



# Forest Restoration in Brazil: Essential Factors for Promoting Restoration at Scale

March 2024



CLIMATE  
POLICY  
INITIATIVE



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## Acknowledgments

This work is supported by a grant from the Climate and Land Use Alliance (CLUA)

The authors would like to thank Anna Maria Cárcamo and Daniella Alves Brum for their research assistance, Gabriel Cozendey and the participants of the Workshop focused on restoration organized by Amazônia 2030 in February 2024 for their comments and suggestions. We would also like to thank Natalie Hoover El Rashidy, Giovanna de Miranda, and Camila Calado for editing and revising the text and Nina Oswald Vieira for formatting and graphic design.

## About Climate Policy Initiative

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 the Pontifical University of Rio de Janeiro (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.

### **Keywords**

Forest restoration, large-scale restoration, environmental legislation

### **Suggested**

Lopes, Cristina L. and Joana Chiavari. *Forest Restoration in Brazil: Essential Factors for Promoting Restoration at Scale*. Rio de Janeiro: Climate Policy Initiative, 2024.

[bit.ly/ForestRestorationInBrazil](https://bit.ly/ForestRestorationInBrazil).

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# List of Acronyms

**AFS** Agroforestry Systems

**ANR** Assisted Natural Regeneration

**APP** Permanent Preservation Area  
(*Área de Preservação Permanente*)

**CCFI** Crop-Cattle-Forest Integration

**CPI/PUC-Rio** Climate Policy Initiative/Pontifical Catholic University of Rio de Janeiro (*Climate Policy Initiative/Pontifícia Universidade Católica do Rio de Janeiro*)

**CPR** Rural Product Note (*Cédula de Produto Rural*)

**DOF** Forest Origin Document  
(*Documento de Origem Florestal*)

**FLR** Forest and Landscape Restoration

**FNMC** National Fund for Climate Change  
(*Fundo Nacional sobre Mudança do Clima*)

**MMA** Ministry of the Environment and Climate Change  
(*Ministério do Meio Ambiente e Mudança do Clima*)

**PAAD** Projects of Environmentally Differentiated Settlements  
(*Projetos de Assentamentos Ambientalmente Diferenciados*)

**PAE** Agro-extractive Settlement Project  
(*Projeto de Assentamento Agroextrativista*)

**PAF** Forest Settlement Project  
(*Projeto de Assentamento Florestal*)

**PCT** Traditional Peoples and Communities  
(*Povos e Comunidades Tradicionais*)

**PDS** Sustainable Development Project  
(*Projeto de Desenvolvimento Sustentável*)

**PES** Payments for Environmental Services

**PLANAVEG** National Plan for Native Vegetation Recovery  
(*Plano Nacional de Recuperação da Vegetação Nativa*)

**PNB** National Biodiversity Policy  
(*Política Nacional de Biodiversidade*)

**PNGATI** Brazilian Policy for Territorial and Environmental Management of Indigenous Lands  
(*Política Nacional de Gestão Territorial e Ambiental de Terras Indígenas*)

**PNMA** National Environmental Policy  
(*Política Nacional do Meio Ambiente*)

**PNMC** National Policy on Climate Change  
(*Política Nacional sobre Mudança do Clima*)

**PNPSA** National Policy of Payments for Environmental Services  
(*Política Nacional de Pagamento por Serviços Ambientais*)

**PRA** Environmental Compliance Program  
(*Programa de Regularização Ambiental*)

**PROVEG** National Policy for Native Vegetation Recovery  
(*Política Nacional de Recuperação da Vegetação Nativa*)

**R&D** Research and Development

**RNE** Spontaneous Natural Regeneration  
(*Regeneração Natural Espontânea*)

**SINAFLOR** National System to Control the Origin of Forest Products  
(*Sistema Nacional de Controle da Origem dos Produtos Florestais*)

**SNUC** National System of Protected Areas  
(*Sistema Nacional de Unidades de Conservação*)

**TCFA** Environmental Control and Inspection Fee  
(*Taxa de Controle e Fiscalização Ambiental*)

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# Introduction

Brazil has an essential role in the climate agenda, capable of reducing its CO<sub>2</sub> emissions by avoiding the removal of vegetation and, at the same time, sequestering carbon from the atmosphere through the restoration of thousands of degraded and deforested lands. Therefore, Brazil can significantly contribute to mitigating the impact of climate change on a global scale.

The restoration of forests and other types of native vegetation has increasingly become a strategic goal for the country, not only in the climate context but also in addressing other major challenges of this century, such as biodiversity loss and food security (Moraes 2016). Additionally, restoration presents itself as a significant socioeconomic activity with great potential to generate income, employment, and social benefits for rural populations (Strassburg et al. 2022; Aliança pela Restauração na Amazônia 2020). However, to achieve desired results in all spheres—climate, ecological, and socioeconomic—restoration needs to be implemented at landscape-scale, covering a wide range of geographical areas, which can include a watershed, an entire biome, or even the entire country's territory (Gann et al. 2019).

The structuring of a chain for large-scale restoration, however, faces various challenges, such as a robust regulatory and well-defined property rights framework to ensure legal certainty, adequate financing tailored to the activity's peculiarities, as well as research and development (R&D), technology, inputs, technical and logistical assistance, adapted to different Brazilian biomes.

Despite the risks involved in the activity, the growing demand for carbon credits from nature-based solutions (NBS)—this market is estimated to reach up to U\$ 50 billion by 2030 (McKinsey 2022)—has generated significant expectations about leveraging restoration in the country, catalyzing initiatives at landscape-scale.

It is estimated that 35 million hectares are severely degraded in Brazil (MapBiomias 2022). In the Amazon alone, it is estimated that carbon prices exceeding U\$ 20 per ton of CO<sub>2</sub> would transform the region's landscape through the natural regeneration of deforested areas, capable of capturing 16 Gt CO<sub>2</sub> and generating revenue of U\$ 320 billion in the next 30 years (Assunção and Scheinkman 2023).

In addition to the carbon market, Payment for other Environmental Services (PES), such as water provision, maintenance of rain cycles, and biodiversity preservation, can boost restoration and drive the development of other components of the chain. The expansion of new sectors, such as the forest products bioeconomy, and the climate transition of sectors like agriculture and energy can also contribute to the restoration of areas with forests and other types of vegetation.

Despite the growing interest in these markets, which can economically enable various business models, and the emergence of companies with ambitious recovery plans, large-scale restoration initiatives have not yet materialized. Large-scale restoration requires not only a favorable physical condition for vegetation growth but also depends on a wide range of other legal, institutional, and economic factors for projects to succeed.

**In this report, Climate Policy Initiative/Pontifical Catholic University of Rio de Janeiro (CPI/PUC-Rio) examines the concept of restoration in legislation and literature, analyzes regulatory frameworks, and identifies and classifies key policies, plans and programs related to restoration activities based on selected criteria, creating a typology that helps understand the different dimensions of the agenda.**

From a legal perspective, CPI/PUC-Rio's researchers address how, where, and why to promote restoration in order to eliminate obstacles and enable projects that encompass a plurality of rural properties, multiple jurisdictions, or involve various stakeholders. This methodology identifies when and where the activity is a legal obligation and when and where it can be done voluntarily, as well as the rules that regulate the restoration activity depending on the adopted restoration modality and land tenure category where the project is implemented.

**CPI/PUC-Rio analysis concludes that current policies were not designed to enable restoration at landscape-scale but rather at property-scale, whether private or public, and vary according to land tenure, regulatory, and technical issues.**

Depending on the land tenure category of the restoration project, specific regulations need to be observed. Similarly, the legal framework establishes differentiated rules for restoration, whether the project is implemented in areas of alternative land use or in areas where restoration is mandatory—regardless of who was responsible for deforestation. Moreover, the concept of restoration has undergone significant evolution and has come to incorporate a multitude of methods, with distinct purposes, costs, and revenues. The combination of different restoration typologies in a single project, however, poses challenges, as the legislation may require or exempt environmental licensing depending on the adopted modality.

**This report identifies three essential factors to promote large-scale restoration, primarily driven by the carbon market:**

1. There is a multitude of restoration typologies—from natural regeneration and seed and seedling planting, through native silviculture, to agroforestry systems (AFS), with distinct costs and revenues (WRI Brazil nda). Different restoration modalities can be contemplated and adopted, in a complementary way, to enhance the economic and socio-environmental viability of large-scale forest restoration initiatives. **Regulatory and institutional requirements need to (be changed to) permit the adoption of different restoration typologies in the same project.**
2. **Restoration strategies need to break down the barrier between public and private lands and encompass all land tenure categories with degraded and deforested lands suitable for restoration.** Brazil, and especially the Amazon, is marked by vast expanses of public areas with great uncertainty about property rights and land tenure conflicts. The restoration of these areas depends on innovative contractual models, socio-environmental safeguards and effective land governance.
3. **Large-scale restoration initiatives need to integrate both areas where restoration is a legal obligation and areas of alternative land use where it can occur voluntarily.** There are various situations where restoration can be a mandatory activity, and for each of them, there are rules, parameters, and differentiated degrees of public intervention. Promoting synergies between mandatory restoration policies can boost compliance with legal obligations. On the other hand, the expansion of restoration in areas of alternative land use depends on solutions to regulatory and procedural issues involving the Forest Code, environmental licensing, and the National System to Control the Origin of Forest Products (*Sistema Nacional de Controle da Origem dos Produtos Florestais* - SINAFLOR).

Landscape-scale restoration requires an innovative regulatory framework and effective governance that coordinates multiple actors and aligns different interests. The ongoing revision of the National Plan for Native Vegetation Recovery (*Plano Nacional de Recuperação da Vegetação Nativa* - PLANAVEG) is an opportunity for the federal government to consider the three factors identified in this publication.



# Evolution of Legislation on Restoration in Brazil

Brazil has a comprehensive set of policies that can promote restoration, developed over decades. Originally, legislation mainly focused on protecting standing forests through conservation measures, and restoration was linked to the non-compliance with legal obligations. Due to the advancement of deforestation and the importance of forests for climate stability and other ecosystem services, policies began to encourage restoration as a voluntary activity.

The Forest Code of 1934 established the obligation for (re)forestation, replanting, or tree cultivation, primarily for economic purposes. At that time, Brazil did not yet have consolidated environmental legislation, but the first diplomas related to the topic were emerging. The Forest Code of 1965 replaced the previous one and marked a new milestone in Brazilian environmental legislation. The law established stricter rules for forest conservation on private properties, such as Permanent Preservation Areas (*Áreas de Preservação Permanente* - APPs) and Legal Reserves (*Reserva Legal* - RL), where deforestation without prior authorization led to the obligation to recover the area. The Forest Code of 1965 underwent various changes and, in its final version, already included an obligation for restoration and/or regeneration of the original ecosystem.

In 1981, the National Environmental Policy (*Política Nacional do Meio Ambiente* - PNMA) provided a comprehensive and holistic view of the environment and regulated environmental civil liability, establishing the general obligation to recover environmental damage. Later, the 1988 Constitution of the Federative Republic of Brazil established a chapter dedicated to the environment, bringing the obligation and duty of everyone to protect an ecologically balanced environment for present and future generations. The Constitution sets the foundation for all Brazilian law, and the recognition of the environment as a central element, serves as the basis for all restoration actions. Environmental liability was reinforced with the enactment of the Environmental Crimes Law in 1998 and Decree no. 6,514/2008, which regulates environmental administrative offenses.

During the first decade of the 2000s, foundational norms for the conservation of native vegetation and Brazilian biodiversity were enacted, namely: the National System of Protected Areas (*Sistema Nacional de Unidades de Conservação* - SNUC), the National Biodiversity Policy (*Política Nacional da Biodiversidade* - PNB), the Forest Public Management Law, and the Atlantic Forest Law.

As climate change became a central concern and began to guide other policies, restoration gained even greater relevance, precisely because it represents an activity that favors both climate mitigation and adaptation. In 2009, Brazil adopted its National Policy on Climate Change (*Política Nacional sobre Mudança do Clima* - PNMC) and established the National Plan on Climate Change and the National Fund for Climate Change (*Fundo Nacional sobre Mudança do Clima* - FNMC), essential instruments for the restoration agenda.

In 2012, the National Congress approved the Native Vegetation Protection Law, known as the new Forest Code. The law retained the main conservationist institutes of the 1965 Forest Code, notably APPs and Legal Reserves, created the Environmental Compliance Program (*Programa de Regularização Ambiental* - PRA) for the environmental adjustment of rural properties with environmental liabilities, allowing the implementation of different restoration modalities, regulated forest replacement as a condition for legal deforestation, and also provided for economic incentives for both mandatory and voluntary restoration.

Only in 2017, the country adopted the National Policy and Plan for Native Vegetation Recovery (*Política e Plano Nacional de Recuperação da Vegetação Nativa* - PROVEG and PLANAVEG), with the aim of coordinating, integrating, and promoting policies, programs, and actions conducive to the recovery of forests and other forms of vegetation in the country, both to comply with legal obligations and to provide incentives for voluntary restoration. In its first edition, PLANAVEG set the goal of restoring 12 million hectares of degraded areas by 2030, but the plan is currently under review by the Ministry of Environment and Climate Change (*Ministério do Meio Ambiente e Mudança do Clima* - MMA).

Finally, incentives for voluntary restoration, particularly for payment for environmental services and the trade of forest carbon credits, gained momentum in the last decade with the adoption of new policies, plans, and programs, such as ENREDD+,<sup>1</sup> the Forest+ Program and its multiple modalities, the National Policy of Payments for Environmental Services (*Política Nacional de Pagamentos por Serviços Ambientais* - PNPSA), the creation of the forest restoration concession modality, and the standardization of a regulated carbon market through legislation currently pending in the National Congress.

## Mapping Restoration Policies in Brazil

The authors mapped, analyzed, and classified this extensive legislative framework, leading to the timeline represented in Figure 2. As depicted, restoration policies can be broad or specific, may establish rules for mandatory and/or voluntary restoration, and can provide incentives or create financing instruments. Some policies may include one or more of these elements.

The restoration policies mapped in this publication were classified according to specific criteria (Figure 1).

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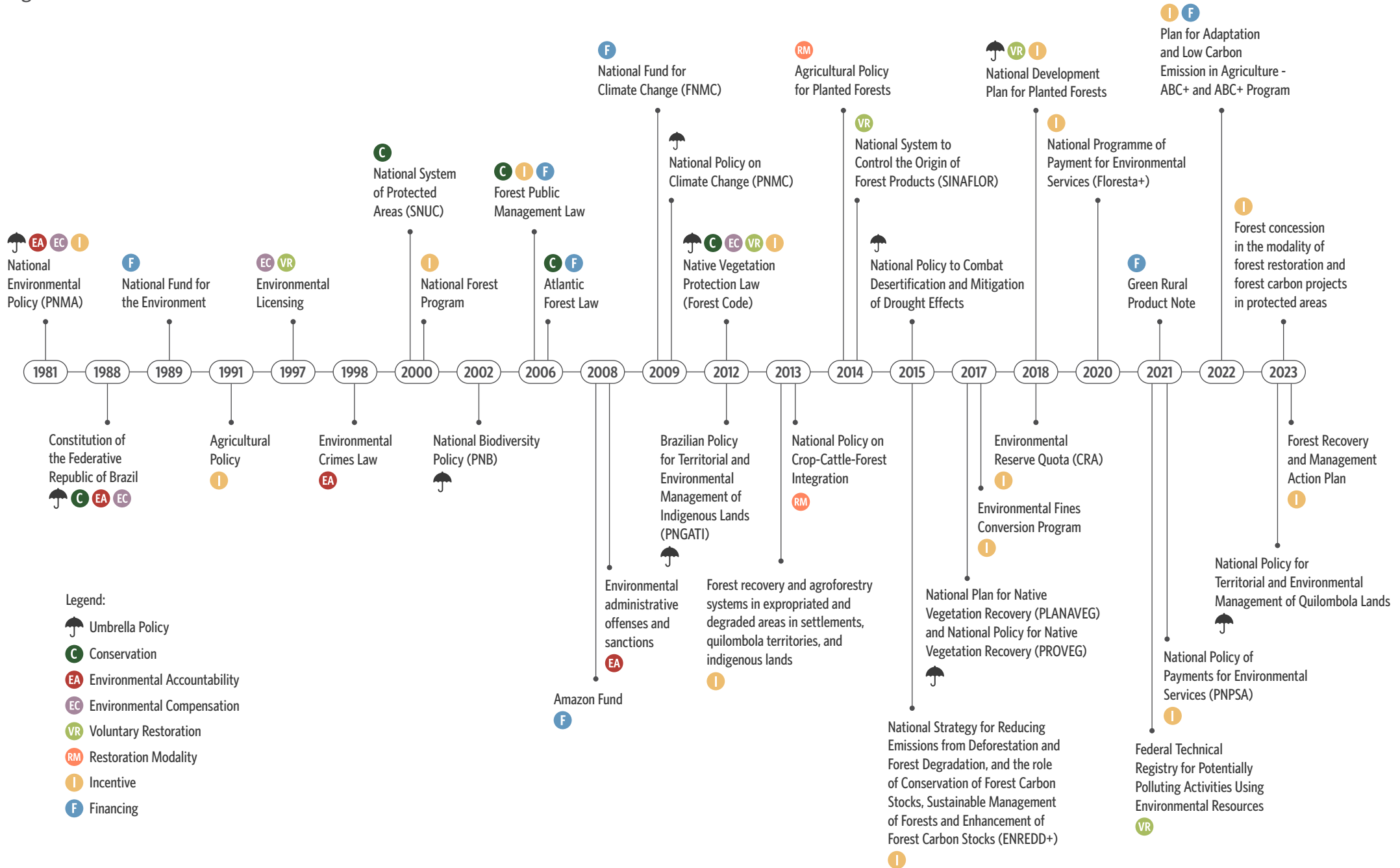
<sup>1</sup> ENREDD+ is Brazil's national strategy for reducing greenhouse gas emissions from deforestation and forest degradation, conserving forest carbon stocks, sustainable forest management and the increase of forest carbon stocks (REDD+).

**Figure 1.** Classification of Restoration Policies



**Source:** CPI/PUC-Rio, 2024

**Figure 2.** Timeline of Restoration Policies



Source: CPI/PUC-Rio, 2024

# Concept of Restoration

The concept of restoration has undergone significant academic, legislative, and policy evolution, following scientific development and the notoriety of the concept.

Brazilian legislation adopts a multiplicity of terms when establishing rules that promote restoration in a broad sense, such as: restoration, reforestation, recovery, recomposition, replacement, regeneration, and silviculture (Figure 3).













The term “restoration” was initially used in scientific literature and legislation solely to designate ecological restoration, defined as the restitution of a degraded ecosystem to a state as close as possible to its original condition.

**Today, the term “restoration” is being employed in a broader sense, encompassing various types of forest restoration, including a variety of productive restoration arrangements (Cosimo and Martins 2020; Barlow et al. 2021). In practice, a multiplicity of methods and models with distinct purposes, costs, and revenues can fall under the concept of restoration.<sup>2</sup>**

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<sup>2</sup> The broad concept of restoration is not defined in the legislation and is referred to as “recovery of native vegetation” in the National Policy for Native Vegetation Recovery (Decree no. 8,972/2017).

**Figure 3.** Glossary of Restoration

<b>RESTORATION</b>	<p> <b>Federal Law no. 9,985/2000, art. 2, item XIV (SNUC)</b> Restoration of an ecosystem or a degraded wildlife population as close as possible to its original condition.</p>	<p> <b>Federal Decree no. 8,972/2017, art. 3, item V (PROVEG)</b> Ecological restoration: intentional human intervention in altered or degraded ecosystems to trigger, facilitate, or accelerate the natural process of ecological succession.</p>	
<b>REFORESTATION</b>	<p> <b>Federal Decree no. 8,972/2017, art. 3, item III (PROVEG)</b> Planting of forest species, whether native or not, in stands, pure or mixed, to establish a forest structure in an area originally covered by deforested or degraded forest.</p>		
<b>RECOVERY</b>	<p> <b>Federal Decree no. 8,972/2017, art. 3, item XIII (PROVEG)</b> Restitution of a degraded ecosystem or wildlife population to a non-degraded condition, which may be different from its original state.</p>	<p> <b>Normative Instruction IBAMA no. 21/2014, item XI (SINAFLOR)</b> Activity involving actions for the restitution of a degraded or altered ecosystem or wildlife population to a non-degraded condition, which may be distinct from the original.</p>	<p> <b>Federal Decree no. 8,972/2017, art. 3, item VI (PROVEG)</b> Restoration of native vegetation cover through the implementation of agroforestry systems, reforestation, natural vegetation regeneration, ecological rehabilitation, and ecological restoration.</p>
<b>RECOMPOSITION</b>	<p> <b>Federal Decree no. 8,972/2017, art. 3, item VI (PROVEG)</b> Restoration of native vegetation cover through the implementation of agroforestry systems, reforestation, natural vegetation regeneration, ecological rehabilitation, and ecological restoration.</p>	<p> <b>Federal Decree no. 7,830/2012, art. 2, item VIII (CAR and PRA)</b> Restitution of a degraded or altered native ecosystem or biological community to a non-degraded condition, which may be different from its original state.</p>	
<b>FOREST COMPENSATION</b>	<p> <b>Federal Decree no. 5,975/2006, art. 13 (Forest Compensation)</b> Compensation for the volume of raw material extracted from natural vegetation by the volume of raw material resulting from forest planting for stock generation or forest cover recovery.</p>		
<b>NATURAL REGENERATION</b>	<p> <b>Federal Decree no. 8,972/2017, art. 3, item IV (PROVEG)</b> Process by which native species establish themselves in an altered or degraded area to be restored or undergoing recovery, without this process occurring deliberately through human intervention.</p>		
<b>FORESTRY</b>	<p> <b>CONEMA (RJ) Resolution no. 17/2009 (environmental licensing of forestry activities)</b> Activity involving the establishment, management, and harvest of forest stands, aiming at the rational utilization and maintenance of forest assets based on economic, ecological, scientific, social, and market demand interests.</p>	<p> <b>FEPAM (RS) Ordinance no. 51/2014 (environmental licensing of forestry activities)</b> Primary activity characterized by the cultivation of tree species, aiming to obtain forest raw materials (timber and non-timber products), intended to meet needs ranging from small farmers to large forest-based industries, a term that can be used synonymously with forest plantation.</p>	

Source: CPI/PUC-Rio, 2024

# How, Where, and Why to Promote Restoration?

Existing policies and legislative frameworks were not designed to facilitate restoration at a landscape-scale. Regulations vary widely based on the concept and typology of restoration outlined in the adopted model, the location where the project is implemented, its land tenure category, as well as the purpose of the restoration, which may have conservationist or income generation and rural development goals. This diversity in regulations can pose significant obstacles to making restoration viable, especially in projects that encompass a plurality of rural properties and multiple jurisdictions or involve various stakeholders.

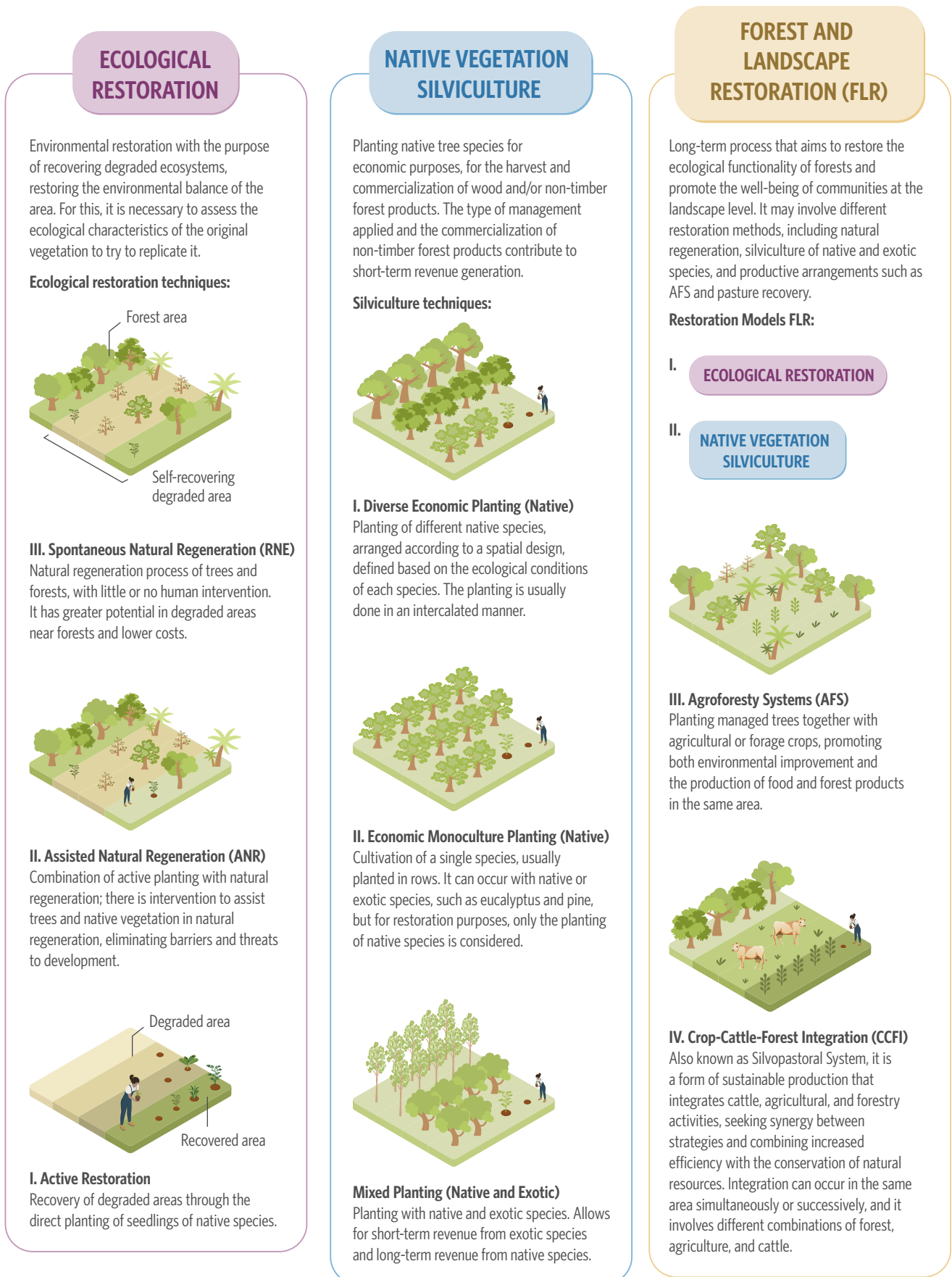
## How: Including All Restoration Modalities

Different restoration modalities can be considered and adopted in a complementary manner to enhance the economic and socio-environmental viability of large-scale forest restoration initiatives. This report identifies the main modalities and methods adopted in Brazil.

**Ecological restoration**, primarily aimed at recovering ecological processes, biodiversity, and ecosystem services, can be promoted through natural regeneration (spontaneous or assisted) and direct planting of seeds and seedlings of native species (Gann et al. 2019). A more recent approach concerns the use of native species silviculture in multifunctional forests that simultaneously considers the environmental and economic importance of forests. Multifunctional forests combine silviculture of native species—whether or not combined with exotic species—with restoration techniques to reconcile the production of timber and non-timber products with biodiversity conservation and maintenance of ecological processes (Zakia, Guerin 2020). **Forest and Landscape Restoration (FLR)** has a broader geographical scope and may encompass not only ecological restoration but also **productive restoration** models, such as silviculture of native species (biodiverse, monoculture, or mixed), agroforestry systems (AFS), and recovery of degraded pastures with crop-cattle-forest integration (CCFI), aiming to restore the degraded area while generating employment and income (WRI Brazil ndb). RPF is not limited to the recovery of degraded or deforested forest areas but also integrates restoration with different land uses, forming a set that can include agriculture, ecological corridors, protected zones, among others. This holistic landscape approach is seen as a way to reconcile biodiversity and productivity, simultaneously meeting social, economic, and environmental demands (Adams et al. 2021) (Figure 4).

This multiplicity of typologies poses challenges in the application of legislation, which may require or exempt environmental licensing for the restoration activity. However, obstacles to the adoption of various restoration typologies in the same project must be eliminated. Complementarity between different restoration typologies can mitigate risks and diversify revenue sources, enhancing the financial viability of the endeavor (Waack, Ferraz, and Batista 2022).

**Figure 4.** Restoration Modalities



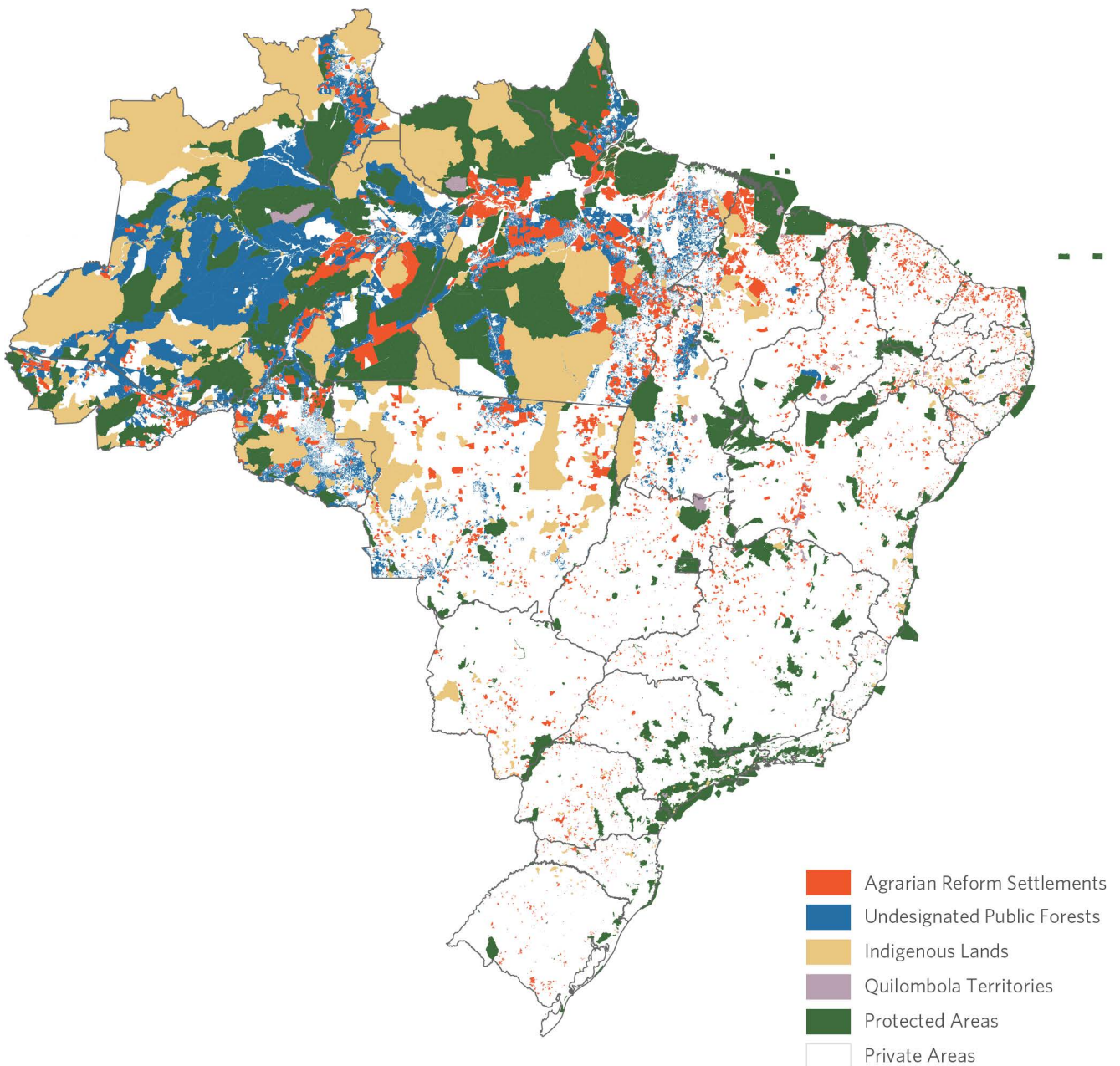
Source: CPI/PUC-Rio adapted from WRI (ndb), 2024



## Where: Encompassing Public and Private Lands

The Brazilian land structure is composed of a mosaic of land tenure categories, with both public and private ownership, and their own regulations and governance (Figure 5). In the Amazon, the land structure is even more complex and challenging. Public lands make up around 63% of the region, private areas only 17%, and over 15% have no land tenure information (Gandour and Mourão 2022). Additionally, there are private and collective possessions on public land without land tenure regularization; fraudulent property titles and land grabbing; and areas without land tenure information—where it is unknown whether the land is federal or state-owned (Chiavari, Lopes, and de Araujo 2021).

**Figure 5.** Land Tenure Categories in the Brazilian Territory



**Source:** CPI/PUC-Rio with data from FUNAI, INCRA, MMA, and SFB, 2021

Restoration activities can be implemented on both public and private lands. However, each land tenure category has specific legislation regulating land use, with implications for restoration.

For instance, the 2012 Forest Code is the primary regulation for private areas and public lands under private occupation, such as agrarian reform settlements and occupations on public lands without land regularization.

On the other hand, public lands can be designated for various purposes, each with its own regulations. The National System of Protected Areas (*Sistema Nacional de Unidades de Conservação* - SNUC) (Law no. 9,985/2000) establishes rules for different types of protected areas and mandates that each protected area has a unit management plan. The Public Forest Management Law (Law no. 11,284/2006) addresses the sustainable production of public forests and allows for management through forest concessions. Finally, Indigenous Lands, *quilombola* territories, and other areas occupied by Traditional Peoples and Communities (*Povos e Comunidades Tradicionais* - PCT) may have specific environmental regulations and management, as seen in the Brazilian Policy for Territorial and Environmental Management of Indigenous Lands (*Política Nacional de Gestão Territorial e Ambiental de Terras Indígenas* - PNGATI) (Decree no. 7,747/2012), sustainable use protected areas, and environmentally differentiated settlements,<sup>3</sup> where sustainable forest management plans are anticipated.

Large-scale restoration projects covering different land tenure categories depend on the interaction of various stakeholders and the adoption of diverse contractual models. For example, restoring private lands involves private actors who can negotiate land purchase/sale or leasing agreements. In contrast, restoring public lands, such as a degraded public forest area or a protected area, may involve public actors, private entities, and traditional communities, with contractual models still under development, as seen in restoration concessions through public bidding. The lack of defined property rights and land conflicts, particularly in the Amazon, may pose challenges to the development of these ventures.

## Why: Encompassing Mandatory and Voluntary Restoration Activities

Restoration can be a mandatory activity when arising from a legal obligation or a voluntary one when undertaken in areas designated for alternative land use, where restoration is not compulsory.

Facilitating large-scale restoration implies that projects cover both mandatory and voluntary restoration areas across multiple rural properties. However, incorporating mandatory restoration areas and voluntary alternative land use areas into a single project is quite challenging in practice. Mandatory restoration must adhere to rules, parameters, and methodologies outlined in legislation. In voluntary restoration, within alternative land use areas, the restorer can choose the method without requiring environmental authorization or a license.

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<sup>3</sup> Projects of Environmentally Differentiated Settlements (*Projetos de Assentamentos Ambientalmente Diferenciados* - PAAD) are settlement modalities, mainly instituted in the Amazon region, which combine land use with environmental preservation and also serve for the protection of the territory of traditional populations. There are three types of PAAD: Agro-extractive Settlement Project (*Projeto de Assentamento Agroextrativista* - PAE); Sustainable Development Project (*Projeto de Desenvolvimento Sustentável* - PDS); and Forest Settlement Project (*Projeto de Assentamento Florestal* - PAF).

## Mandatory Restoration

There are three scenarios in Brazil where restoration may be a mandatory activity: (i) when restoration is required to remedy environmental damage; (ii) when restoration results from non-compliance with a conservation obligation; and (iii) when restoration is obligatory as compensation.

### (i) Restoration Resulting from an Obligation to Remedy Environmental Damage:

Under Brazilian law, those causing environmental damage are obligated to repair it. In this regard, anyone responsible for the unauthorized removal or degradation of native vegetation is obliged to restore the area. Liability for restoration is irrespective of fault; the mere proof of a causal link between the agent's action or omission (e.g., deforestation or burning) and environmental damage (loss of native vegetation and ecosystem services) is sufficient.<sup>4</sup> In this situation, restoration is always mandatory for the party causing environmental degradation. The challenge here lies in compelling the offender to undertake restoration, particularly in cases of illegal deforestation, necessitating the intervention of public authorities through law enforcement and environmental accountability systems.

### (ii) Restoration Resulting from Non-compliance with a Conservation Obligation:

In Brazilian law, environmental obligations also have real nature (*propter rem*),<sup>5</sup> meaning they are tied to the thing itself and persist regardless of the owner. They can be enforced against the holder (whether private or public) or the current possessor, as well as previous possessors and successors.<sup>6</sup>

When legislation establishes an obligation to conserve native vegetation in a specific area, and this obligation is breached, the owner or possessor is obliged to restore (remediation of environmental damage), even if they were not responsible for the deforestation.<sup>7</sup> In this case, the obligation to remedy is joint between the deforester and the titleholder/possessor of the area and can be enforced by the competent authority against either.<sup>8</sup>

Public landholders (Union, states, and municipalities) also bear responsibility for the conservation, monitoring, and inspection of forests and other forms of vegetation. In the event of neglect in the duty of control and inspection, the State's environmental responsibility is subsidiary enforcement, meaning the State will only be called upon to restore the area if the original degrader, the one responsible for illegal deforestation, fails to do so.<sup>9</sup> The establishment of a preference order for fulfilling the obligation and holding the main perpetrator accountable aims to avoid widespread State accountability, which would harm society as a whole.

4 The regime of objective environmental civil liability is provided for in §1 of art. 14 of Law no. 6,938/1981 (National Environmental Policy Law).

5 The Latin expression *propter rem* means "because of the thing" or "by reason of the thing".

6 This understanding was the subject of repetitive appeals in the Superior Court of Justice (*Superior Tribunal de Justiça* - STJ) (repetitive theme no. 1204), and the thesis was approved on September 26, 2023. Learn more at: [bit.ly/42cUNK2](https://bit.ly/42cUNK2).

7 The Superior Court of Justice has already ruled that "the responsibility for environmental restoration is objective and *propter rem*, affecting the owner of the property, regardless of whether they were the cause of the damage." Learn more at: STJ, AgInt in REsp no. 1,856,089/MG, Minister Sérgio Kukina, First Panel, June 25, 2020.

8 A joint obligation is one that can be claimed in whole or in part from any of the debtors.

9 Summary no. 652 of the STJ, adopted on December 2, 2021. [bit.ly/42cC40Y](https://bit.ly/42cC40Y).

## Box 1. Examples of Conservation Regulations in Brazil

The Forest Code establishes obligations to conserve Permanent Preservation Areas (*Áreas de Preservação Permanente* - APPs) and Legal Reserves. The law expressly states that “the obligations provided for in this law have real nature and are transmitted to the successor, of any nature, in the case of transfer of ownership or possession of rural property” (as translated by the authors).<sup>10</sup> Thus, owners and possessors of rural properties with liabilities in APPs and Legal Reserves are obliged to restore the vegetation in these areas, even if they were not the cause of the liabilities. The application of the Forest Code is not trivial; the law establishes differentiated rules for the recovery of APPs and Legal Reserves, depending on the date of deforestation, the size of the rural property, and the region where the land is located. Deforestation prior to July 22, 2008 follows the rules of consolidated rural areas and can be restored with parameters less stringent than deforestation after this legal milestone. Properties smaller than four fiscal modules have even more flexible parameters than those larger than four fiscal modules. Finally, the Legal Reserve varies depending on the region; properties in the Legal Amazon have higher percentages of Legal Reserves, so the obligation to restore the Legal Reserve also depends on the property’s location.

Public lands with their own destination and regulation may have specific and stricter conservation rules than the Forest Code, such as the SNUC Law. In fully protected areas, the law only admits the indirect use of their natural resources, and in sustainable use protected areas, the sustainable use of a portion of their natural resources is allowed. If a specific area of a protected area has been deforested or degraded, contrary to the law and its management plan, the restoration of the area to recover the damage is an obligation of the party causing the degradation and also of the public administration, responsible for the protected area’s management, which has joint responsibility but subsidiary enforcement.

The same reasoning applies to public forests not designated under the terms of the Public Forest Management Law. The management of public forests for sustainable production must be done through sustainable forest management. When there is a forest concession, the concessionaire is responsible for conserving ecosystem services and biodiversity, being obliged to restore degraded areas, except in the case of damage resulting from invasion by third parties. The restoration of degraded public forests is the responsibility of whoever caused the damage, whether a legitimate occupant or not, but also of the State, due to its omission in monitoring public assets.

Recently, the Public Forest Management Law was amended to contemplate the possibility of concession for forest restoration activities and the exploitation of products and services (including the commercialization of carbon credits), located in public forests with degraded areas.<sup>11</sup> It remains a way for the State to fulfill its responsibility to restore degraded areas in public forests, offering an economic benefit for third parties (concessionaire) to promote area recovery.<sup>12</sup> In this case, the concessionaire must carry out the restoration in accordance with the law, the call for application, and the concession agreement.

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<sup>10</sup> Original text: “as obrigações previstas nesta Lei têm natureza real e são transmitidas ao sucessor, de qualquer natureza, no caso de transferência de domínio ou posse do imóvel rural” (Law no. 12.651/2012).

<sup>11</sup> The Law no. 11,284/2006 was amended by Law no. 14,590/2023.

<sup>12</sup> In this line, Floriano de Azevedo Marques Neto argues that the object of concessions would be to transfer the duties of conservation and management of public forests so that the right of exploitation would constitute the counterpart offered by the Government to the private entity for this transfer (Marques Neto 2009).

### (iii) Restoration Arising from an Obligation to Compensate:

Environmental damage can occur even if the activity is conducted within the bounds of the law. In such cases, Brazilian law provides for compensatory measures with the aim of offsetting unavoidable environmental impacts.

The primary activity that triggers restoration as a compensatory measure is legal deforestation. According to the Forest Code, the suppression of native vegetation requires prior authorization from the competent authority and reforestation/forest compensation. Although forest compensation was initially regulated as a mechanism to compensate for the loss of forest biomass, today, it should be understood more broadly as a tool for compensating for the loss of biodiversity and ecosystem services caused by vegetation suppression. However, in practice, legal deforestation is not adequately compensated, as the regulations in most states do not establish appropriate metrics and procedures. Innovative mechanisms can promote effective forest compensation and contribute to the restoration of priority areas for conservation, enhancing landscape design and connectivity (Lopes 2023; Lopes and Cárcamo 2023).

Compensatory measures are usually stipulated in the environmental licensing process and do not necessarily need to be related to vegetation suppression. The licensor may require restoration as a compensatory measure for carbon-intensive activities and those with significant greenhouse gas emissions. For instance, the licensing of an oil and gas exploration and production activity or a thermoelectric plant could demand the restoration of degraded areas as a measure to offset the emissions from the activity. Although these measures are not yet mandated by licensing processes in Brazil, there are grounds for their adoption by environmental agencies (Gato et al. 2022).

### Voluntary Restoration

Voluntary restoration is understood as the restoration activity carried out in areas with alternative land uses, where the legislation does not establish the obligation to conserve and restore native vegetation. These are areas where the landowner can engage in different economic activities, such as agriculture and cattle, and voluntarily chooses to restore the area. As it is a voluntary activity not restricted to specific parameters, the landowner can adopt various methods, from natural regeneration and active planting, aiming at ecological restoration, to various models of productive restoration.

According to the Forest Code, planting or reforestation with native or exotic forest species does not require prior authorization. However, for the purpose of controlling future forest exploitation, the planting must be reported to the competent authority within one year (Federal Law no. 12,651/2012, Art. 35, § 1). The law stipulates that the SINAFLOR be the registration platform for plantations, but as the system does not yet have a specific module for this purpose, competent authorities need to provide an alternative since the transportation and commercialization of forest raw materials depend on the Forest Origin Document (*Documento de Origem Florestal* - DOF). Additionally, as SINAFLOR registration is done for the purpose of controlling the origin of forest raw materials, it would not be necessary for restoration activities where forest exploitation is not foreseen.

This provision of the Forest Code can be understood as a general rule, exempting restoration activities from environmental licensing. However, silviculture activities are considered

effective or potentially polluting and capable of causing environmental degradation, thus subject to environmental licensing (CONAMA Resolution no. 237/1997). The CONAMA resolution makes no distinction as to whether silviculture activities involve exotic or native species and whether they are conducted in conjunction with other forms of restoration. Similarly, the legislation of most states requires environmental licensing, and studies indicate that the collection of the Environmental Control and Inspection Fee (*Taxa de Controle e Fiscalização Ambiental* - TCFA) is one of the obstacles to the expansion of native silviculture in Brazil (do Valle et al. 2020).

This normative contradiction between the Forest Code and environmental licensing regulations highlights the lack of clarity regarding what would qualify as a restoration activity or as silviculture. Nevertheless, the Forest Code would encompass the entire diversity of modalities and methods—from ecological restoration to silviculture of native and exotic species—as the law exempts authorization for the planting of both native and exotic species for any purpose.

# Conclusion

Large-scale restoration of forests and other types of native vegetation has broad potential to generate climate, ecological, and socioeconomic benefits in the country. Brazil has a comprehensive set of policies that vary according to land tenure, regulatory, and technical issues but were designed considering the scale of rural properties.

Landscape-scale restoration requires an innovative regulatory framework that takes into account different land tenure categories and various restoration modalities, facilitating the adoption of projects that combine mandatory and voluntary restoration. Therefore, effective governance is necessary to coordinate multiple stakeholders and align different interests.

The revision of PLANAVEG provides an opportunity for the federal government to consider all these issues, expanding the restoration goal to encompass both mandatory restoration areas, such as APP, Legal Reserve, and protected areas liabilities, as well as degraded areas of alternative land use where restoration is voluntary; including the different restoration modalities and methods, considering the landscape scale, incorporating innovative administrative models for restoration on public lands, and benefiting from the logic of the carbon market to help make the plan viable by mobilizing the necessary financial resources.

# References

- Adams, C., L. G. de Araujo, R. A. Sanches, C. R. T. Fudemma, J. R. Buzati, V. H. Sanches et al. "Governança da restauração florestal da paisagem no Brasil: desafios e oportunidades". *Desenvolvimento e Meio Ambiente* 58 (2021).
- Aliança pela Restauração na Amazônia. *Panorama e Caminhos Para a Restauração de Paisagens Florestais na Amazônia*. 2020. [bit.ly/3SC1f97](https://bit.ly/3SC1f97).
- Assunção, Juliano and José Alexandre Scheinkman. *Carbon and the Fate of the Amazon*. Rio de Janeiro: Climate Policy Initiative, 2023. [bit.ly/Amazon\\_Carbon](https://bit.ly/Amazon_Carbon).
- Barlow, J., P. Sist, R. Almeida, C. Arantes, E. Berenguer et al., eds. *Amazon Assessment Report 2021*. New York: United Nations Sustainable Development Solutions Network, 2021. [bit.ly/3HRODpp](https://bit.ly/3HRODpp).
- Chiavari, Joana, Cristina L. Lopes, and Julia N. de Araujo. *Panorama dos Direitos de Propriedade no Brasil Rural*. Rio de Janeiro: Climate Policy Initiative, 2021. [bit.ly/PanoramaDireitosDePropriedade](https://bit.ly/PanoramaDireitosDePropriedade).
- Cosimo, Luiz Henrique and Sebastião V. Martins. "A restauração do ponto de vista econômico". *Sociedade de Investigações Florestais*. 2020. Access date: December 10, 2023. [bit.ly/3SC7GZP](https://bit.ly/3SC7GZP).
- do Valle, Raul S.T., Luciana M. Alves, Mariana Oliveira, and Rafael Feltran-Barbieri. *Implicações da legislação brasileira na atividade de plantio de florestas nativas para fins econômicos*. São Paulo: WRI Brasil, 2020. [bit.ly/3uhPxbC](https://bit.ly/3uhPxbC).
- Gandour, Clarissa and João Mourão. *Fighting Deforestation in the Amazon: Strategic Coordination and Priorities for Federal and State Governments*. Rio de Janeiro: Climate Policy Initiative, 2022. [bit.ly/FightingDeforestationAMZ](https://bit.ly/FightingDeforestationAMZ).
- Gann, George D., Tein McDonald, Bethanie Walder, James Aronson, Cara R. Nelson et al. *Princípios e padrões internacionais para a prática da restauração ecológica*. Society for Ecological Restoration, 2019. [bit.ly/3OXFJut](https://bit.ly/3OXFJut).
- Gato, Camila, Raquel F. Rosner, Tadeu Badaró, and Vivian M. Ferreira. *Avaliação de impactos climáticos em empreendimentos de energia fóssil: Estratégias jurídicas para o licenciamento ambiental*. Abrampa, 2022. [bit.ly/49ztRak](https://bit.ly/49ztRak).
- Lopes, Cristina L. *Oportunidades e Desafios para a Reposição Florestal na Amazônia e no Cerrado*. Rio de Janeiro: Climate Policy Initiative, 2023. [bit.ly/ReposicaoFlorestal](https://bit.ly/ReposicaoFlorestal).
- Lopes, Cristina L. and Anna Maria Cárcamo. *Innovative Mechanisms for Forest Compensation in Brazilian MATOPIBA*. Rio de Janeiro: Climate Policy Initiative, 2023. [bit.ly/InnovativeMechanisms](https://bit.ly/InnovativeMechanisms).



MAPBIOMAS. *Projeto MapBiomass – Módulo de Condição de Vigor da Pastagem Versão 2.0*. Access date: January 10, 2024. [bit.ly/3Ox0MUj](https://bit.ly/3Ox0MUj).

Marques Neto, Floriano de A. *Bens públicos: função social e exploração econômica: o regime jurídico das utilidades públicas*. Belo Horizonte: Fórum, 2009, p. 363.

McKinsey. *Mercado voluntário de carbono tem potencial gigantesco no Brasil*. 2022. Access date: December 10, 2023. [bit.ly/4brfS7v](https://bit.ly/4brfS7v).

Moraes, M. A., org. *Restauração de florestas e paisagens no Brasil*. Brasília: UICN, 2016. [bit.ly/47O2K9z](https://bit.ly/47O2K9z).

Strassburg, Bernardo B.N., Paulo Branco, Álvaro Iribarrem, Agnieszka Latawiec, Carolina Salcedo et al. *Identificando Áreas Prioritárias Para Restauração: Bioma Amazônia 2030*, 2022. [bit.ly/3N6wyoV](https://bit.ly/3N6wyoV).

Waack, Roberto S., Thais Ferraz, and Alan Batista. *Como viabilizar a restauração florestal em larga escala*. Página 22. 2022. Access date: November 20, 2023. [bit.ly/3umoifM](https://bit.ly/3umoifM).

WRI Brasil. *Plantar florestas nativas é um bom negócio? Conheça 4 modelos*. 2019. Access date: December 10, 2023. [bit.ly/3OdsOPF](https://bit.ly/3OdsOPF).

WRI Brasil. *Sistemas Agroflorestais (SAFs): o que são e como aliam restauração e produção de alimentos*. 2021a. Access date: December 10, 2023. [bit.ly/3vR9oOY](https://bit.ly/3vR9oOY).

WRI Brasil. *Silvicultura de nativas: O que é, tipos, retornos ambientais e econômicos*. 2021b. Access date: December 10, 2023. [bit.ly/3OcJjjR](https://bit.ly/3OcJjjR).

WRI Brasil. *ILPF: os benefícios econômicos e ecológicos da integração Lavoura-Pecuária-Floresta para o país*. 2021c. Access date: December 10, 2023. [bit.ly/3SszzrF8](https://bit.ly/3SszzrF8).

WRI Brasil. *Projeto Verena*. nda. Access date: January 20, 2024. [bit.ly/49jV4Nx](https://bit.ly/49jV4Nx).

WRI Brasil. *O ciclo da restauração de paisagens e florestas*. ndb. Access date: February 20, 2024. [bit.ly/430JNzJ](https://bit.ly/430JNzJ).

Zakia, Maria José B. and Natalia Guerin. "Incentivo para as florestas do futuro". *Opiniões* 16, no. 58 (2020): 26-27. [bit.ly/4bTMib2](https://bit.ly/4bTMib2).

## Consulted Legislation

Constitution of the Federative Republic of Brazil of 1988. [bit.ly/3PHJun2](https://bit.ly/3PHJun2).

Law no. 6,938, August 31, 1981. [bit.ly/3Sr83qW](https://bit.ly/3Sr83qW).

Law no. 7,347, July 24, 1985. [bit.ly/428gESG](https://bit.ly/428gESG).

Law no. 7,797, July 10, 1989. [bit.ly/3U4IX2x](https://bit.ly/3U4IX2x).

Law no. 8,171, January 17, 1991. [bit.ly/42bqJyw](https://bit.ly/42bqJyw).

Law no. 9,985, July 18, 2000. [bit.ly/3SsVoUv](https://bit.ly/3SsVoUv).

Law no. 11,284, March 2, 2006. [bit.ly/3s9ocHt](https://bit.ly/3s9ocHt).

Law no. 11,428, December 22, 2006. [bit.ly/3RFwkZW](https://bit.ly/3RFwkZW).

Law no. 12,114, December 9, 2009. [bit.ly/3OfyHR8](https://bit.ly/3OfyHR8).

Law no. 12,187, December 29, 2009. [bit.ly/44pWQdk](https://bit.ly/44pWQdk).

Law no. 140, December 8, 2011. [bit.ly/3HwoyvU](https://bit.ly/3HwoyvU).

Law no. 12,651, May 25, 2012. [bit.ly/3FP8kNZ](https://bit.ly/3FP8kNZ).

Law no. 12,805, April 29, 2013. [bit.ly/438jWV5](https://bit.ly/438jWV5).

Law no. 12,854, August 26, 2013. [bit.ly/3Sqyk8S](https://bit.ly/3Sqyk8S).

Law no. 13,153, July 30, 2015. [bit.ly/47M3wnm](https://bit.ly/47M3wnm).

Law no. 14,119, January 13, 2021. [bit.ly/48HGuj6](https://bit.ly/48HGuj6).

Law no. 14,590, May 24, 2023. [bit.ly/3SuperV](https://bit.ly/3SuperV).

Decree no. 99,274, June 6, 1990. [bit.ly/3Hrxm64](https://bit.ly/3Hrxm64).

Decree no. 3,420, April 20, 2000. [bit.ly/3HNBihT](https://bit.ly/3HNBihT).

Decree no. 4,339, August 22, 2002. [bit.ly/3Sr2bOD](https://bit.ly/3Sr2bOD).

Decree no. 5,975, November 30, 2006. [bit.ly/47N5vb6](https://bit.ly/47N5vb6).

Decree no. 6,063, March 20, 2007. [bit.ly/3S7XHuT](https://bit.ly/3S7XHuT).

Decree no. 6,514, July 22, 2008. [bit.ly/47NlmXo](https://bit.ly/47NlmXo).

Decree no. 6,527, August 1, 2008. [bit.ly/3tSTeUY](https://bit.ly/3tSTeUY).

Decree no. 6,660, November 21, 2008. [bit.ly/3S8cq96](https://bit.ly/3S8cq96).

Decree no. 7,747, June 5, 2012. [bit.ly/427Homg](https://bit.ly/427Homg).

Decree no. 7,830, October 17, 2012. [bit.ly/3KvHYmQ](https://bit.ly/3KvHYmQ).

Decree no. 8,235, May 5, 2014. [bit.ly/3Od1BIO](https://bit.ly/3Od1BIO).

Decree no. 8,375, December 11, 2014. [bit.ly/3NBXn58](https://bit.ly/3NBXn58).

Decree no. 8,972, January 23, 2017. [bit.ly/3O9iIE7](https://bit.ly/3O9iIE7).

Decree no. 9,179, October 23, 2017. [bit.ly/429JAd6](https://bit.ly/429JAd6).

Decree no. 9,578, November 22, 2018. [bit.ly/48MyrSa](https://bit.ly/48MyrSa).

Decree no. 9,640, December 27, 2018. [bit.ly/3HvuSDN](https://bit.ly/3HvuSDN).

Decree no. 10,828, October 1, 2021. [bit.ly/48KnUXB](https://bit.ly/48KnUXB).

Decree no. 11,015, March 29, 2022. [bit.ly/3vVH1PC](https://bit.ly/3vVH1PC).

Decree no. 11,548, June 5, 2023. [bit.ly/4b4ZhGB](https://bit.ly/4b4ZhGB).

Decree no. 11,786, November 20, 2023. [bit.ly/48I3oqB](https://bit.ly/48I3oqB).

Normative Instruction MMA no. 6, December 15, 2006. [bit.ly/40uHbca](https://bit.ly/40uHbca).

Normative Instruction MMA no. 2, May 6, 2014. [bit.ly/47LzOPT](https://bit.ly/47LzOPT).

Normative Instruction IBAMA no. 21, December 23, 2014. [bit.ly/3UeS4xL](https://bit.ly/3UeS4xL).

Normative Instruction MMA/IBAMA/ICMBIO no. 1, January 29, 2020. [bit.ly/3S7JuOI](https://bit.ly/3S7JuOI).

Normative Instruction IBAMA no. 13, August 23, 2021. [bit.ly/3OeREnj](https://bit.ly/3OeREnj).

Ordinance MMA no. 370, December 2, 2015. [bit.ly/3Hw1NYS](https://bit.ly/3Hw1NYS).

Ordinance MMA no. 288, July 2, 2020. [bit.ly/3u5QFii](https://bit.ly/3u5QFii).

Ordinance MAPA no. 471, August 10, 2022. [bit.ly/42c1CLD](https://bit.ly/42c1CLD).

Ordinance MAPA no. 628, November 14, 2023. [bit.ly/3U6GhI1](https://bit.ly/3U6GhI1).

CONAMA Resolution no. 001, January 23, 1986. [bit.ly/47P1oLI](https://bit.ly/47P1oLI).

CONAMA Resolution no. 237, December 19, 1997. [bit.ly/3SbtmvD](https://bit.ly/3SbtmvD).

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