressão de Vegetação</i>)
BANDES/ES	Espírito Santo Development Bank (<i>Banco de Desenvolvimento do Espírito Santo</i>)
BNDES	Brazilian Development Bank (<i>Banco Nacional de Desenvolvimento Econômico e Social</i>)
CPI/PUC-Rio	Climate Policy Initiative/Pontifical Catholic University of Rio de Janeiro (<i>Climate Policy Initiative/Pontifícia Universidade Católica do Rio de Janeiro</i>)
FEMA/MA	State of Maranhão Environmental Fund (<i>Fundo Especial de Meio Ambiente/Maranhão</i>)
FERFA/BA	State of Bahia Fund for Environmental Resources (<i>Fundo Estadual de Recursos para o Meio Ambiente/Bahia</i>)
FMA/RJ	State of Rio de Janeiro Fund for the Atlantic Forest (<i>Fundo da Mata Atlântica/Rio de Janeiro</i>)
FUEMA/TO	State of Tocantins Environment Fund (<i>Fundo Estadual do Meio Ambiente/Tocantins</i>)
FUNBIO	Brazilian Biodiversity Fund (<i>Fundo Brasileiro para a Biodiversidade</i>)
FUNDÁGUA /ES	State of Espírito Santo Fund for Water and Forest Resources (<i>Fundo Estadual de Recursos Hídricos e Florestais do Espírito Santo</i>)
ICMBIO	Chico Mendes Institute for Biodiversity Conservation (<i>Instituto Chico Mendes de Conservação da Biodiversidade</i>)
IDG	Institute for Development and Management (<i>Instituto de Desenvolvimento e Gestão</i>)
IEMA/ES	State of Espírito Santo Institute of Environment and Water Resources (<i>Instituto de Meio Ambiente e Recursos Hídricos/Espírito Santo</i>)
INEA/RJ	State of Rio de Janeiro Environment Institute (<i>Instituto Estadual do Ambiente/Rio de Janeiro</i>)
INEMA/BA	State of Bahia Environment and Water Resources (<i>Instituto do Meio Ambiente e Recursos Hídricos/Bahia</i>)
MAPA	Ministry of Agriculture and Livestock (<i>Ministério da Agricultura e Pecuária</i>)

MAPBIOMAS	Brazilian Annual Land Use and Land Cover Mapping Project (<i>Projeto de Mapeamento Anual do Uso e Cobertura da Terra no Brasil</i>)
MATOPIBA	Maranhão, Tocantins, Piauí, and Bahia
MMA	Ministry of the Environment and Climate Change (<i>Ministério do Meio Ambiente e Mudança do Clima</i>)
NATURATINS /TO	State of Tocantins Nature Institute (<i>Instituto Natureza do Tocantins</i>)
PPCERRADO	Plan of Action for the Prevention and Control of Deforestation in the Cerrado (<i>Plano de Ação para Prevenção e Controle do Desmatamento e das Queimadas no Bioma Cerrado</i>)
PES	Payments for Environmental Services
SARE	Computerized System for Ecological Restoration Support (<i>Sistema de Apoio à Restauração Ecológica</i>)
SEAMA/ES	State of Espírito Santo Environment and Water Resources Secretariat (<i>Secretaria do Meio Ambiente e Recursos Hídricos/Espírito Santo</i>)
SEAS/RJ	State of Rio de Janeiro Environment and Sustainability Secretariat (<i>Secretaria de Estado do Ambiente e Sustentabilidade/Rio de Janeiro</i>)
SEMA/BA	State of Bahia Environment Secretariat (<i>Secretaria de Meio Ambiente/Bahia</i>)
SEMA/MA	State of Maranhão Environment and Natural Resources Secretariat (<i>Secretaria de Estado do Meio Ambiente e Recursos Naturais/Maranhão</i>)
SEMAR	State of Rio de Janeiro System of Forest Restoration Monitoring and Evaluation (<i>Sistema Estadual de Monitoramento e Avaliação da Restauração Florestal do Rio de Janeiro</i>)
SEMARH/PI	State of Piauí Environment and Water Resources Secretariat (<i>Secretaria de Meio Ambiente e dos Recursos Hídricos do Estado do Piauí</i>)
SEMIL/SP	State of São Paulo Environment, Infrastructure, and Logistics Secretariat (<i>Secretaria de Meio Ambiente, Infraestrutura e Logística/São Paulo</i>)
TACs	Conduct Adjustment Agreements (<i>Termos de Ajustamento de Conduta</i>)
TCU	Brazilian Court of Accounts (<i>Tribunal de Contas da União</i>)
UFR/MA	State of Maranhão Reference Fiscal Unit (<i>Unidade Fiscal de Referência do Estado do Maranhão</i>)
USP	University of São Paulo (<i>Universidade de São Paulo</i>)

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Introduction

The Cerrado region in Brazil, which includes the states of Maranhão, Tocantins, Piauí, and Bahia, known as **MATOPIBA**, is where the country's largest agricultural frontier expansion occurs, primarily due to soy and corn production. MATOPIBA represents 11% of the Cerrado biome but holds 51.7% of the cultivated soybean area in Brazil (Rudorff et al. 2022). Grain production in the region has increased by 37% over the last 10 years, with expected growth in the coming years (MAPA 2023).

The Brazilian Cerrado is of high environmental relevance. It is a savanna ecosystem with one of the world's greatest biodiversity (ICMBIO 2023) and is considered the "birthplace of Brazil's waters": the region holds three major aquifers and six of Brazil's eight large watersheds (WWF Brasil nd). However, this natural wealth is threatened by both legal and illegal deforestation for alternative land use. More than a quarter of Brazil's deforestation in 2022 took place in MATOPIBA, marking a 37% increase from 2021 (MAPBIOMAS 2022). Deforestation leads to biodiversity loss, exacerbates climate change, and affects water availability (Garrido 2023),¹ all essential factors for agricultural production and the well-being of the Cerrado's population.

The federal government is drafting the new Plan of Action for the Prevention and Control of Deforestation in the Cerrado (*Plano de Ação para Prevenção e Controle do Desmatamento e das Queimadas no Cerrado - PPCERRADO*) with the aim of achieving zero deforestation by 2030. This goal entails eliminating illegal deforestation and compensating for legal deforestation. However, the plan fails to acknowledge that the national legislation already includes a mechanism for compensating authorized deforestation, the forest compensation.²

According to the Forest Code, the removal of native vegetation for agricultural activities depends on prior authorization from the competent authority and the environmental impacts must be recovered through forest compensation (Federal Law no. 12,651/2012, article 26). Forest compensation holds the potential to serve as an effective mechanism for offsetting environmental impacts. However, in most states within MATOPIBA, forest compensation is regulated and implemented based on the supply of forest products for the consumer market (Lopes, Nardi, and Chiavari 2021; Lopes 2023). Nevertheless, an innovative implementation of existing modalities could promote the restoration of priority areas for the region's conservation and water and climate security.

¹ There was a 66% reduction in water coverage in protected areas in the Cerrado in 2022, especially in Tocantins (Garrido 2023).

² The Ministry of the Environment and Climate Change (*Ministério do Meio Ambiente e Mudança do Clima - MMA*) established a working group with the Brazilian Association of State Environmental Entities (*Associação Brasileira de Entidades Estaduais de Meio Ambiente - ABEMA*) and representatives from Cerrado states to address deforestation in the region and the regulations concerning Authorization to Suppress Vegetation (*Autorização de Supressão de Vegetação - ASV*). In this context, Bahia introduced the Cerrado Pact, committing to establish a forest compensation mechanism and to promote the forest chain through forest compensation resources (MAPBIOMAS 2023).

Researchers from Climate Policy Initiative/Pontifical Catholic University of Rio de Janeiro (CPI/PUC-Rio) analyzed the main forms of forest compensation in MATOPIBA states and identified state and federal public policies that could serve as examples for a more efficient and innovative implementation of forest compensation in MATOPIBA. From these case studies, the researchers identified opportunities for innovation through the use of (i) a management platform for forest compensation credits and debits; (ii) payment for environmental services (PES) as a mechanism to direct forest compensation resources; (iii) management of forest compensation resources by a third party; and (iv) combining forest compensation resources with public and/or private funds through blended finance and match funding mechanisms.

This report delves deeper into the analyses previously published by CPI/PUC-Rio regarding forest compensation, now focusing on the states of MATOPIBA. In addition to the review of regulations and institutional information, CPI/PUC-Rio researchers conducted an in-person workshop on the topic in Rio de Janeiro on September 26, 2023. The workshop included presentations from representatives of the governments of São Paulo, Espírito Santo, and Rio de Janeiro, as well as representatives from the Brazilian Development Bank (*Banco Nacional de Desenvolvimento Econômico e Social* - BNDES) and the Brazilian Biodiversity Fund (*Fundo Brasileiro para a Biodiversidade* - FUNBIO). The presentations focused on public policies identified by researchers as examples of innovation in resource management for restoration. Furthermore, the workshop facilitated discussions and exchanges between the presenters and representatives from the governments of Bahia, Maranhão, and Tocantins. Although invited, the state of Piauí did not participate in the workshop. Finally, the researchers also engaged in bilateral discussions via phone and/or email with representatives from Bahia, Maranhão, and Piauí.

Main Results

1. The three regulated forest compensation modalities in MATOPIBA—reforestation by the debtor, forest compensation credits, and cash payments—present varying challenges and opportunities for the states and the forest compensation debtors, with greater or lesser positive impacts on the environment.
2. Information on the use of reforestation by the debtor as a forest compensation modality by forest compensation debtors in the MATOPIBA states is unavailable. Lack of technical knowledge about forest restoration, high financial costs, and land issues may present significant barriers to the adoption of this modality.
3. All MATOPIBA states allow the fulfillment of forest compensation through the acquisition of forest compensation credits, but none of them have a computerized system for managing the mechanism. The adoption of a computerized platform that brings together forest compensation debtors, landowners with available areas, and restoration project proponents in one place would facilitate compliance with the obligation and state monitoring.
4. Only Bahia and Maranhão allow the mandatory forest compensation to be fulfilled through cash payments, the preferred option among the obligation debtors. In both states, the funds are allocated to state environmental funds, but while in Bahia, the funds are earmarked for forest compensation activities, in Maranhão, the funds can be used for all purposes specified in the fund. In both states, the funds are not being utilized, indicating difficulties on the part of the responsible authorities in effectively managing and implementing the forest compensation resources.
5. Transferring the management of forest compensation funds to a specialized third-party financial management entity is a promising alternative for more efficient forest compensation implementation. This transfer relieves the state from directly overseeing the management of capital and forest compensation activities, allowing greater flexibility in project contracting and resource allocation. This mechanism depends on good governance among all parties involved and state monitoring to ensure the intended outcomes.
6. One way for states to increase financial resources allocated to restoration is through mixed financing mechanisms such as blended finance or match funding. These mechanisms could combine resources from forest compensation payments with other sources, both public and private. The resources can be directed to priority areas for conservation and water security, enabling the scaling of restoration projects and promoting better landscape design and connectivity.
7. States can align different public policies to promote landscape restoration, as is the case with mandatory forest compensation and PES. A well-regulated governance arrangement and the adoption of robust management systems can direct forest compensation resources towards restoration through PES.

Forest Compensation Modalities in MATOPIBA

According to the Brazilian Forest Code (Federal Law no. 12,651/2012), the request for authorization to suppress vegetation (*Autorização de Supressão de Vegetação* - ASV) needs to include a plan for forest compensation. The forest law stipulates that the party responsible for compensation must undertake the planting of vegetation, preferably native species in the same biome where the suppression occurred. The law prohibits the removal of native vegetation on properties with abandoned areas and demands mitigating and compensatory measures if threatened or migratory species are present in the suppression area.

State regulations propose other means of fulfilling forest compensation, such as cash payments or acquiring credits based on verified planting by a third party.

In 2023, Maranhão issued a regulation outlining forest compensation in the state. Alongside the three compensation modalities (reforestation, forest compensation credits, and fee payments), the state mandates compensatory planting for protected species subject to suppression. The compensatory planting project needs assessment before ASV issuance. For this obligation to be effective, the state needs a robust forest inventory capable of identifying protected species.

Reforestation by the Debtor

The reforestation modality involves the planting of seeds and seedlings by the debtor (who requested the ASV), to recover degraded, altered, or underutilized areas. The reforestation can be done with native or exotic species in areas designated by the responsible agency.

Regulation

Regulation for reforestation by the debtor depends on whether the area slated for recovery is under a legal conservation obligation or falls under alternative land use. Federal and/or state laws must authorize forest compensation in Permanent Preservation Areas (*Áreas de Preservação Permanente* - APPs), Legal Forest Reserves, or Protected Areas (*Unidades de Conservação*). Federal Decree no. 5,975/2006 permits forest compensation in APPs and Legal Forest Reserves through native species planting. Most states follow a similar rule. Both federal and most state laws allow forest compensation in areas of alternative land use, using both native and exotic species (Lopes, Nardi, and Chiavari 2021).

Reforestation by the Debtor in MATOPIBA

The modality of reforestation carried out directly by the debtor is included in the legislation of Maranhão, Tocantins, and Piauí. Bahia's legislation does not include this option, despite it being the main modality foreseen in federal law.

In **Maranhão**, in this modality, the debtor must carry out the planting on their own or third-party lands, subject to prior approval/licensing by the state environmental agency.

Tocantins' regulation is more detailed and aims to generate a commercial stock of forest raw materials. The legislation encourages the reforestation of specific species, such as rubber trees for latex production. Additionally, it allows forest compensation to be directed towards projects reclaiming degraded Legal Forest Reserve and APP areas. Planting must be verified through a planting diagnosis by the State of Tocantins Nature Institute (*Instituto Natureza do Tocantins - NATURANTINS/TO*).

Piauí recently issued a decree stipulating that 50% of forest compensation must involve the reforestation with native species, subject to prior approval by the competent authority. However, due to producers' resistance in adopting this modality, this decree may be revoked.

Due to the lack of data and information on reforestation carried out directly by the debtor for forest compensation in MATOPIBA, assessing how this modality is being implemented in the states is not feasible.

Challenges and Opportunities

Reforestation by the debtor of forest compensation may present benefits and challenges. The most significant benefit of reforestation is promoting the recovery of degraded areas and compensating for the removal of native vegetation through the planting of seeds and seedlings. In this modality, the debtor is only released from the obligation upon demonstrating the reforestation's results. However, in cases where the state does not demand or encourage restoration in priority areas, reforestation can result in fragmented compensation in less relevant areas.

Yet, there are numerous challenges for debtors: high restoration costs, lack of technical knowledge, and difficulties in finding available areas. Moreover, all states require prior approval of reforestation projects.

It is the responsibility of the state agency to license/approve reforestation. Therefore, the state needs legislation or guidelines for the preparation of project terms of reference. Additionally, the state needs to monitor and oversee these projects.

Forest Compensation Credits

One way to fulfill forest compensation is the debtor's acquisition of forest compensation credits, generated from reforestation carried out by third parties. The generation of credits depends on authorization by the competent body, which conducts technical project analysis, inspection of plantings, and the submission of the forest compensation linkage document. These requirements may vary by state. The debtor can purchase the credits and meet their obligation per the metrics established by law. Finally, it is the responsibility of

the competent environmental agency to carry out credit issuance and transfer operations, determine forest compensation debts, and balance credits and debits. All MATOPIBA states regulate this modality.

Regulation

Normative Instruction MMA no. 6/2006 establishes definitions, metrics related to suppression and forest planting, and the entire process for generating, linking, issuing, and utilizing forest compensation credits. States may adopt different metrics, but the federal standard is widely used as a reference. This instruction regulates compensation based on the consumption of forest raw material, establishing metrics based on the volume of biomass suppressed/consumed.

The general rule is that the raw material consumer must replace the same volume consumed. However, the debit and credit metrics differ when compensation is the responsibility of the ASV holder, who conducts the suppression for alternative land use. In practice, for every hectare of Cerrado that is deforested (debit), the ASV holder needs to compensate only one-fifth of the suppressed area with native species and one-fourth with exotic species (credit).

Forest Compensation Credits in MATOPIBA

All MATOPIBA states allow the fulfillment of forest compensation through credit acquisition. Regulations enable credit generation through planting both native and exotic species like eucalyptus and pine. In practice, credit generation is mostly carried out with historically incentivized exotic species (Sabbag 2011).

In **Tocantins**, the credit mechanism is the primary method for fulfilling the forest compensation obligation. The transaction occurs between private parties, and the competent authority only conducts inspections to certify credit issuance and the operation of credit and debit compensation. There is no computerized system for recording operations in the state, as envisaged by federal law. The state believes it is an effective modality, with the state being solely responsible for ensuring obligation compliance.

In **Piauí**, legislation stipulates that forest compensation can be fulfilled by acquiring forest credits through the Green Treasury Platform (Law no. 7,193/2019). However, the platform has never been created, and the credit and debit compensation is manually carried out by state environmental technicians. Eucalyptus reforestation is the primary credit generation modality in the state.

Maranhão recently revised its state regulations on acquiring forest compensation credits, which can be obtained through Forest Compensation Credit Authorization (*Autorizações de Crédito de Reposição Florestal - ACRFs*), approved by the state.

Challenges and Opportunities

This forest compensation modality offers significant flexibility to the state, which can adopt more stringent or more flexible parameters, metrics, and procedures, deciding whether the responsible authority will have a more active or distant role in the credit and debit generation, certification, compensation, and monitoring process.

From the debtor's perspective, if there is an established credit generation market, this modality simplifies obligation fulfillment as it only requires credit acquisition and presentation to the responsible authority.

Regarding environmental protection, as currently regulated and implemented, this modality has very limited gains; the compensated area is much smaller than the deforested area, and credit generation occurs primarily through the reforestation of exotic species. However, if the regulations specify that credit generation must be from environmentally beneficial restoration methods (ecological restoration, landscape restoration, productive restoration, among others), this modality can compensate for environmental damage resulting from native vegetation loss.

Cash Payments

Cash payments as a method of meeting forest compensation is not provided for in federal legislation. However, some states include cash payments to a state fund or a specific account as one of the forest compensation modalities. The legislation establishes an equivalence between the suppressed area or the volume of suppressed raw material and a corresponding value. The resources can be earmarked, linked to forest compensation activities, or unlinked, and may be used for various purposes other than compensation.

Cash Payments in MATOPIBA

In MATOPIBA, only Bahia and Maranhão allow forest compensation to be met through cash payments.

In **Bahia**, cash payments for forest compensation are directed to the State of Bahia Fund for Environmental Resources (*Fundo Estadual de Recursos para o Meio Ambiente da Bahia - FERFA/BA*) and are the most utilized modality by debtors. Regarding the fees charged, the law provides for payment of R\$ 18 per cubic meter of suppressed vegetation.³ This metric follows the logic of raw material consumption/supply without considering the type of vegetation and other environmental variables. As the Cerrado consists of six different vegetation types, from grassland to forests, the charges for suppressed vegetation volume can vary significantly across the state's Cerrado area.

Bahia's legislation states that forest compensation resources are linked and should preferably be allocated to reforestation projects for timber production in underutilized or abandoned areas located outside APPs, or to the planting of native species in public forest domains. The mandatory earmarking of forest compensation resources was only regulated in 2016; previously, payments were not earmarked and could be directed to various purposes.

³ In Bahia, the pecuniary value equivalent to the costs of forest compensation, to be deposited in the FERFA, is determined by the cost of implementing and effectively maintaining forest species and considers the value of removed volumes as R\$ 18 per cubic meter, R\$ 36 per meter of charcoal, or R\$ 12 per stère (Decree no. 15,180/2014, Art. 45-A).

The State of Bahia Environment Secretariat (*Secretaria de Meio Ambiente da Bahia - SEMA/BA*) manages the FERFA/BA and is responsible for launching calls for the application of forest compensation resources. However, SEMA/BA has not issued any calls for the application of compensation resources since enacting the regulation that stipulated the linking of payments to reforestation projects. Currently, SEMA/BA is evaluating the possibility of issuing a public call for the restoration of a state public forest.

In **Maranhão**, the fees paid for compensation are collected in the State of Maranhão Environmental Fund (*Fundo Especial de Meio Ambiente do Maranhão - FEMA/MA*). The calculation of the forest compensation fee is quite complex. SEMA/MA Regulation no. 380/2023, which regulates forest compensation in the state, refers to the parameters of State Law no. 8,598/2007, of 0.6 State of Maranhão Reference Fiscal Unit (*Unidade Fiscal de Referência do Estado do Maranhão - UFR/MA*) per stere cubic meter, which is equivalent to the volume of a 1m³ wood pile, including spaces between the logs. However, if the debts are overdue by October 31, 2018, the calculation must be based on the parameters of State Law no. 11,009/2019.

FEMA/MA is linked to the State of Maranhão Environment and Natural Resources Secretariat (*Secretaria de Estado do Meio Ambiente e Recursos Naturais/Maranhão - SEMA/MA*) and managed by the Environmental State Council. State law states that the government will encourage actions aimed at protecting, maintaining, and recovering the environment, among other activities, through financial, technical, scientific, and operational support. Therefore, these resources could be used to promote the restoration of priority areas for conservation and better landscape design and connectivity. However, these resources are not marked as compensation funds, and it was not possible to verify if they have been used through publicly available information.

Tocantins and Piauí do not have a provision for cash payments for meeting mandatory forest compensation. In Tocantins, the law that established the State of Tocantins Environment Fund (*Fundo Estadual do Meio Ambiente do Tocantins - FUEMA/TO*) provides that administrative authorizations may provide resources to the fund, theoretically allowing the collection of resources from ASVs. However, since the fund has not yet been regulated, forest compensation by cash payments is not accepted in the state. In Piauí, according to the State of Piauí Environment and Water Resources Secretariat (*SEMARH/PI*), there is a proposal to allow forest compensation through cash payments, with values intended for *Pró Verde* Program.⁴

Due to the lack of access and transparency of public data, it is not possible to identify the total collected and the destination of resources in both Bahia and Maranhão. The lack of access to information on the implementation of forest compensation through cash payments does not allow for a comprehensive evaluation of the instrument as a mechanism for the compensation for authorized deforestation.

⁴ Program created with the objective of promoting and supporting the environmental development of the state, including instruments, projects, and actions by both the public and private sectors, aiming to fulfill the commitments made by Brazil under the Paris Agreement and achieve sustainable, social and economic development goals in the state of Piauí.

Challenges and Opportunities

From the debtor's perspective, this modality simplifies the fulfillment of obligations since mere proof of payment is required for exoneration, unlike the reforestation modality, in which exoneration only occurs when the debtor proves that the planting was done as required by the responsible authority.

From the state's perspective, cash payments can bring both advantages and disadvantages. On the one hand, the state can decide how and where to apply the resources, but, on the other hand, it becomes responsible for managing and allocating the resources. These pros and cons depend on state regulations since, in some states, resources are linked to forest compensation activities, while in others, they are allocated to specific funds or accounts without any specific allocation toward forest compensation or restoration.

From an environmental protection perspective, this modality also presents both advantages and challenges. Cash payment can scale the restoration of priority areas, unlike the reforestation carried out by the debtor, which ends up being fragmented by each debtor. However, when the regulation allows payments not to be linked, resources can be directed to other purposes rather than forest restoration projects.

Innovative Mechanisms for Forest Compensation Management

Some states have successful public policies in managing obligations and incentives for forest restoration. These policies and an innovative national initiative were selected as case studies by researchers from CPI/PUC-Rio. Through the analysis of these cases, it was possible to identify mechanisms that can serve as examples for a more efficient and innovative implementation of forest compensation in MATOPIBA. Although the case studies refer to southeastern states (Rio de Janeiro, São Paulo, and Espírito Santo) that have Atlantic Forest and a significantly different land use history, the mechanisms can be adapted to the reality of any Brazilian state.

Computerized Platform for Managing Forest Compensation Credits and Debts

The use of technological instruments, such as creating a computerized platform for managing forest compensation credits and debts, can simplify and boost obligation fulfillment. However, the generation of compensation credits depends on the area for implementing forest restoration projects. Rural property owners may not necessarily be the ones to carry out these projects but may be interested in offering areas where restoration is mandatory, such as in Permanent Preservation Areas (*Áreas de Preservação Permanente* - APPs) and Legal Reserves or areas for alternative land use.

A platform that consolidates forest compensation debtors, landowners with available areas, and restoration project proponents would streamline obligation fulfillment. Monitoring the execution of restoration projects can be facilitated through the system itself. The role of the public authority is to establish the criteria for forest restoration that will be adopted by project proponents and metrics for the correspondence between debits and credits (Figure 1). The system can also include other environmental obligations arising from environmental licensing, making obligation management easier for the state while simultaneously promoting scale in forest restoration. This is precisely what the state of São Paulo did with the implementation of a project repository under the *Nascentes* Program (Box 1).

Figure 1. Platform for the Management of Forest Compensation Credits and Debts



Source: CPI/PUC-Rio, 2023

A platform for managing forest compensation credits and debts does not financially burden the state or require the state to implement restoration projects. The state has the freedom to set rules and criteria for restoration projects, adopt maps of priority areas, define equivalences between debts and credits, and thereby drive restoration for a better landscape design.

The advantage of this mechanism for the MATOPIBA states is that all of them already foresee the possibility of fulfilling forest compensation through credit acquisition, in their respective legislation or regulations. However, implementation would depend on investments in technological resources for system development, implementation, and maintenance, as well as the adoption of criteria for project approval. Additionally, the state would need to adopt communication and engagement strategies so that restoration experts, debtors, and landowners with available land are aware of and have access to the platform.

Box 1. *Nascentes* Program, São Paulo

The pioneering *Nascentes* Program in the state of São Paulo was established in 2014 in the context of a severe water crisis, to restore riparian forests and ensure the state's water supply, and the term *nascentes* means natural springs. Currently, the program is part of a larger state project, the *Refloresta-SP* Program, aiming to restore degraded areas for climate change mitigation and adaptation, biodiversity conservation, water resources, and stimulating the bioeconomy.⁵

The *Nascentes* Program works by bringing together those who need restoration, including those obligated to perform forest compensation, those who have areas to be restored, and those who know how to restore, i.e., those with technical knowledge and practice in executing restoration projects. Restoration experts identify available areas, contact landowners, and submit projects for approval by the program's executive committee. This connection is facilitated through the project repository (*Prateleira de Projetos*).

Within the project repository, a forest restoration project is submitted, analyzed, and approved according to the criteria of the State of São Paulo Environment, Infrastructure, and Logistics Secretariat (*Secretaria de Meio Ambiente, Infraestrutura e Logística de São Paulo - SEMIL/SP*). Projects must include area diagnostics (such as biome, potential for natural regeneration, and location) and methodology. Restoration must be conducted through natural regeneration or planting native vegetation. Subsequently, the secretariat registers the projects in the Computerized System for Ecological Restoration Support (*Sistema de Apoio à Restauração Ecológica - SARE*), through which monitoring is carried out. The program focuses on results; when projects achieve the predicted ecological indicators, they are successful.

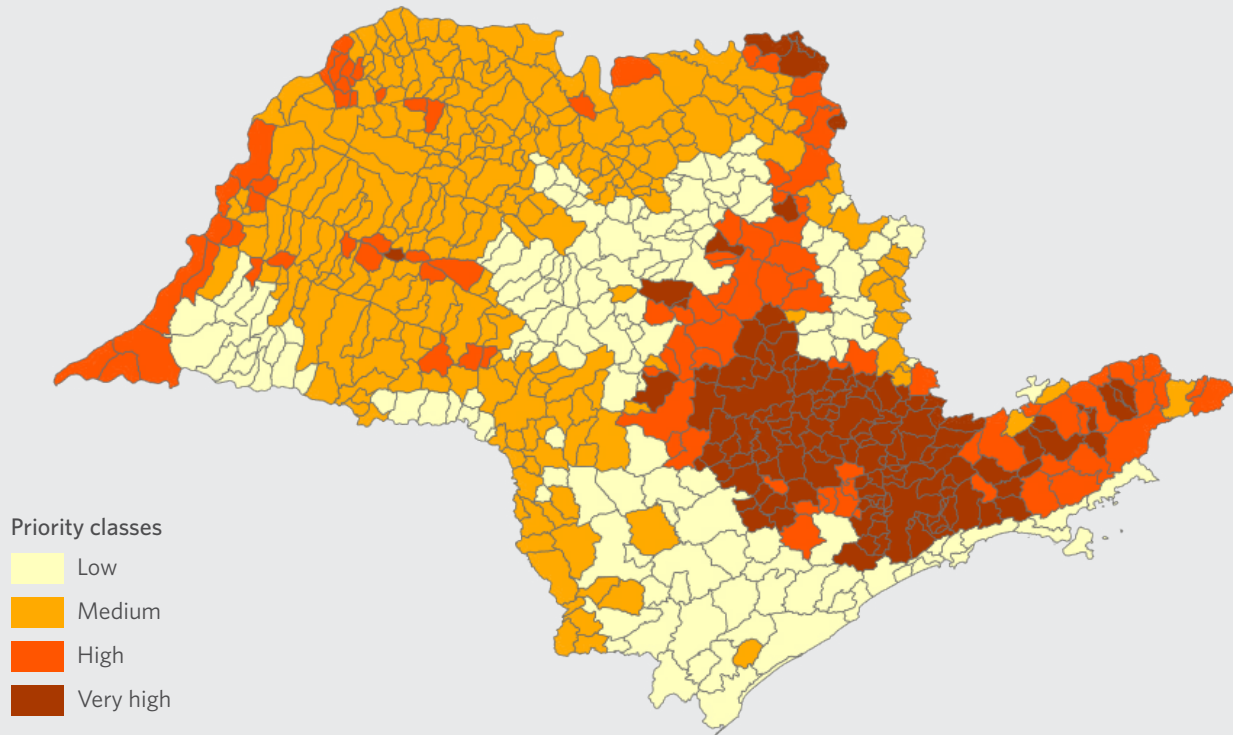
Interested parties (debtors obligated to restore) join an approved project available on the project repository and contract it wholly or partially. This system simplifies obligation fulfillment, aiding debtors in meeting their commitment. The Secretariat publicizes the project repository through regional forums in which it participates, such as watershed committees and management councils of conservation units.

The program adopted a Map of Priority Areas for Restoration necessary to ensure water security and the connectivity of protected areas in the state. The state is divided into areas with different priority classes: low, medium, high, and very high. Initially, the program only allowed compensation in areas of the same or higher priority, with progressive discounts concerning the original obligation. Recently, the state regulated the possibility of compensation in lower priority areas, applying a surcharge in the area to be compensated ("reverse step"). The adoption of the forest restoration methodology and the preparation of the map of priority areas involved partnerships, such as with the University of São Paulo (*Universidade de São Paulo - USP*).

The *Nascentes* Program is considered a success. By April 2023, approximately 30,000 hectares had already been restored or were in the restoration process through the program (Governo do Estado de São Paulo nda).

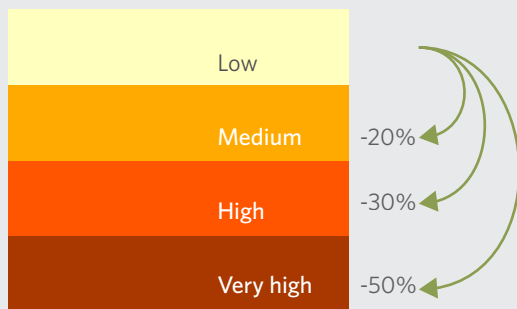
⁵ The new *Refloresta-SP* Program has a broader scope than *Nascentes* and encompasses voluntary restoration initiatives, including the recovery of riparian forests and other types of forest fragments through ecological restoration, the establishment of multifunctional forests, agroforestry systems, and silvopastoral systems.

Figure 2. Map of Priority Areas for Restoration in the State of São Paulo

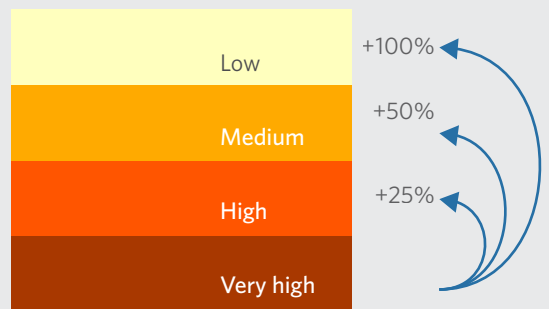


ENVIRONMENTAL COMPENSATION CRITERIA

Discount for compensating in a higher priority class



Increase for compensating in a lower priority class



Source: CPI/PUC-Rio with data from DATAGEO - State of São Paulo Environment System, 2023

Payment for Environmental Services (PES) for Directing Forest Compensation Resources

In cases where the state may receive payment for forest compensation in cash, a possible avenue for directing received funds toward restoration is through PES. PES is a means of transferring resources to those who provide environmental services, including vegetation conservation and restoration. Therefore, PES could serve as a mechanism for effectuating the restoration arising from the obligation of forest compensation.

A PES program, in this case, could direct resources both to landowners who offer areas for restoration and to technical assistants and other actors in the chain. For payment to be made, it is essential to have a management system to evaluate and monitor the restoration, as well as technical criteria for prior approval of the restoration project and possible criteria for prioritizing areas, as seen in the case of the *Refloresta* Program in Espírito Santo (Box 2).

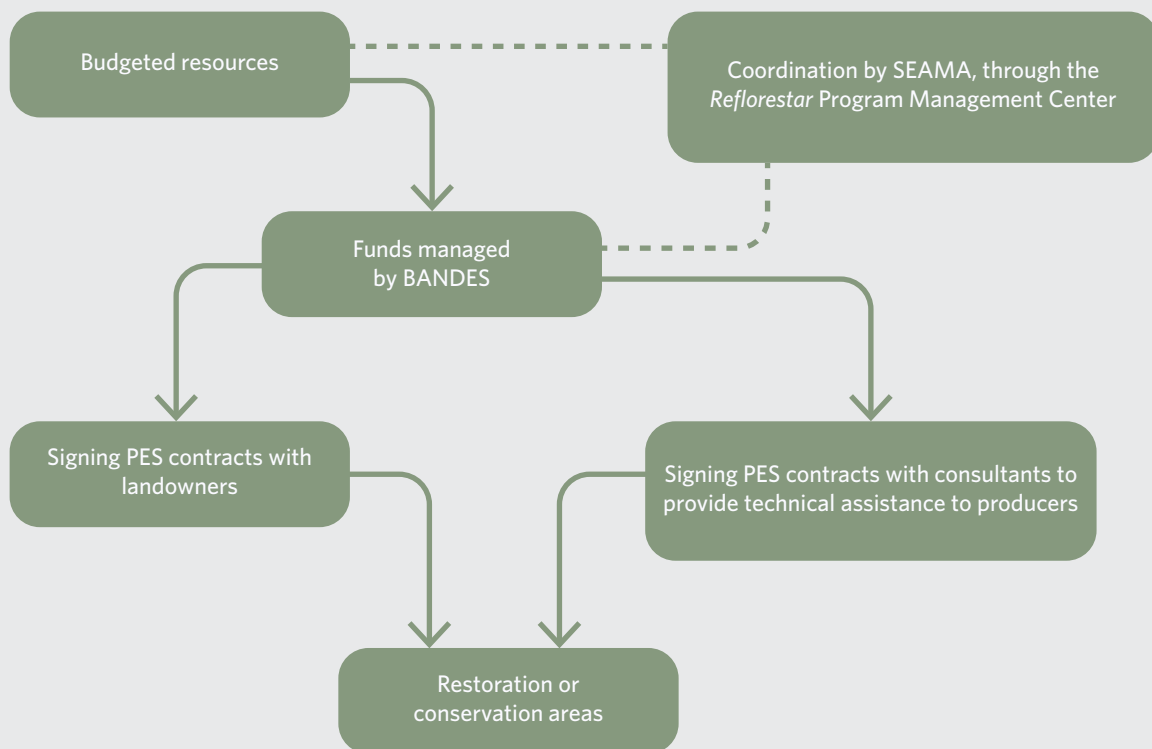
Though Espírito Santo's *Refloresta* Program does not use resources from forest compensation obligations, the mechanism can be replicated in states where compensation is made through payments to state funds. This is the case in Bahia and Maranhão, as previously mentioned. Both states have PES laws with provisions for payments for restoration activities.

Box 2. Reforesta Program, Espírito Santo

The Espírito Santo *Reforesta* Program was established in 2012 to promote the restoration of the hydrological cycle and achieve the state's climate goals through forest cover conservation and recovery. The program utilizes funds from the State of Espírito Santo Fund for Water and Forest Resources (*Fundo Estadual de Recursos Hídricos e Florestais do Espírito Santo - FUNDÁGUA/ES*) and disburses payments through PES. Therefore, the state amended its PES law, including forest restoration among the eligible activities to receive funds.

The PES is executed through contracts with rural producers, following the program's criteria and procedures, such as presenting a technical project. The program also provides resources to consultants accredited by the State of Espírito Santo Environment and Water Resources Secretariat (*Secretaria do Meio Ambiente e Recursos Hídricos/Espírito Santo - SEAMA/ES*) to provide technical assistance to producers. The Espírito Santo Development Bank (*Banco de Desenvolvimento do Espírito Santo - BANDES/ES*) serves as the financial and operational agent for the program, facilitating payments to rural producers and accredited consultants, supervised by SEAMA/ES.

Figure 3. Flowchart of the *Reforestar* Project, Espírito Santo



Source: CPI/PUC-Rio, 2023

The funds disbursed are higher for restoration involving the planting of native species, but the program also allows payments for natural regeneration, conservation, implementation of agroforestry systems and silvopastoral systems, sustainable forest management, and planting exotic species. The program also offers a bonus for restoration in priority areas for recharging watersheds. Most producers choose restoration through agroforestry systems to generate income. The resources are transferred in the form of donations, but in cases of implementation deviations, the contractor is obliged to reimburse the public coffers with duly corrected amounts, including penalties for non-compliance (Espírito Santo State Government nd).

According to State of Espírito Santo Institute of Environment and Water Resources (*Instituto de Meio Ambiente e Recursos Hídricos/Espírito Santo - IEMA/ES*), the monitoring and management platform developed in partnership with a civil society entity differentiates this project. The platform allows real-time monitoring of activities covered by the program. The project also entails extensive communication, although engagement with rural producers remains a challenge. As of January 2023, the state had 4,329 PES contracts covering an intervention area of 22,000 hectares, of which 10,600 were allocated for recovery (SEP 2023).

Outsourcing the Management of Forest Compensation Resources

Outsourcing the management of public funds, such as those derived from forest compensation payments to a specialized entity in financial and project management is a promising alternative for more efficient forest compensation management. This transfer of management relieves the state, allowing greater flexibility in project contracting forms and resource transfers, and eases communication regarding the call for bids. Outsourcing can also ensure that resources are directed to the purposes established by law, avoiding any misuse, provided there is transparency and well-established rules. Even with this management transfer, the state maintains control over defining areas of strategic interest for fund allocation and ensures results through well-defined governance with managers.

Management can be outsourced to an operational manager and a financial manager, or a single manager to perform both functions. The operational manager is responsible for the fund's activities, while the financial manager makes investment decisions; both should be based on the guidance and purpose of public policy and be accountable within the governance established by the state.

Initially, this model could be used by any state receiving payments in cash for forest compensation. However, the state must consider that the compensation resource should be regarded as private funding with a public purpose. This understanding was adopted at the federal level by the Federal Court of Audit (TCU 2010) and regulated in Federal Law no. 13,668/2018. The state of Rio de Janeiro also adopted a similar approach (Box 3). However, some state attorneys, such as in Bahia, believe that resources from forest compensation have the legal nature of public funding, posing a legal barrier to third-party management.

Box 3. Atlantic Forest Fund, Rio de Janeiro

The State of Rio de Janeiro Fund for the Atlantic Forest (*Fundo da Mata Atlântica do Rio de Janeiro - FMA/RJ*) was established in 2013 to receive resources collected by the State of Rio de Janeiro Environment Institute (*Instituto Estadual do Ambiente/Rio de Janeiro - INEA/RJ*) as forest compensation, environmental compensation derived from licensing, Conduct Adjustment Agreements (*Termos de Ajustamento de Conduta - TACs*), which are legal agreements regarding environmental infringements, and other sources.

In 2015, the state issued State Law of Rio de Janeiro no. 7061/2015, enabling the possibility of resource administration by a financial institution selected through a public bidding based on criteria from the State of Rio de Janeiro Environment and Sustainability Secretariat (*Secretaria de Estado do Ambiente e Sustentabilidade do Rio de Janeiro - SEAS/RJ*). The State Attorney of Rio de Janeiro issued an opinion asserting that environmental compensation resources are private funds with a public purpose (Mascarenhas 2009). This opinion established the legal understanding that allowed the state to transfer the management of the FMA/RJ. In 2017, this understanding was solidified with the approval of State Constitutional Amendment no. 70, including in the state's constitution that environmental compensation resources arising from environmental licensing are considered private funds. Forest compensation resources receive the same legal treatment by equivalence.

To provide greater flexibility in the use of resources, the state, through a public bidding process, selected the Brazilian Biodiversity Fund (*Fundo Brasileiro para a Biodiversidade - FUNBIO*) to be the operational manager of the FMA/RJ. In 2017, the state held another bidding process and chose the Institute for Development and Management (*Instituto de Desenvolvimento e Gestão - IDG*) as the second operational manager of the fund. The *Caixa Econômica Federal* is the financial manager of the FMA/RJ.

Initially, the resources of the FMA/RJ were directed only to Protected Areas (*Unidades de Conservação*). With the establishment of the *Florestas do Amanhã* Program in 2019, the state started using the FMA/RJ resources for Atlantic Forest restoration activities through a call for projects via public tenders. The first call, already closed, allocated R\$ 25 million for implementing projects within the scope of the State Plan for Ecological Restoration of the Atlantic Forest, in strategically identified areas outlined in the regulations (FUNBIO 2023). The execution of the projects is monitored by the operational manager and the INEA/RJ through the State of Rio de Janeiro System of Forest Restoration Monitoring and Evaluation (*Sistema Estadual de Monitoramento e Avaliação da Restauração Florestal do Rio de Janeiro - SEMAR*).

Blended Finance and Match Funding

Blended finance is funding that combines various sources, including public and private resources. This financing can be done through match funding, a model in which an initial amount is matched by an equal or greater value from one or more public or private donors; for example, for every unit of currency donated by an individual to a project, a second donor matches or triples the value.

In a blended financing scenario, public resources can originate from different legal obligations such as mandatory forest compensation and environmental licensing, while private resources can come from the private sector and philanthropic organizations.

One way for states to increase resources dedicated to restoration is by combining forest compensation payments with other sources, whether public or private. This would enable the scaling of restoration projects. The *Floresta Viva* Program by the Brazilian Development Bank (*Banco Nacional de Desenvolvimento - BNDES*) utilizes a match funding mechanism to promote forest restoration (Box 4).

The management of blended finance can be carried out by the state or through an outsourced entity. The governance of the financing should define the role of the involved parties, with the state directly or indirectly aiding in directing resources for public purposes. This includes mapping priority areas to guide tenders and project selection, as well as technical criteria established by state, federal, and municipal regulations and policies.

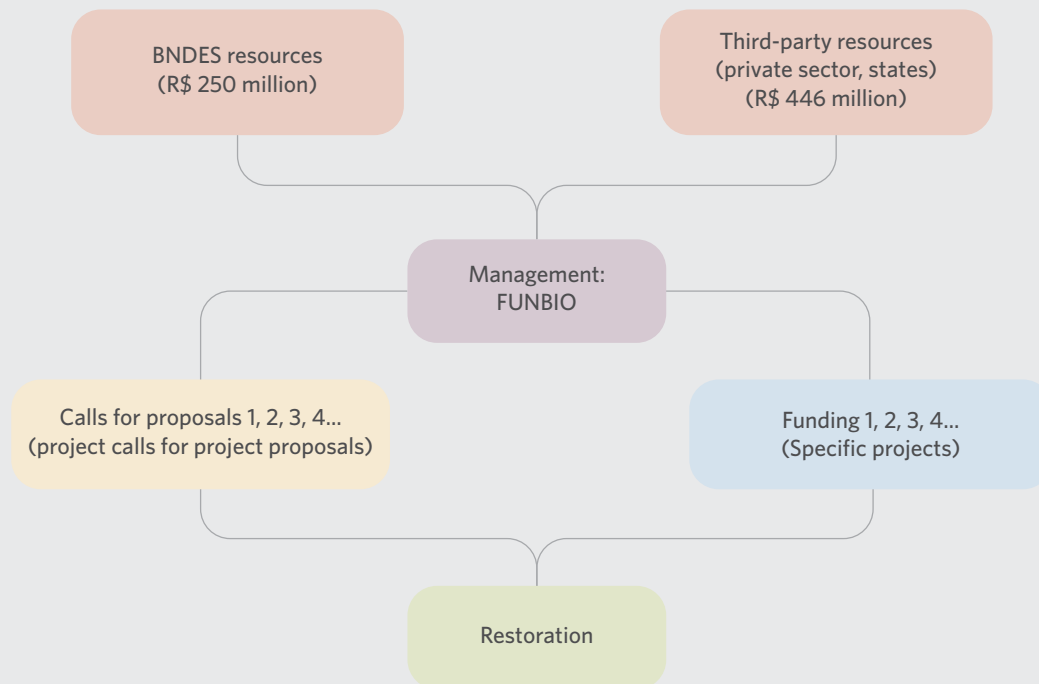
Box 4. BNDES *Floresta Viva* Program

The *Floresta Viva* Program is a match funding initiative that combines BNDES resources with public and private partners aimed at restoration and the restoration chain. The program aims to restore between 20,000 and 30,000 hectares, removing seven to 10 million tons of carbon dioxide from the atmosphere over a 25-year vegetation growth cycle.

BNDES and partner resources are managed by FUNBIO, a non-profit entity experienced in financial project management, selected through a public call. FUNBIO is responsible for publicizing public calls for restoration project proposals, selecting projects, disbursing resources, as well as monitoring activities and results (BNDES nd).

The Program started with an initial contribution of R\$ 250 million from BNDES and, by September 2023, gathered R\$ 446 million from 16 supporters, including funds from companies and state governments (see Figure 4 below). BNDES resources are combined with those of partners, contributing equal or higher value in tenders (public calls for projects) or in specific projects through structured funding. A management group comprising BNDES, FUNBIO, and partners is formed for each public call, collectively identifying the project area, scope, and priorities. Thus, the program partners have an active role and align their interests with public policies. The tenders cover broader objectives, such as the restoration of mangroves or protected areas in a specific state. Structured funding initiatives are directed to specific projects of interest to the partner(s).

Figure 4. Flowchart of the BNDES *Floresta Viva* Program



Source: CPI/PUC-Rio, 2023

As of August 2023, the program had partnerships with various private sector entities and the state of Rio de Janeiro. By that date, two public calls were made, one focusing on nine mangroves, sandbanks, and their respective draining basins in different regions of the country, and the second emphasizing the recovery of at least 400 hectares within or around 10 protected areas located in the state of Amazonas. So far, only the state of Rio de Janeiro is a partner through the *Florestas do Amanhã* Program, but other states are negotiating to join the program.

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Bahia

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Espírito Santo

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