Halting Deforestation through Finance: Regulatory Mapping of the Central Bank of Brazil

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About Climate Policy Initiative

Climate Policy Initiative (CPI) is an analysis and advisory organization with deep expertise in finance and policy. CPI has seven offices around the world. In Brazil, CPI has a partnership with the Pontifical Catholic 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.

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List of Acronyms and Abbreviations

ABC Plan Agricultural Sector Plan for Climate Change Mitigation and Adaptation for the Consolidation of a Low-Carbon Economy (*Plano Setorial de Mitigação e de Adaptação às Mudanças Climáticas para a Consolidação de uma Economia de Baixa Emissão de Carbono na Agricultura*)

ABC Program National Program for Low-Carbon Emissions in Agriculture (*Programa para Redução da Emissão de Gases de Efeito Estufa na Agricultura*)

ANA National Water and Sanitation Agency (*Agência Nacional de Águas e Saneamento Básico*)

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

BNDES Brazilian Development Bank (*Banco Nacional de Desenvolvimento Econômico e Social)*

BCB Central Bank of Brazil (*Banco Central do Brasil*)

BCBS Basel Committee on Banking Supervision

CAR Rural Environmental Registry (*Cadastro Ambiental Rural*)

CBD Convention on Biological Diversity

CEBDS Brazilian Business Council for Sustainable Development (*Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável*)

CMN National Monetary Council (*Conselho Monetário Nacional*)

COMEF Financial Stability Committee (*Comitê de Estabilidade Financeira*)

COPOM Monetary Policy Committee (*Comitê de Política Monetária*)

CNUC National Registry of Conservation Units (*Cadastro Nacional de Unidades de Conservação*)

CRSO Committee for Organizational Social and Environmental Responsibility (*Comitê de Responsabilidade Socioambiental Organizacional*)

DETER Real-Time Deforestation Detection System (*Sistema de Detecção de Desmatamento em Tempo Real*)

DRSAC Social, Environmental, and Climate Risk Document (*Documento de Riscos Social, Ambiental e Climático*)

DSGE Dynamic Stochastic General Equilibrium

ECOS Committee of Sustainable Economy (*Comitê Economia Sustentável*)

ESG Environmental, Social, and Governance

ETF Exchange Traded Funds

FC Forest Code

FEBRABAN Brazilian Federation of Banks (*Federação Brasileira de Bancos*)

FSB Financial Stability Board

FSR Financial Stability Report

FUNAI Brazilian Indigenous Peoples Foundation (*Fundação Nacional dos Povos Indígenas*)

GHG Greenhouse gases

GRC Governance, Risk, and Control Committee (*Comitê de Governança, Riscos e Controles*)

GRSAC Report Social, Environmental, and Climate Risks and Opportunities Report (*Relatório de Riscos e Oportunidades Sociais, Ambientais e Climáticos*)

IBAMA Brazilian Institute of Environment and Renewable Natural Resources (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais*)

ICMBIO Chico Mendes Institute for Biodiversity Conservation (*Instituto Chico Mendes de Conservação da Biodiversidade*)

INCRA National Institute for Colonization and Agrarian Reform (*Instituto Nacional de Colonização e Reforma Agrária*)

INPE National Institute for Space Research (*Instituto Nacional de Pesquisas Espaciais*)

IPCC Intergovernmental Panel on Climate Change

ISSB International Sustainability Standards Board

MAPA Ministry of Agriculture and Cattle (*Ministério da Agricultura e Pecuária*)

MATOPIBA Maranhão, Tocantins, Piauí e Bahia

MCR Rural Credit Manual (*Manual de Crédito Rural*)

MDA Ministry of Agrarian Development and Family Agriculture (*Ministério do Desenvolvimento Agrário e Agricultura Familiar*)

MF Ministry of Finance

MGI Ministry of Management and Innovation in Public Services (*Ministério de Gestão e Inovação em Serviços Públicos*)

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

NGFS Network for Greening the Financial System

NDC Nationally Determined Contribution

PGR-BCB BCB's Integrated Risk Management Policy (*Política de Gestão Integrada de Riscos do Banco Central do Brasil*)

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

PNMC National Plan on Climate Change (*Plano Nacional sobre Mudança do Clima*)

PPCERRADO Action Plan for Prevention and Control of Deforestation in the Cerrado biome (*Plano de Prevenção e Controle do Desmatamento no Bioma Cerrado*)

PPCDAM Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (*Plano de Ação para Prevenção e Controle do Desmatamento na Amazônia Legal*)

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

PRODES Project for Monitoring Deforestation in the Legal Amazon by Satellite (*Projeto de Monitoramento do Desmatamento na Amazônia Legal por Satélite*)

PRONABIO National Biological Diversity Program (*Programa Nacional da Diversidade Biológica*)

PRSA Policy for Socio-Environmental Responsibility (*Política de Responsabilidade Socioambiental*)

PRSAC Social, Environmental, and Climate Responsibility Policy (*Política de Responsabilidade Social, Ambiental e Climática*)

RENOVAGRO Program for Financing Sustainable Agricultural Production Systems (*Programa de Financiamento a Sistemas de Produção Agropecuária Sustentáveis*)

RL Legal Reserve (*Reserva Legal*)

RSAC Social, Environmental, and Climate-related Risks (*Riscos Sociais, Ambientais e Climáticos*)

SAMBA Stochastic Analytical Model with a Bayesian Approach

SDGs Sustainable Development Goals

SFB Brazilian Forest Service (*Serviço Florestal Brasileiro*)

SFN National Financial System (*Sistema Financeiro Nacional*)

SICAR National Rural Environmental Registry System (*Sistema Nacional de Cadastro Ambiental Rural*)

SICOR Rural Credit and PROAGRO Operations System (*Sistema de Operações do Crédito Rural e do PROAGRO*)

SNCR National Rural Credit System (*Sistema Nacional de Crédito Rural*)

SUSEP Superintendence of Private Insurance (*Superintendência de Seguros Privados*)

TCFD Task Force on Climate-related Financial Disclosures

TNFD Task Force on Nature-related Financial Disclosures

UNCED United Nations Conference on Environment and Development

WEF World Economic Forum

Contents

Introduction

Addressing climate change and nature loss requires a significant shift in allocating financial resources. Central banks and financial regulators can play a crucial role in guiding banks and investors towards a transition to a low-carbon and nature positive economy. To ensure that investments align with social, environmental and climatic goals, these financial authorities must leverage a range of tools that include strategic measures and policies, innovative financial instruments, policy frameworks, and incentives designed to channel financial flows into sustainable projects. Simultaneously, they need to update their risk assessment methodologies to comprehensively integrate the diverse risks and impacts of climate change and nature loss on the financial system.

Endowed with vast and biodiverse ecosystems, Brazil faces a pressing challenge in mitigating emissions and halting nature loss. Historically, the country has witnessed rapid land use changes associated with deforestation, particularly in the Amazon rainforest, and conversion of other non-forest natural ecosystems, including savannah formations and grasslands, notably in the Cerrado biome. Over the years, the federal and state governments have implemented various initiatives to address this issue, including environmental legislation and regulations, policy interventions, and international collaborations.

The Central Bank of Brazil (*Banco Central do Brasil* - BCB) has joined these efforts, recently playing a crucial role in leading the financial sector towards sustainable financing. In 2020, the BCB included a Sustainability dimension in their BC# Agenda. The initiative aligns with the global trend of regulatory interest in climate change, recognizing it not only as a social and environmental concern but also as a risk to financial stability. Under this agenda, the BCB has forged important partnerships, by joining the Network for Greening the Financial System (NGFS) and supporting the Task Force on Climate-related Financial Disclosures (TCFD). Furthermore, the BCB has made significant strides in assessing and managing social, environmental, and climate risks. Besides that, the BCB has adopted a sector-specific strategy, with an emphasis on rural credit. This is relevant considering that emissions in Brazil are predominantly associated with land use change and the agricultural sector. The measures involve regulations to align agricultural financing to sustainability goals by restricting access to rural credit for farmers who do not comply with environmental criteria. The BCB's approach is committed to fostering a low-carbon economy and combating deforestation on multiple fronts, strengthening its position as a pioneer at the intersection of finance and environmental conservation.

To understand the BCB's efforts in addressing deforestation and conversion, researchers from the Climate Policy Initiative/Pontifical Catholic University of Rio de Janeiro (CPI/PUC-RIO) conducted a comprehensive study delving into the bank's sustainability initiatives. This work explores the challenges, regulatory framework, and potential impacts of these measures on Brazil's environmental landscape. As such, this study offers a nuanced

understanding of the BCB's pivotal role in the fight against deforestation, providing insights that resonate not only within the country but also in the broader global conversation on sustainable finance. Moreover, it identifies strategic recommendations aimed at advancing the sustainability agenda while acknowledging gaps that still need to be filled.

The remainder of this report follows this structure: Section 2 outlines the research methodology. Section 3 provides a historical context of deforestation and conversion in Brazil, exploring its determinants and tackling strategies, and presents the institutional, legal, and national political context. Section 4 details BCB's actions and regulatory measures towards the national financial system, with a special focus on rural credit. The study concludes with Section 5, consolidating insights on the nexus between finance and environmental conservation and Section 6 suggesting remaining gaps and future steps.

On Deforestation and Conversion

In Portuguese, it is common to use the term "desmatamento" (deforestation) to refer to both deforestation and ecosystem conversion. However, when it comes to the conversion of non-forest ecosystems, the term "desmatamento" is not the most appropriate. For this case study, we are employing the following definitions:

Deforestation: Permanent reduction of the tree canopy cover below the minimum 10% threshold. Includes areas of forest converted to agriculture, pasture, water reservoirs, mining and urban areas. Excludes areas where the trees have been removed as a result of harvesting, and where the forest is expected to regenerate naturally or with the aid of silvicultural measures.

For the case of Brazil, it is relevant to mention that approximately 95% of all deforestation in the Amazon and conversion in the Cerrado, considering the MATOPIBA[1] region (including the state of Tocantins and parts of the states of Maranhão, Piauí and Bahia) is illegal (Valdiones et al. 2021). These two biomes account for 82% of Brazil's total deforestation (TerraBrasilis 2023a).

Conversion: Ecosystem conversion refers to the process of transforming one type of ecosystem into another, often with significant changes in its structure, composition, and ecological functions. This conversion can result from human activities, natural processes, or a combination of both. Ecosystem conversion is often associated with human activities such as agriculture, urbanization, industrial development, and infrastructure construction. Ecosystem conversion can also occur naturally over time due to environmental changes, such as climatic shifts or geological events. For example, as a region transitions from a humid climate to arid conditions, the ecosystem may naturally convert from a forested area to a desert.

1 MATOPIBA is an acronym for the states of Maranhão (MA), Tocantins (TO), Piauí (PI), and Bahia (BA).

Methodology

This report examines the initiatives of the BCB to address deforestation and conversion. The approach is designed to ensure a thorough understanding of the evolving regulatory landscape of BCB's actions, as well as its gaps and challenges.

This study involves an extensive literature review, examining academic publications, policy documents, and reports related to the BCB's policies and resolutions concerning deforestation and conversion. This review provides a historical context, charting the evolution of regulatory measures and their impact on deforestation and conversion-free practices.

Additionally, this research provides empirical evidence regarding the effectiveness of policies and BCB's measures. This includes a focus on outcomes and analyses available in the public domain, contributing to a data-driven evaluation of the impact of the policies and actions.

Direct engagement with key departments within the BCB was instrumental in gaining firsthand insights. Discussions with the BCB officials offer a qualitative dimension to the study, providing perspectives on the practical implementation, challenges faced, and the outcomes of the regulatory initiatives.

Furthermore, the analysis incorporated a review of official documents. This included examining BCB and National Monetary Council (*Conselho Monetário Nacional* – CMN) resolutions, as well as public consultations, normative instructions, circulars, and reports, such as the BCB's Social, Environmental, and Climate Risks and Opportunities Reports. This analysis helps to understand the formalized structures, regulatory frameworks, and the outcomes of the BCB's initiatives.

This multifaceted methodology aims to provide a comprehensive understanding of the BCB's initiatives on deforestation and conversion. The integration of empirical evidence enhances the study's depth and contributes to the analysis of the role played by the BCB in the intersection of finance and environmental conservation.

Context

Importance of the Forests and Ecosystems Preservation

Tropical forests play a vital role in sustaining life on Earth, providing essential ecosystem services, sheltering a vast diversity of plant and animal species, regulating water cycles, and offering protection against extreme events (Nobre et al. 1991; Spracklen et al. 2012 and Nobre 2014). Due to the high density of their vegetation and the age of their trees, which can reach hundreds of years, these forests house a massive storage of carbon accumulated over time in the form of vegetation, soil, and biomass. In this way, they serve as enormous carbon reservoirs, with the Amazon being the largest forest of this type on the planet.

In addition to the Amazon, Brazil is home to a variety of biomes, including the Cerrado, Atlantic Forest, Pantanal, Caatinga, and Pampa each with unique characteristics, playing a central role in maintaining water regimes, ecosystem services, and biodiversity protection. Although less dense than the Amazon rainforest, they also represent significant carbon stocks.[2]

Forests and other ecosystems are crucial for preserving biodiversity. They provide habitats for countless plant and animal species that have evolved over millennia. The intricate web of life within these ecosystems is delicately balanced, with each species playing a vital role in its functioning. However, deforestation, conversion, and degradation pose severe threats to this biodiversity. As forests are cleared, countless species lose their habitats, leading to declines in population numbers and, in extreme cases, extinction (Cardinale et al. 2012). Furthermore, the loss of forest cover disrupts water regulation and hydrological flows, affecting local and regional climates, soil erosion rates, and water quality, with far-reaching consequences for both ecosystems and human communities (Smith et al. 2013).

When deforestation or conversion happens through land conversion, triggered by logging or fires (wild or anthropocentric), there is a rapid and substantial release of carbon stock into the atmosphere in the form of carbon dioxide (CO_2), amplifying the concentration of greenhouse gases (GHG) (Gibbs, Harris, and Seymour 2018). Furthermore, deforestation and conversion releases additional GHG, such as methane (CH_4), mainly linked to agricultural activities, intensifying the overall environmental impact (Johnson and Johnson 1995).

Deforestation, conversion, and ecosystem degradation also impact natural carbon sinks. Vegetation serves as a carbon sink, meaning it removes CO_2 from the atmosphere (Luyssaert

2 It's important to note that these ecosystems also harbor substantial below ground carbon stocks, contributing significantly to carbon sequestration and storage.

et al. 2008).[3] When a forest is degraded or deforested, it loses its capacity to act as a carbon sink, and in some cases, it can even become a net source of carbon, emitting more GHG than it absorbs (Mills et al. 2023).

As Brazil possesses the largest area of native tropical vegetation on the planet, it bears a significant responsibility for reducing GHG emissions. However, it is estimated that the Legal Amazon,[4] which has over 800,000 square kilometers of deforested native vegetation, has already lost about 20% of its original extent (Gandour 2021). This amount exceeds the average of 15% loss of native vegetation in other Amazonian countries, making Brazil the country with the worst forest preservation index among Amazonian nations (Ferreira 2023). The Cerrado, on the other hand, has already lost more than 50% of its native primary vegetation (TerraBrasilis 2023a, 2023b). In this regard, while burning fossil fuels is the primary source of emissions in the rest of the world, the main emission factor in Brazil is land use change due to agriculture and deforestation (OC 2023).

In the early 2000s, around two-thirds of Brazilian GHG emissions were related to these factors, with 80% of these emissions coming from the Amazon and about 15% from the Cerrado. The significant reduction in deforestation rates between 2004 and 2010 helped decrease the share of this sector in Brazil's total emissions. But the resurgence of deforestation over the past decade led to an increase in emissions from land use changes once again, resulting in a decade of 40% increase in raw emissions. At the same time, emissions from the agricultural sector rose 12% from 2010 to 2021.

Despite this trend, Brazil has internationally committed to reducing emissions and increasing conservation efforts. Brazil has established the National Biological Diversity Program (*Programa Nacional da Diversidade Biológica* - PRONABIO) in 1994, with the mission of promoting the implementation of the commitments undertaken by Brazil under the Convention on Biological Diversity (CBD), including the 2011-2020 Strategic Plan. In COP 21, in 2015, which resulted in the adoption of the Paris Agreement, Brazil presented an Nationally Determined Contribution (NDC) committing to reduce GHG emissions by 37% from 2005 levels by 2030. In this context, there is an urgent need to reverse the emissions pattern and return to a trajectory of GHG reduction, as well as addressing biodiversity and nature loss, in line with international commitments, by reducing deforestation and conversion, and investing in more sustainable agriculture.

Deforestation and Conversion in Brazil

Environmental policy in Brazil has been significantly influenced by the economic logic of territorial occupation throughout its history. During the colonial period, occupation was guided by extractive and agricultural activities, which resulted in significant environmental losses. The exploitation of natural resources did not consider the long-term impacts on biodiversity and ecosystems. Consequently, forests were deeply affected, such as the Atlantic Forest, a coastal Brazilian biome that today covers less than a quarter of its original area (SOS MA 2023).

On the other hand, the Amazon Forest remained relatively intact during that time, with only a few sporadic exploration incursions in the region for the search of spices and oils, which were

3 Luyssaert, S., Schulze, ED., Börner, A. et al. Old-growth forests as global carbon sinks. Nature 455, 213–215 (2008).

4 The Legal Amazon is a region encompassing nine Brazilian states in the Amazon basin (Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia, Roraima, Tocantins, and parts of Maranhão), established by the federal government in 1953 to plan socioeconomic development. It covers 59% of the country's territory, and plays a crucial role in preserving biodiversity, hosting 56% of Brazil's indigenous population (IPEA 2008).

transported to Europe. A significant change occurred in the 1970s, during the military period, when a series of policies were implemented to promote territorial occupation and economic development. Major infrastructure projects, such as roads and power plants, along with the encouragement of resins extraction (particularly rubber) and non-timber products, as well as manufacturing and agricultural activities, contributed to deforestation in the Amazon (Pokorny et al. 2021).

The region then became the target of large-scale economic activities with little regard for environmental preservation. A complex interplay of factors such as logging, land grabbing, speculation, mining, cattle and other agricultural production contributed to high deforestation rates and the transformation of the Amazonian landscape. In 1985, the forest covered 90% of the biome, but by 2022, this proportion had decreased to 78%. During this period, pasture areas expanded from 3.3% to 13.7%, reflecting a significant increase in cattle ranching. Cropland also experienced a notable rise, increasing from 80,000 hectares to more than 7 million hectares (equivalent to a percentage rise of virtually 0% to 1.7%) (MAPBIOMAS 2023).

It was only in the late 20th century that the debate on the importance of preserving the Amazon gained momentum. The world witnessed an increased recognition of climate issues with the establishment of the Intergovernmental Panel on Climate Change (IPCC), pivotal global environmental summits like the Rio Earth Summit (United Nations Conference on Environment and Development - UNCED), and international treaties such as the Kyoto Protocol. The forest began to attract international attention and Brazilian authorities started to face pressure to protect the biome, due to the advocacy efforts of environmental organizations and local social movements. In response, the government launched the Program for Monitoring Deforestation in the Legal Amazon by Satellite (*Programa de Monitoramento do Desmatamento na Amazônia Legal por Satélite* - PRODES) in 1988. PRODES monitors deforestation and degradation in the Amazon using high-resolution satellite images coordinated by the National Institute for Space Research (*Instituto Nacional de Pesquisas Espaciais* - INPE).

In the same vein, the Brazilian Institute of Environment and Renewable Natural Resources (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* - IBAMA) was created in 1989. IBAMA is an executive agency of the Brazilian federal government responsible for the implementation and execution of environmental policies and plays a crucial role in monitoring and combating illegal deforestation.

Following the implementation of these policies, deforestation rates fell between 1988 and 1991, followed by a period of instability.[5] The situation worsened again in the late 1990s and early 2000s due to the increased global demand for agricultural commodities and the lack of effective measures to combat deforestation.

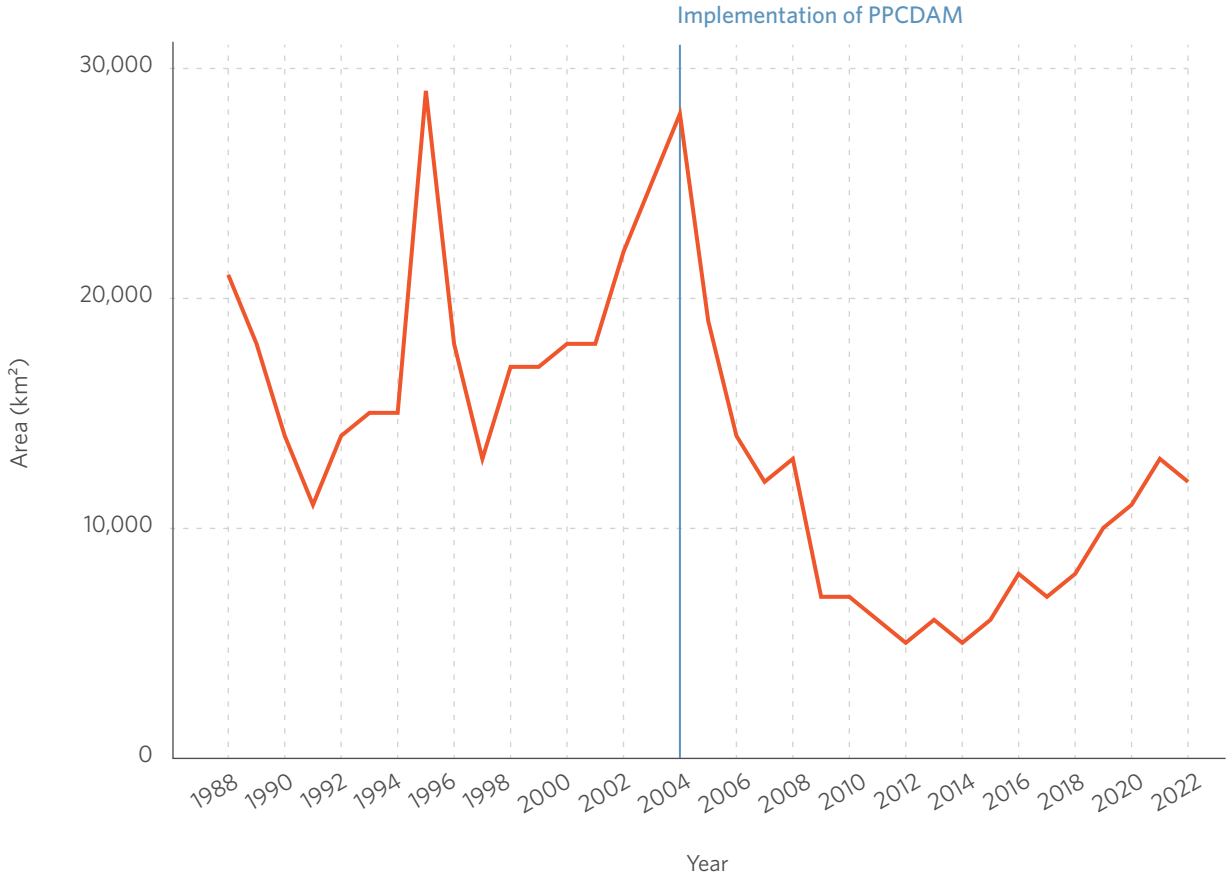
In 2004, the government launched the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (*Plano de Ação para Prevenção e Controle do Desmatamento na Amazônia Legal* - PPCDAM), establishing guidelines and goals to reduce illegal deforestation, introducing innovative policy instruments, and expanding the responsibility of government actors in reducing deforestation. This transformed what had been an exclusive competence of the Ministry of the Environment and Climate Change (*Ministério do Meio Ambiente e Mudança do Clima* - MMA) into a shared and cross-cutting mandate among various ministries. PPCDAM

5 In 1995, PRODES/INPE recorded a peak in the deforestation rate, with 29,000 square kilometers deforested. This value represents a break in the historical series, and there is no consensus regarding the explanation for this record. Among the likely hypotheses for the significant increase in deforestation in that year is the availability of capital for agricultural investment as a consequence of the Real Plan of 1994, which stabilized the inflation in the Brazilian economy.

actions were organized into three pillars: environmental monitoring and control, land and territorial planning, and the promotion of sustainable productive activities.[6] Complementing the PPCDAM, the government also released the Real-Time Deforestation Detection System (*Sistema de Detecção de Desmatamento em Tempo Real* - DETER), which is a monitoring and alert tool that uses satellite images to promptly detect areas of recent deforestation.

The subsequent years were marked by a significant decrease in deforestation in the Amazon, the largest recorded in the historical series of PRODES. Between 2004 and 2012, the country saw a reduction of more than 80% in the deforestation rate of the forest (Gandour 2021). Empirical evidence supports the thesis that policies introduced under the PPCDAM were successful in combating deforestation, even though the drop in prices of agricultural commodities also contributed to the slowdown in deforestation (Hargrave and Kis-Katos 2013; Assunção et al. 2015; and Burgess et al. 2019).

Figure 1. Annual Deforestation Rates in the Legal Amazon, 1988-2022



Source: *CPI/PUC-Rio with data from TerraBrasilis (PRODES), 2023*

Deforestation in the Amazon increased again from the mid-2010s onward, with the flexibilization of government environmental policies, reduced investments in law enforcement, and the onset of an economic crisis in the country. Rising deforestation rates became particularly significant after 2018, when the newly elected federal government explicitly supported the economic exploitation of the region at the expense of environmental preservation. During this period, the government implemented measures that weakened

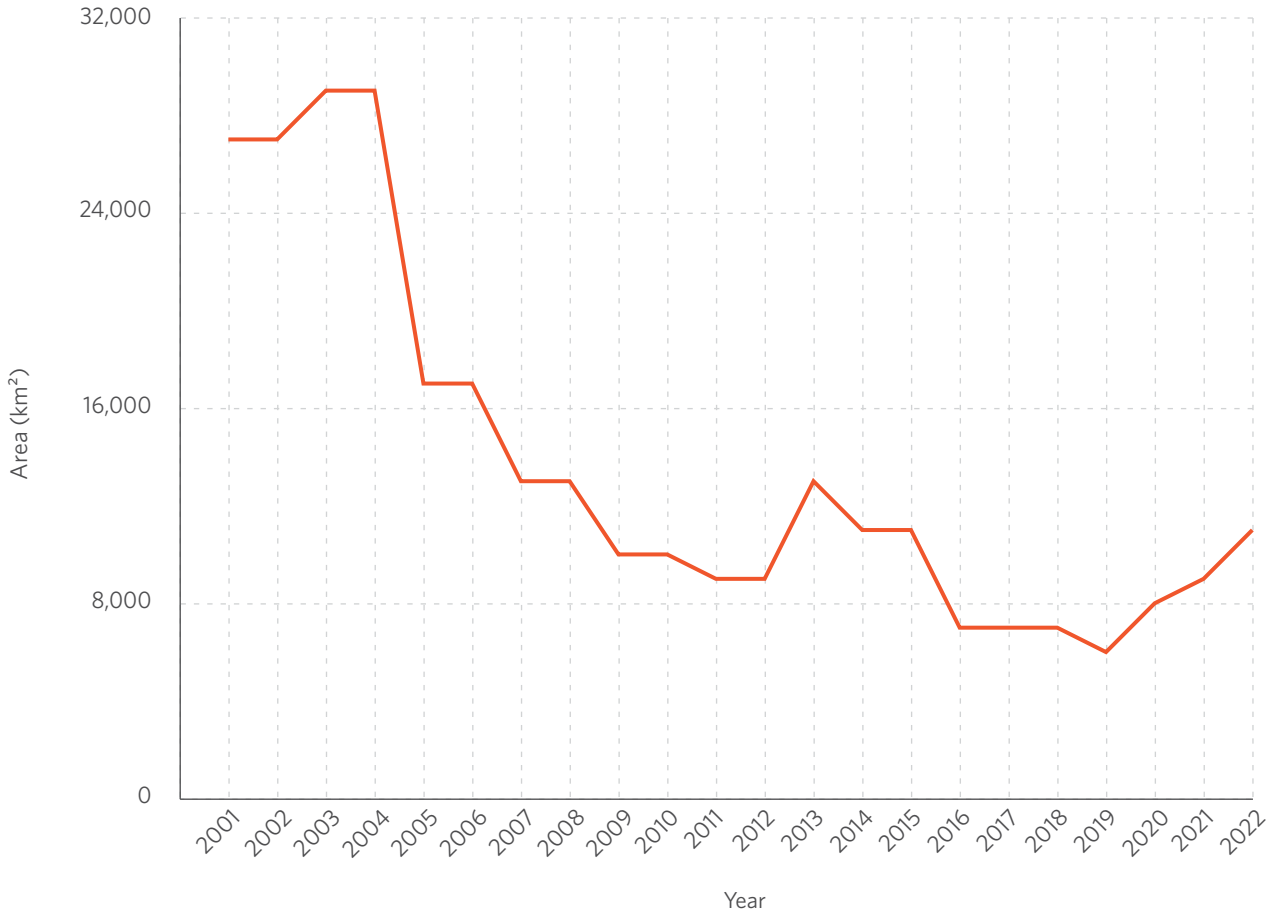
6 In 2016, a fourth axis of action was added, focused on normative and economic instruments.

deforestation control policies and environmental protection, passing regulations to relax environmental licensing and halting the creation of new protected areas. These actions created an incentive for forest occupation and exploitation, resulting in a sharp increase in deforestation. Additionally, throughout this period, economic incentives stemming from agricultural policies contributed to changes in land use and productivity, as explained further in section "Regulatory Progress in Rural Credit".

Despite setbacks in Brazil's environmental agenda, in 2023 the federal administration changed and announced the fight against deforestation as one of its priorities, which includes a reestablishment of PPCDAM and the reactivation of the Amazon Fund.

Conversion in the Cerrado, the second-largest biome in Brazil, poses an equally serious and concerning environmental challenge. Despite its importance for biodiversity and climate regulation, the Cerrado has experienced alarming deforestation and conversion rates. Between 2019 and 2022, over 40% of all deforestation/conversion in Brazil occurred in this biome (TerraBrasilis 2023a). Currently, natural primary vegetation represents only 47% of the biome, while pasture and crop areas account for approximately 30% and 15%, respectively (INPE and EMBRAPA 2020).

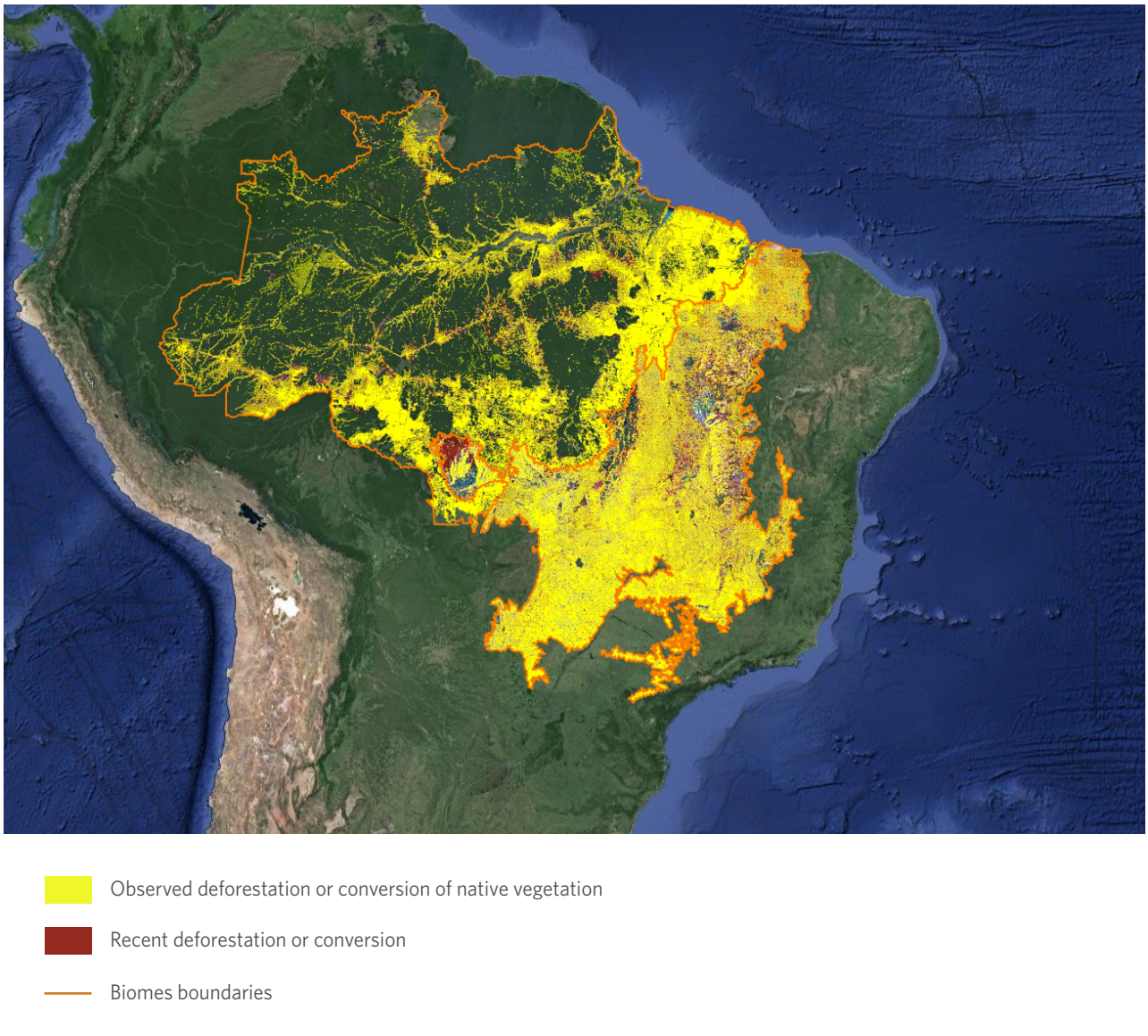
Figure 2. Annual Deforestation/Conversion Rates in the Cerrado, 2001-2022



Note: *The term "desmatamento" used by PRODES encompasses both the suppression of native vegetation and the conversion of areas. In Portuguese, both "deforestation" and "conversion" usually fall under the same term ("desmatamento"). It's important to note that, in the context of the Cerrado, the biome is not classified as a forest.*
Source: *CPI/PUC-Rio with data from TerraBrasilis (PRODES), 2023*

Like the Amazon, conversion in the Cerrado has been linked to public policies that incentivized the occupation of Brazil's countryside and the expansion of agricultural activities since the 1960s. Innovations in agricultural techniques and government incentives for territorial occupation encouraged rural producers from other regions to migrate to the Midwestern states, where new areas were opened for crops and cattle farming. The construction of highways heading north also triggered a migratory movement to the region, intensified in the 2000s with the adaptation of soybeans to the Cerrado's weather and soil, shifting the agricultural frontier expansion to the northern region of the biome, known as MATOPIBA.

Figure 3. Deforested/Converted Areas in the Amazon and Cerrado Biomes, 2000-2022



Note: *The representation of deforestation polygons is sensitive to scale. When presenting the entire Brazilian map captured from an interactive source, while accurately reflecting locations, the polygons adjust in size to optimize visibility, potentially creating the impression of widespread deforestation due to their spatial distribution. For a more detailed examination, refer to Figure 4.*

Source: *CPI/PUC-Rio with data from TerraBrasilis (PRODES), 2023*

The Brazilian government also implemented efforts to combat deforestation and conversion in the Cerrado. However, by the time the Prevention and Control of Deforestation Plan for Cerrado (*Plano de Prevenção e Controle do Desmatamento no Cerrado* - PPCERRADO) was launched in 2010, the biome had already lost nearly half of its native vegetation coverage. The plan was modeled after the PPCDAM, containing similar pillars of action, and registered three phases of development before being revoked in 2019, along with other prevention and control plans for different biomes.

One of the main challenges related to combating conversion in this biome is that, unlike the Amazon, the existing historical data on conversion for the Cerrado is relatively recent. The first results from the Cerrado monitoring system (PRODES Cerrado) were only presented in 2018, with annual conversion data being available only from 2013 onwards. The data reveal that the Cerrado is currently the Brazilian biome with the highest level of conversion (MMA 2023b).

In the face of alarming deforestation in the biome, the current federal administration announced a new phase of PPCERRADO to be implemented over five years, between 2023 and 2027. The new Plan entails strengthening the enforcement of forest legislation and the recovery and increase of native vegetation stocks and encouraging sustainable forest stewardship practices. The plan also commits to zero deforestation, which means eliminating illegal deforestation and compensating for legally sanctioned clearing of native vegetation[7] and resulting Greenhouse Gas (GHG) emissions.

Currently, the federal government has signaled a commitment to reduce native vegetation loss in the country and achieve zero deforestation by 2030 in all biomes (Cristaldo 2024). To reach this goal, a joint effort of public policies, effective enforcement, and society's commitment to ecosystem conservation is essential. However, environmental protection measures still face strong resistance in some sectors, including the Congress.

Determinants of Deforestation and Conversion

Most deforestation in Brazil is illegal, accounting for approximately 95% of all deforestation in the Amazon and the Cerrado, with the latter considering the MATOPIBA region (Valdiones et al. 2021). Although these two biomes account for 82% of Brazil's total deforestation (TerraBrasilis 2023a), they have distinct dynamics and determinants of deforestation.

In the Amazon, around half of recent deforestation is concentrated in undesignated public areas (Alencar et al. 2021). Since these areas lack specific designation, they become vulnerable to illegal activities such as land grabbing, invasions, and illegal logging. This scenario drives deforestation and contributes to forest degradation (Moutinho and Azevedo 2023).

Land tenure insecurity in the region is a historical problem related to the uncertainty of land rights recognition. There is a peculiarity regarding land tenure distribution in the Amazon: while 60% of its lands are classified as public lands, this number is only 12% in the rest of the country (Azevedo et al. 2020). In addition to being highly deforested, some of these

7 In alignment with the commitment to combat deforestation, it's worth noting that, unlike in the Amazon where the requirement for legal reserve is 80%, the Cerrado, has a lower mandatory percentage of 35% — applying specifically to properties within the Legal Amazonia (EMBRAPA nd).

public lands are illegally registered as private property, highlighting their vulnerability to land grabbing and real estate speculation. Land tenure insecurity, therefore, is at the root of difficulties in adopting sustainable land use models.

The areas recently deforested in the Amazon are often converted into pastures, which occupy about two-thirds of the historically deforested area in the Amazon rainforest (INPE 2014). These pastures have low productivity, with an average of one cattle head per hectare–area equivalent to a soccer field–in the region (Barreto 2021). Extensive cattle farming, practiced in many of these areas, results in low productivity and pasture degradation.[8] In 2021, nearly 60% of pastures in the biome showed some degree of degradation (MAPBIOMAS 2023).

Indeed, about a fifth of the country's total pastures consist of newly deforested areas, primarily concentrated in the northern region of the country (Guimarães 2020). There is evidence that the expansion of these pastures occurred as a means of land grabbing public lands (Lima Filho et al. 2021).

Although there are significant differences compared to the Amazon, the causes of illegal deforestation in the Cerrado are also linked to production chains, agricultural expansion, land insecurity and speculation, and inadequate fire management. While fire is a natural element in the biome's ecology, the occurrence of wildfires and forest fires is becoming increasingly frequent, intense, and destructive. Heat spots do not occur uniformly across the territory, with a higher concentration in states with higher deforestation levels and on rural properties, most of which are large and medium-sized (TerraBrasilis 2023b). The increasing intensity of fires is also associated with climate change, which leads to droughts and a greater vulnerability to fires (Li et al. 2021).

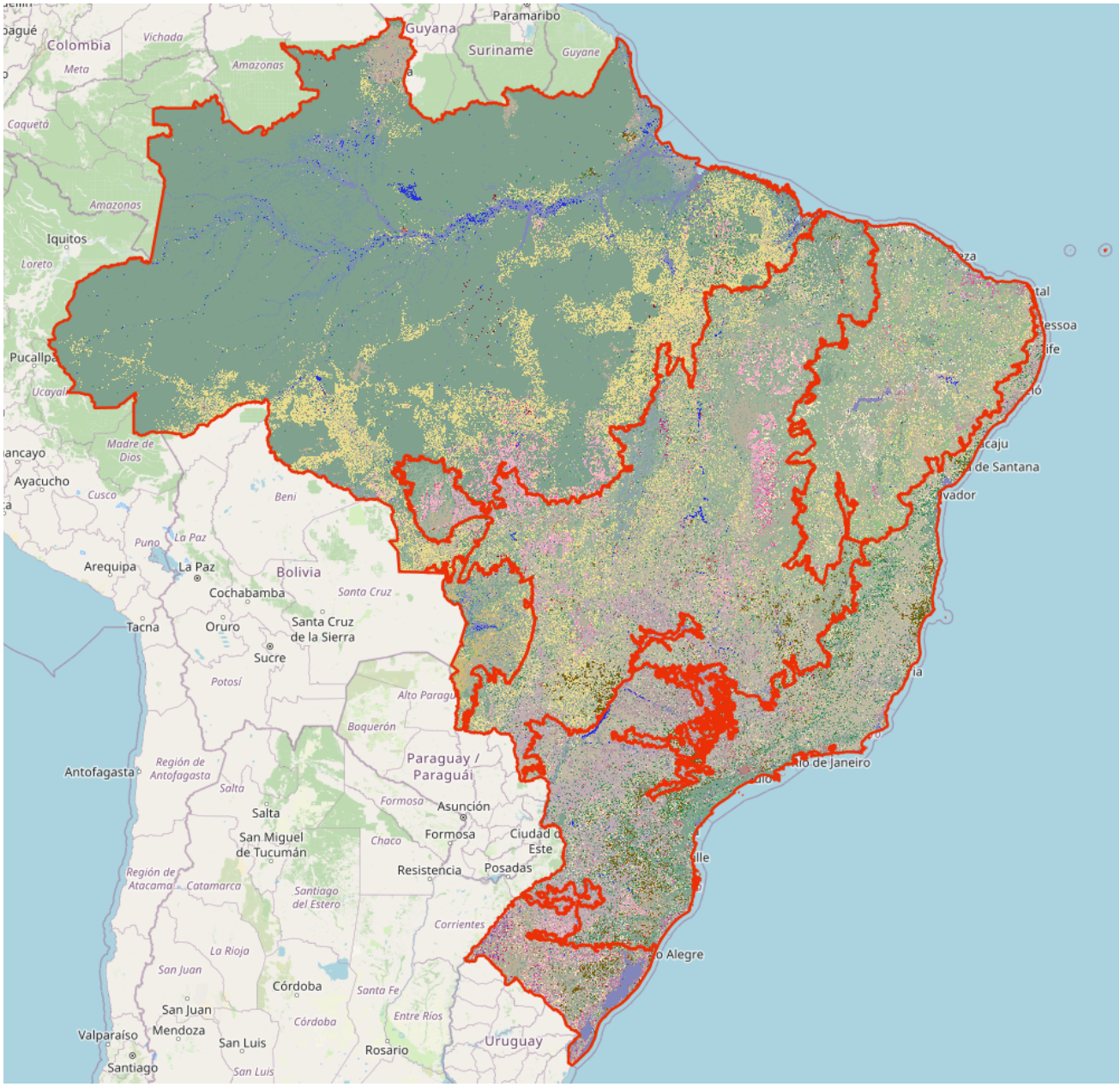
Similarly to the dynamics of the heat spots, recent Cerrado deforestation predominantly occurs in private areas, although it is also present in public areas. The land tenure dynamics on the biome explain this characteristic, as it is marked by a low percentage of public lands and protected areas, with a predominance of private properties accounting for nearly 80% of its total area. Despite this, the Cerrado still has a significant volume of public lands that attract deforestation due to speculative land acquisition by the private sector (MMA 2023b).

The scale of deforestation in the Cerrado has changed over time, shifting from small, deforested areas to larger areas exceeding 100 hectares, indicating significant investments for large-scale vegetation clearing. This extensive deforestation mainly concentrates in the northern part of the biome, in the MATOPIBA region.

MATOPIBA represents the most recent migration of agriculture to the Cerrado, with the adaptation of soybean cultivation to the Cerrado's weather and soil, a movement that intensified in the 2000s, increasing deforestation pressure in the region. However, despite the strong expansion of soybean cultivation in MATOPIBA, about a quarter of the soybean area in the region has low to medium agricultural suitability, and two-thirds of the soybean planting area comes from areas deforested before 2002. However, the entire biome has nearly 30 million hectares of pasture areas with high agricultural suitability, meaning that the stock of already consolidated lands is more than sufficient for doubling soybean cultivation in the Cerrado (Schüler and Bustamante 2022).

8 Pasture degradation occurs when the vegetation coverage is totally or partially lost, exposing the soil and reducing the amount of available organic matter. It is also associated with the presence of weeds and pests affecting forage plants.

Figure 4. Land Use and Land Cover Changes in Brazil, 1985-2022



Source: *CPI/PUC-Rio with data from MAPBIOMAS Platform, 2023.*

From the perspective of expanding food production, the country currently has vast deforested areas available for agricultural activities, eliminating the need to deforest new areas. In fact, in recent years, there has been a deceleration in the expansion of the agricultural area alongside an increased land productivity (Souza et al. 2020). Non-forest natural pastures and formations account for 27% of the country's land. Increased agricultural productivity can be achieved by converting pastures into crop areas and intensifying cattle farming, eliminating the need for further deforestation. This is supported by the fact that public policies that helped reduce deforestation did not negatively impact local agricultural production, indicating that increased productivity can be achieved through improved land allocation (Assunção et al. 2023).

While command and control strategies are used to combat deforestation and conversion, they have limitations in their effectiveness. To address this complex issue broadly, it is necessary to adopt a more comprehensive approach, including land tenure regulation and the implementation of financial incentives for conservation and sustainable agricultural practices.

In this regard, the national rural credit policy in Brazil, centered on the Brazilian Agricultural Plan (*Plano Safra*), can play a significant role in the relationship between agricultural activities and deforestation. Through subsidies to provide better financial conditions and direction of private bank's resources for rural financing, the Agricultural Plan is the main policy for supporting the agricultural sector in Brazil. Empirical evidence shows that rural credit has a positive average impact on agricultural productivity, reducing the total agricultural area, with no increase in deforestation (Souza et al. 2020). These gains are primarily associated with credit for small farmers, who face greater credit constraints. However, the results suggest that rural credit for larger producers is associated with increased productivity accompanied by an expansion of cultivated land and pastures, leading to deforestation.

These results indicate that rural credit offers room for improvement in reconciling production and conservation objectives. Specifically, linking subsidized rural credit to compliance with environmental requirements and land tenure can boost productivity and contribute to reducing pressures on deforestation. The rural credit policy has advanced in this regard, as shown in more detail in Section "Regulatory Progress in Rural Credit" (Assunção et al. 2020).

The specific conditions for credit lines defined within the scope of the Brazilian Agricultural Plan are subject to approval by the CMN and are annually registered in the Rural Credit Manual (*Manual de Crédito Rural* - MCR) by the Central Bank of Brazil (BCB). The Central Bank of Brazil, as the regulator, plays an important role in imposing restrictions and impediments in rural credit allocation and establishing financial incentives to promote sustainable practices in the agricultural sector. These efforts aim to address and discourage illegal deforestation and conversion while encouraging increased agricultural productivity without the need for opening new deforested areas.

Institutional, Legal, and Political Context

Brazil's environmental policy is shaped by a complex network of institutions, laws, and policies aimed at protecting the environment and promoting sustainable development. At the federal level, the MMA plays a central role in the formulation and implementation of these policies. It is responsible for directing policies focused on the conservation, protection, and sustainable use of natural resources. Additionally, the MMA coordinates national plans to control deforestation, such as the PPCDAM and PPCERRADO, as well as the National Environmental Policy (*Política Nacional do Meio Ambiente* - PNMA) and the National Plan on Climate Change (*Plano Nacional sobre Mudança do Clima* - PNMC).

IBAMA also plays a significant role as a federal agency linked to the MMA. It is responsible for environmental oversight and control throughout the Brazilian territory. This includes issuing licenses for projects that may impact the environment, monitoring the quality of natural resources, and imposing fines and embargoes in cases of environmental violations. In a similar manner, the Chico Mendes Institute for Biodiversity Conservation (*Instituto Chico Mendes de Conservação da Biodiversidade* - ICMBIO), also linked to the MMA, is responsible for managing the country's protected areas . Its duties include monitoring, the development of management plans, scientific research, and environmental education actions. At the state and municipal levels, entities such as environmental secretariats and state environmental protection agencies play a crucial role in implementing environmental policies and granting licenses for activities that may impact the environment.

In the legislative context, the Environmental Crimes Law (Law no. 9,605/1998) is one of the main legal frameworks, establishing criminal and administrative penalties for actions harmful to the environment. The approval of the new Forest Code (FC), or Law no. 12,651/2012, was another significant milestone, setting rules for land use, protection of native vegetation, and the restoration of degraded areas. The FC complements the monitoring system with requirements for preserving the Legal Reserve (*Reserva Legal* - RL) on rural properties and Permanent Preservation Areas (*Áreas de Preservação Permanente* - APPs), limiting the exploitation of vegetation in these areas.

The implementation of the Brazilian Forest Code is primarily the responsibility of the states, playing a crucial role in enforcing the guidelines established by the law. Additionally, the legislation mandates the creation of tools such as the Rural Environmental Registry (*Cadastro Ambiental Rural* - CAR) and the Environmental Compliance Program (*Programa de Regularização Ambiental* - PRA) as essential instruments for environmental management, monitoring, and compliance. While these instruments are fundamental at the national level, they are implemented and coordinated by the states, establishing a direct connection between federal environmental policies and the specific realities of each federative unit. It is worth noting that the management of the CAR database is a federal responsibility and a frequent subject of contention among the ministries. It was previously under the responsibility of the Brazilian Forest Service (*Serviço Florestal Brasileiro* - SFB) linked to the MMA and was formally transferred to the Ministry of Management and Innovation in Public Services (*Ministério da Gestão e Inovação em Serviços Públicos* - MGI).

Brazilian legislation also includes specific regulations for the protection and conservation of specific biomes, such as the Atlantic Forest Law (Law no. 11,428/2006) and the Pantanal Law, at the state level (Law no. 8,830/2008, Mato Grosso). In addition, institutions can

implement sublegal regulations related to the country's environmental and climate policies. Resolutions from the BCB and the CMN sometimes include provisions that encourage compliance with the current environmental legislation. They may also offer incentives for the National Financial System (*Sistema Financeiro Nacional* - SFN) to adopt sustainable practices and promote environmental conservation. Similarly, the Superintendence of Private Insurance (*Superintendência de Seguros Privados* - SUSEP) regulates the insurance market through sublegal acts such as ordinances and circulars, specifying specific rules to be followed by insurance companies. Representative entities, like the Brazilian Federation of Banks (*Federação Brasileira de Bancos* - FEBRABAN), can also take significant initiatives towards sustainability, indicating trends for the SFN. Finally, financial institutions can independently take their own measures towards environmental conservation, as is the case with Rabobank and the Brazilian Development Bank (*Banco Nacional de Desenvolvimento Econômico e Social* - BNDES), which monitor deforestation in rural credit operations.

The Central Bank of Brazil

Institutional Process

The Central Bank of Brazil (BCB), the country's primary monetary authority, is a federal agency dedicated to managing the country's purchasing power of the currency and price stability, promoting a robust and competitive financial system, while also contributing to the society's economic well-being. The bank also underscores social and environmental responsibility and integrity, and seeks recognition for promoting "inclusion, transparency, sustainability, and competitiveness in the financial system, along with encouraging financial education"[9] (as translated by the authors) (BCB 2023b, p. 27).

Since February 2021, the BCB has technical, operational, administrative, and financial autonomy granted through Law no. 179/2021. The law also establishes a fixed term for the president and directors of bank, which does not coincide with the term of the president of the republic, reducing the pressure of political interference in its operations.

As part of its mission, the BCB contributes to sustainable development in social, environmental, and economic areas, including the assessment and monitoring of risks associated with climate change for the SFN and the economy. In its institutional strategic planning, the BCB sets strategic objectives to promote sustainable finance and reduce socio-environmental and climate risks in the economy and the financial system. Furthermore, its actions contribute to various Sustainable Development Goals (SDGs) of the United Nations' 2030 Agenda for Sustainable Development.

The BCB is led by a Collegiate Board, and its organizational structure includes three committees: the Monetary Policy Committee (*Comitê de Política Monetária* - COPOM), the Financial Stability Committee (*Comitê de Estabilidade Financeira* - COMEF), and the Governance, Risk, and Control Committee (*Comitê de Governança, Riscos e Controles* - GRC). The latter addresses social, environmental, and climate risks in BCB's Integrated Risk Management Policy (*Política de Gestão Integrada de Riscos do Banco Central do Brasil* - PGR-BCB).

In addition to these committees, the BCB established an Committee for Organizational Social and Environmental Responsibility (*Comitê de Responsabilidade Socioambiental Organizacional* - CRSO) in 2017 to coordinate internal actions of social and environmental responsibility, consolidate best practices, and facilitate integration and the exchange of experiences regarding sustainability initiatives and projects developed within the BCB, within a governance framework for the implementation and monitoring of its Policy for Socio-

9 Original Text: "inclusão, transparência, sustentabilidade e competitividade no SFN e pelo estímulo à educação financeira".

Environmental Responsibility (*Política de Responsabilidade Socioambiental* - PRSA), created in the same year. In 2021, the PRSA was revised, and the Committee of Sustainable Economy (*Comitê Economia Sustentável* - ECOS)[10] was established, a consultative committee aimed at coordinating initiatives, projects, and activities carried out by different areas of the BCB in the Sustainability dimension of the BC# Agenda, launched in 2020.

The BCB actively participates in international forums and organizations, such as the Basel Committee on Banking Supervision (BCBS), the Financial Stability Board (FSB), the Network for Greening the Financial System (NGFS), and the G20, contributing to discussions on climate issues and their potential impacts on the financial system, as well as supporting the Task Force on Climate-related Financial Disclosures (TCFD).

The BCB, as the monetary authority, issues resolutions that establish rules and guidelines for financial institutions and other entities under its jurisdiction. These resolutions have the force of law within the financial system and are developed based on the legal framework that defines the BCB's regulatory authority. They are created in accordance with regulatory needs and changes in the financial and economic environment. They may be subject to public consultation to allow for a more participatory and transparent process in defining certain standards.

In addition to the resolutions issued by the Central Bank itself, the CMN, as the highest deliberative authority in the SFN, has the competence to issue directives and regulations for its operation. The CMN regulates Brazil's monetary, credit, budgetary, fiscal, and public debt policies. The Council is composed of the Minister of Finance, who presides over it, the Minister of Planning, and the President of the Central Bank. The BCB, in turn, serves as the executive secretariat of the CMN, providing the necessary technical support for its operation.

Regulatory Improvements, Actions, and Policies in Place

In recent decades, major corporations and the financial sector have moved to adopt Environmental, Social, and Governance (ESG) practices and address a shift towards a low-carbon economy. Aligning with global best practices and recognizing the pivotal nature of this agenda, the BCB and the CMN have spearheaded a series of initiatives and introduced new requirements. They have also established a fresh regulatory framework, aiming to modernize practices and foster sustainability within the SFN, highlighted in Figure 5. These measures have sought to ensure that financial institutions actively consider socio-environmental aspects in their operations. They also play a crucial role in channeling resources towards decarbonization efforts and supporting financing aligned with rigorous ESG criteria, ultimately fostering the development of a sustainable economy.

In 2014, the CMN issued Resolution no. 4,327/2014, introducing the concept of socio-environmental risk management in the SFN. This resolution provided guidance for financial institutions to implement a comprehensive PRSA. The PRSA, as outlined by the resolution, serves as a blueprint, encapsulating principles and guiding directives for an institution's socio-environmental actions. It encompasses various aspects, including governance,

10 Central Bank Resolution no. 169, of December 2, 2021.

socio-environmental risk management, and the need for action plans. This regulatory step represented a significant stride, encouraging financial institutions to integrate socio-environmental considerations into their operations and overarching strategies.

Upon the publication of CMN Resolution no. 4,327/2014, financial institutions faced the obligation of establishing and implementing their own PRSAs starting in 2015. In a bid to facilitate the regulation's implementation, FEBRABAN, the primary representative entity for the banking sector in Brazil, published the Socioenvironmental Responsibility Protocol (SARB14) in the same year (FEBRABAN 2014). This protocol laid the foundation for a self-regulation program, offering comprehensive guidelines and procedures. It aimed to seamlessly integrate socio-environmental risk assessment and management practices into the fabric of business operations and relationships within the SFN.

The SFN witnessed further strides towards sustainability with notable initiatives. In 2015, the first green bond was issued in Brazil, a significant milestone in the country regarding sustainable finance.[11] In the following year, FEBRABAN and the Brazilian Business Council for Sustainable Development (*Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável* - CEBDS) jointly published the Guide for Green Bond Issuance in Brazil (FEBRABAN 2016). The document provided guidelines for green bond issuance directed to participants and stakeholders in the fixed-income securities market in Brazil, considering the main stages of the process, in accordance with current regulations.

In 2017, three years after the publication of CMN Resolution no. 4,327/2014, the CMN issued Resolution no. 4,557/2017, outlining the framework for risk and capital management. Socio-environmental risk became an integral part of the broader requirements of traditional risk management structures. The climatic element, however, was only implicitly considered within the broader context of the environmental category, lacking a distinct emphasis. The norm provided limited details on the treatment of social, environmental, or climate-related risks.

In the same year, the TCFD, a global initiative established by the FSB to identify relevant information for the assessment and pricing of climate change risks and opportunities by the financial sector, developed a comprehensive and accessible protocol for financial disclosures related to climate change. The TCFD recommendations were launched in 2017 and have since been voluntarily adopted globally by both public and private, financial and non-financial institutions. In line with the TCFD recommendations, the World Economic Forum (WEF) introduced in 2020 the framework of "Measuring Stakeholder Capitalism Towards Common Metrics and Consistent Reporting of Sustainable Value Creation" (WEF 2020). This initiative consolidates metrics and criteria to assist companies in measuring and disclosing their contributions to a more sustainable relationship with the planet. One of the pillars of the WEF approach is labeled "Planet" and indicates the application of TCFD recommendations.

In the face of the growing need for enhanced financial disclosures on climate change, FEBRABAN, as the primary representative entity of the Brazilian banking sector, initiated the development of a roadmap in 2018 to assist banks in adopting TCFD recommendations (FEBRABAN 2022). This roadmap serves as a practical tool, offering guidance on integrating TCFD recommendations into governance practices, business strategies, and reports of financial institutions.

11 In 2015, BRF pioneered the green bond market in Brazil and Latin America, becoming the first issuer in a € 500 million deal to finance sustainable projects.

As an effort to modernize the SFN, the Central Bank launched the BC# Agenda in 2019. The agenda's initiatives are structured in five dimensions: Inclusion, Competitiveness, Transparency, Education, and Sustainability, with the latter being incorporated in September 2020. The BCB's movement aligns with the expanding interest of regulators in the subject, affirming its understanding of the importance of social, environmental, and climate risks for financial stability and acknowledging the crucial role of financial institutions in addressing these risks.

The BC# Sustainability Agenda addresses the promotion of sustainable finance and the proper management of social, environmental, and climate risks in the economy, the SFN, and the BCB itself by integrating sustainable variables into the institution's decision-making process. Among the actions announced in the BC# Sustainability Agenda is the publication of the BCB's Report on Social, Environmental and Climate-related Risks and Opportunities, whose first edition was released in September 2021. The report, issued annually and currently in its third edition, provides an integrated overview of the BCB's actions related to ESG factors. The report also highlights the progress of the BC# Sustainability Agenda in five areas: regulation, supervision, policies, partnerships, and internal actions.

Regarding regulation, the BCB updated its normative framework for socio-environmental risks in 2021, with the approval of a series of norms by the CMN. Before the resolutions were published, the BCB conducted Public Consultation 85/2021 to disseminate a set of normative proposals to enhance the rules for managing social, environmental, and climate risks applicable to financial institutions, in a participatory process that involved contributions from civil society and stakeholders. In September 2021, CMN Resolutions no. 4,943/2021 and no. 4,944/2021 were published, outlining definitions and requirements for the identification, assessment, measurement, and monitoring of risks applicable to institutions. Simultaneously, CMN Resolution no. 4,945/2021 established the Social, Environmental, and Climate Responsibility Policy (*Política de Responsabilidade Social, Ambiental e Climática* - PRSAC) and outlined actions for its effectiveness, replacing the old PRSA and mentioning climate concerns explicitly.

The new risk management rules focus on addressing the possibility of losses for regulated institutions. These rules redefine the concept of social risk, related to actions that violate fundamental rights or common interests, and environmental risk as the losses occurring to the financial institutions as a cause of environmental degradation and excessive use of natural resources, including deforestation. Additionally, they introduce the concepts of transition climate risk, related to the shift to a low-carbon economy, and physical climate risk, concerning extreme weather events and long-term climate changes that may impact institutions.

These rules also integrate these risks with traditional ones (credit, market, liquidity, and operational), establishing minimum criteria to be followed by financial institutions. Moreover, they demand that these concerns are considered in the risk appetite statement and stress tests, focusing on scenarios of climate change and a transition to a low-carbon economy. Financial institutions must also identify risks to reputation, concentration in vulnerable sectors, and enhancement of social, environmental, and climate management.

Complementarily, the recently introduced PRSAC consists of a set of social, environmental, and climate principles and guidelines that institutions must adhere to in carrying out their activities. Socially, it encompasses respect, protection, and promotion of fundamental rights and common interests. In the environmental context, it emphasizes the preservation, repair,

and, when possible, the recovery of the environment. Regarding climate, the PRSAC focuses on the institution's contribution to transitioning to a low-carbon economy and reducing the impacts of frequent and severe weather events or long-term environmental changes associated with shifts in climate patterns.

More importantly, the PRSAC establishes the need for financial institutions to implement actions to ensure their effectiveness and strengthen governance and transparency requirements. To achieve this, the PRSAC should be publicly disclosed alongside its actions, and the institutions are responsible for establishing clear and verifiable criteria.

Together, Resolutions CMN no. 4,943, no. 4,944, and no. 4,945 address double materiality by considering both financial materiality, related to the risks and impacts of environmental, social, and climatic factors that financial institutions may face, and social and environmental materiality, which pertains to the impacts these institutions may have on these issues. These resolutions provide a comprehensive approach, recognizing the bidirectional interaction between financial institutions and their external environment, integrating ESG aspects into regulatory frameworks.

In addition to enhancing regulation on socio-environmental risks, the BCB also expanded disclosure requirements for information related to risks and opportunities arising from social, environmental, and climate issues by financial institutions, based on TCFD recommendations. Similarly, the BCB conducted Public Consultation 86/2021 to disclose the normative proposal for establishing these new requirements. Due to the complexity of implementing this action, the BCB opted for the gradual adoption of recommendations in two phases.

The first phase was completed in 2021, with the publication of prudential regulation addressing qualitative aspects of the recommendations, focusing on governance, institutional strategies, and risk management. BCB Resolution no. 139/2021 oversees the disclosure of the Social, Environmental, and Climate Risks and Opportunities Report (*Relatório de Riscos e Oportunidades Sociais, Ambientais e Climáticoas* - GRSAC Report), covering requirements for (i) the management of social, environmental, and climate risks (physical and transition), considering aspects such as governance and strategies adopted by institutions over different time horizons; (ii) indicators used in the management of social, environmental, and climate risk; and (iii) business opportunities associated with social, environmental, and climate issues. Risks originating from deforestation must also be addressed in the GRSAC report. Normative Instruction BCB no. 153/2021 was released simultaneously, establishing standardized tables for presenting the GRSAC Report.[12]

The second phase, still in progress, foresees the implementation of the quantitative aspects of the recommendations, focusing on metrics and targets. This phase was rescheduled due to ongoing international initiatives, such as the global sustainability information standard by the International Sustainability Standards Board (ISSB), affiliated with the IFRS Foundation, published in June 2023, and recommendations of the Basel Committee on Banking Supervision (BCBS) To align the new quantitative requirements to be incorporated into Brazilian regulation with international initiatives, the BCB postponed the conclusion of this phase but launched Public Consultation 100/2024 to obtain contributions and information with a view to improving the rules that deal with the disclosure of the GRSAC Report. The BCB emphasizes the gradual implementation of this regulation as a fundamental premise to foster synergies and learning for both the central bank and institutions within the SFN.

12 For more details on Normative Instruction BCB no. 153/2021, see bit.ly/4dUN6xs.

In 2022, regulatory actions on the agenda included adjustments to the accounting registration of sustainability assets related to social, environmental, and climate issues, with the publication of BCB Normative Instruction no. 325. This measure aims to enhance transparency in the use of these assets by financial institutions, standardizing their accounting registration to enable monitoring by the Central Bank and appropriate actions when necessary. Additionally, in 2023, BCB issued Normative Instruction no. 406, providing guidance on gold purchases and eliminating the presumption of legality and good faith to encourage responsible practices and mitigate deforestation associated with illegal mining of this metal.

Lastly, the regulatory agenda envisions the establishment of a Sustainable Rural Credit Bureau *(Bureau de Crédito Rural Sustentável)*[13] and the introduction of sustainability incentives for rural credit operations. The BCB has an extensive agenda specifically focused on social and environmental aspects applicable to rural credit, which will be the subject of the next section of this report.

Concerning supervisory actions within the BC# Sustainability Agenda, initiatives include refining the Social, Environmental, and Climate-related Risks (RSAC) supervision process,[14] the structuring and expansion of information collection on socio-environmental risks through the Social, Environmental, and Climate Risk Document (D*ocumento de Riscos Social, Ambiental e Climático* - DRSAC), instituted by BCB Resolution 151/2021 and BCB Normative Instruction 222/2021. Information collection on financial institutions' exposure to environmental, social, and climate risks has already started, with a staggered submission schedule, and the first data submission was received by the DRSAC in February 2023.

Supervisory activities also involve conducting climate stress tests, assessing the sensitivity of financial institutions' credit portfolios to physical risk considering extreme climatic scenarios. The first exercise was conducted in 2022, evaluating extreme droughts, and the second, in 2023, assessed the risk of heavy rainfall. In 2023, the BCB also introduced the Financial Stability Survey (FSR), a module focusing on climate risk-related issues and their effects on the financial system within the macroprudential monitoring framework, slated for annual monitoring. It is important to mention that the BCB's supervision already assesses credit exposure of financial institutions associated with deforestation.

In addition, structured macroeconomic models aimed at tackling climate-related concerns are being developed, with a primary focus on creating scenarios for stress tests assessing financial stability. This includes the adaptation of the BCB's Dynamic Stochastic General Equilibrium (DSGE) model for the Brazilian economy, *Samba*, incorporating the impacts of climate change and policies fostering the transition to a low-carbon economy. The BCB is also participating in working groups led by the NGFS, to address queries about historical data and scenarios used to estimate and condition projections in the domestic climate-related model.

The BCB has been working to assess the impact of social, environmental, and climate risks on the economy and the SFN. One project specifically measures the economic and financial effects of the 2015 Mariana disaster, while others analyze the impact of frost events on

13 Currently denominated as Rural Credit Bureau (*Bureau de Crédito Rural)*.

14 The action aims to strengthen guidance to financial institutions on aspects evaluated by the BC's supervision related to the new regulations on social, environmental, and climate responsibility and risk, through CMN Resolutions nos. 4,943/2021 and 4,945/2021, and BCB Resolution no. 138/2021.

companies' production chains, and the impacts of extreme events on companies' financial flows (Silva et al. 2023).[15]

The BC# Sustainability Agenda also involves incorporating sustainability criteria in the selection of counterparts for managing international reserves and investment choices. The evaluation of counterparts occurs annually, where criteria such as execution, back-office, and market analysis are assessed, including an indicator scoring the sustainability ranking of these counterparts. Additionally, sustainability standards are incorporated into recent investment decisions involving green bonds, as well as the selection of Exchange Traded Funds (ETFs) for corporate bonds, considering their ESG classifications within the reserve investment portfolios.

In terms of partnerships within the BC# Sustainability Agenda, the BCB formalized its support for TCFD in 2020 and became a TCFD Supporter, demonstrating its commitment to enhancing transparency on climate issues in the financial sector to bolster resilience. Additionally, the BCB joined the NGFS in the same year, a network that brings together central banks and supervisory authorities to share sustainable practices in the financial sector and mobilize resources for the transition to a sustainable economy. The BCB also forged partnerships, such as signing memorandums of understanding with the Climate Bonds Initiative, and maintained international connections with other central banks, international organizations, and multilateral forums to develop competencies and regulations related to socio-environmental and climate risks in the SFN. In January 2022, the BCB became a member of the Steering Committee of the NGFS, joining a select group of central banks guiding the network's agenda.

Finally, the BC# Sustainability Agenda outlines internal actions related to measures that the BCB adopts to incorporate more responsible and sustainable practices into its operations and organizational culture. Some examples include the socioenvironmental responsibility in the Museum of Values, the promotion of a sustainability culture by the Socioenvironmental Responsibility Committee, the completion of a GHG emissions inventory, and the reduction of environmental impact in banknote management, including the annual withdrawal of non-circulating notes. These actions aim to make BCB's operations more aligned with responsible socioenvironmental practices.

Regulatory Progress in Rural Credit

As shown before, the main source of GHG emissions in Brazil is land use change and agricultural activities. Regulations concerning financing for the agricultural sector in Brazil thus constitute a relevant policy lever to implement changes at scale. The national rural credit policy is the primary agricultural policy in the country and can be a significant ally in combating deforestation when aligned with sustainability objectives and compliance with Brazil's Forest Code. Every year, hundreds of billions of brazilian reais in financing are directed to agricultural policy through the Brazilian Agricultural Plan, with most resources being subsidized or directed by policy guidelines. Brazil announced R$ 426 billion in credit

15 The Mariana disaster occurred in November 2015 in Brazil and involved the catastrophic failure of a tailings dam near the city of Mariana, releasing toxic mud from iron ore mining operations. This environmental tragedy caused extensive damage to nearby communities and ecosystems, making it one of Brazil's largest environmental accidents. The incident prompted discussions about mining practices, environmental regulations, and corporate responsibility.

in the 2023/24 agricultural year alone, which corresponded to nearly 40% of the country's total agricultural production in 2023 estimated at R$ 1,135 trillion reais (MAPA 2024). The balance of rural credit loans in February 2023 was of R$ 586.3 billion, equivalent to 12.1% of all credit operations in the Brazilian Financial System (BCB 2023a).

The Ministries of Agriculture and Cattle (*Ministério da Agricultura e Pecuária* - MAPA), of Finance (*Ministério da Fazenda* – MF), of Agrarian Development and Family Agriculture (*Ministério do Desenvolvimento Agrário e da Agricultura Familiar* - MDA) and the BCB develop normative proposals for the Agricultural Plan, regulating funding sources, allocating amounts for each credit line, and the respective financial conditions for obtaining loans for the next agricultural year. The specific conditions for the credit lines defined within the scope of the Agricultural Plan are subject to approval by the CMN and are recorded annually in the MCR by the BCB. All beneficiaries and financial institutions operating in the National Rural Credit System (*Sistema Nacional de Crédito Rural* - SNCR), private or public, must adhere to the provisions in the MCR.

Through rules aligned with environmental preservation, it is possible to encourage business models that adopt sustainable techniques and technologies while boosting productivity, without resorting to the opening of new deforested areas. Empirical evidence shows that rural credit has significant impacts on agricultural productivity and positive effects on vegetation coverage, reducing pressures for deforestation (BCB 2023a).

In 2008, the BCB began to require documentary evidence of environmental compliance and rural property registration for financing agricultural activities in the Amazon biome, through Resolution no. 3,545/2008. Empirical evidence shows that this measure led to a reduction in the volume of credit granted in the biome between 2008 and 2011, which, in turn, helped to curb deforestation (Assunção et al. 2019). This effect was mainly due to a decrease in the volume of medium and large-sized credit contracts and was concentrated in municipalities where cattle farming was the primary economic activity. The author's interpretation is that in these municipalities, rural credit was being used to support activities that encroached on the forest. Despite its initial effectiveness upon implementation, it weakened in the following years due to a general weakening of other command-and-control policies aimed at combating deforestation.

In 2010, the CMN published Resolution no. 3,896, which established the National Program for Low-Carbon Emissions in Agriculture (*Programa para Redução da Emissão de Gases de Efeito Estufa na Agricultura* - ABC Program), a credit line aimed to promote the adoption of good production practices that allow for the reduction of greenhouse gas emissions. The ABC Program has been in operation since 2010 and emerged in the context of the Ministry of Agriculture's launch of the Agricultural Sector Plan for Climate Change Mitigation and Adaptation for the Consolidation of a Low-Carbon Economy (*Plano Setorial de Mitigação e de Adaptação às Mudanças Climáticas para a Consolidação de uma Economia de Baixa Emissão de Carbono na Agricultura* - ABC Plan), whose goal is to promote a series of actions to reduce GHG emissions in agriculture and enable the agricultural sector to adapt to climate change. Renamed as the Program for Financing Sustainable Agricultural Production Systems (*Programa de Financiamento a Sistemas de Produção Agropecuária Sustentáveis* - RENOVAGRO) in 2023, the program is an investment line that operates with subsidized interest rates and financed approximately R$ 23.3 billion between the 2013/2014 and 2022/2023 agricultural

years, which constitutes a relatively small portion of total investment credit, representing around 6% (BCB 2023c).

RENOVAGRO/ABC credit lines aim to support the recovery of degraded areas and pastures, the adjustment or regularization of rural properties in accordance with environmental legislation, including the restoration of LRs or APPs. Eligible sustainable agricultural practices financed through RENOVAGRO /ABC credit lines include cultivating forests, Crop-Cattle-Forest integration systems, no-till production systems, use of biofertilizer, among others (Resolution CMN no. 4,889/2021).

In 2012, CMN Resolution no. 4,106 created new incentives for rural credit operations that met specific environmental criteria. Producers who could prove the existence of LRs and APPs as stipulated by the Forest Code, and presented a PRA or adopted traceability systems could enjoy cumulative increases in credit limits. Additionally, producers who adopted the no-till practice, a low-carbon emission technique, would receive an additional increase in credit limits. In the following year, through Resolution no. 4,226/2013, the CMN adjusted this rule to also include producers enrolled in the CAR as beneficiaries of the increased credit limit.

CAR is an electronic registration system that maps and documents information about rural properties, including their vegetation coverage, land use, and preservation areas. CAR was instituted nationally by the Forest Code, with the goal of creating a registry of all rural properties in the country, integrating environmental information into a database to facilitate the environmental regularization of rural properties and ensure control, monitoring, and combating deforestation in Brazil.

Although CAR is mandatory for all rural properties, its implementation is still ongoing and depends on various stages. This includes property registration in the National Rural Environmental Registry System (*Sistema Nacional de Cadastro Ambiental Rural* – SICAR) of the CAR by producers, whose deadline has been extended several times over the years due to operational and logistical challenges. Besides the registration, as the CAR information is self-declared by property owners, analysis and data validation steps by competent state agencies are necessary to ensure the accuracy and compliance of information, as well as the proper application of environmental regulations. Despite progress, CAR implementation faces enormous challenges: as of September 2023, about 27% of total registrations had undergone some form of analysis, and only 1.3% of registrations had completed environmental regularity analysis (MMA 2023b; Lopes et al. 2023).

In the context of rural credit, the presentation of the CAR registration receipt became effectively mandatory for receiving agricultural financing in 2018. CMN Resolutions no. 4,487/2016 and CMN no. 4,529/2016 consolidated this change in the Rural Credit Manual, initially scheduled for May 2017 but postponed to 2018 as the government extended the CAR registration deadline several times in that interval. This measure was a significant step towards environmental regularization, promoting compliance with a legal requirement of the Forest Code.

In 2020, CMN published Resolution no. 4,883/2020, expanding the working capital credit limits for producers with a 'validated CAR'. This represented progress compared to CMN Resolution no. 4,226/2013, as now, to qualify for the limit increase, CAR information needed to be validated by a state agency, and not simply presented.

Later, Resolution CMN no. 5,021/2022 improved this measure by specifying three stages of CAR analysis for the increase in working capital credit limits. The new resolution brought greater clarity regarding the specific criteria for determining producer eligibility. Producers who had completed CAR analysis and were in compliance with the Forest Code, whether there was a surplus of LRs or not, would be eligible for the credit limit increase. Those who had the CAR analyzed, and were in the process of environmental regularization, would also be eligible. In the case of environmental liabilities, the producer would need to have joined the PRA.

In 2023, CMN included an additional benefit for producers with the CAR under these conditions. In addition to the increase in working capital credit limits, these producers could also obtain discounts on interest rates on working capital operations, as per CMN Resolutions no. 5,078/2023 and no. 5,102/2023. The interest rate discount tends to be more attractive than the expansion of the available credit limit to the producer, as it directly affects the operation's cost. However, the impact of the change is potentially small, given that less than 2% of registrations have completed analysis and are therefore eligible for the discount. However, these resolutions represent another step in generating incentives for producers to comply with environmental legislation, and for states to expedite CAR analysis and PRA regulation.

In another front, the BCB released Public Consultation no. 82 in 2021 to disclose proposals for regulations related to sustainability criteria applicable in rural credit granting and the characterization of enterprises with access restrictions to rural credit due to socio-environmental issues. Although the sustainable criteria ended up not being implemented, this initiative flagged the ongoing commitment of the BCB to improve regulations to promote sustainability in rural credit and resulted in one of the most significant steps towards environmental compliance in rural credit with Resolution BCB no. 140/2021.

This resolution included a new chapter in the MCR, establishing social, environmental, and climate impediments in the conditions for granting rural credit. With this resolution, the provision of credit would not be allowed for properties with canceled CAR registration, and enterprises located in protected areas, indigenous territories, and/or quilombola communities. Additionally, enterprises that had embargoes from IBAMA due to the economic use of illegally deforested areas in the Amazon biome and those that subjected workers to conditions akin to slavery were also prohibited.

Resolution BCB no. 140 brought an innovative approach by linking access to agricultural financing to the compliance with pre-established criteria. Unlike previous approaches based on financial benefits and documentation presentation, the resolution established that rural producers violating these criteria would have their access to financing blocked. This is done by means of real-time verification, using geoprocessing techniques, previous to the system automated BCB authorization to each rural credit operation.[16] The measure creates significant pressure for producers to seek compliance with these criteria, as the prohibition of credit access tends to be more effective in achieving results than financial incentive measures by imposing direct and immediate consequences for non-compliance with rules or regulations.

Resolution CMN no. 5,081/2023 introduced important improvements and new impediments compared to Resolution BCB 140/2021. The new norm expanded the restriction on

16 Critical rural credit regulation requirements are checked through Rural Credit and PROAGRO Operations System (*Sistema de Operações do Crédito Rural e do PROAGRO* – SICOR) .

rural credit granting related to the CAR, extending the prohibition to enterprises with suspended CAR registrations.[17] Additionally, the norm conditioned credit provision to rural properties wholly or partially located in protected areas listed in the National Registry of Conservation Units (*Cadastro Nacional de Unidades de Conservação* - CNUC). There was a modification in the definition of lands occupied by indigenous people, requiring them to be homologated, regularized, or defined as an Indigenous Reserve in the Indigenous Information System of the Brazilian Indigenous Peoples Foundation (*Fundação Nacional dos Povos Indígenas* - FUNAI). The resolution also expanded restrictions by blocking credit to embargoed areas, including embargoes issued by state agencies throughout the national territory, not limited to the Amazon biome. Furthermore, the norm introduced credit restrictions for enterprises in Public Forest Type B (undesignated) areas and established that the identification of rural property for credit purposes will be based on the information from the SICAR.

These changes represent a significant evolution in regulations to promote more sustainable practices and compliance with environmental laws in the agricultural sector. Not only did regulations become stricter towards environmental conditionalities for rural credit, but they also advanced on implementation issues by clearly defining registries and databases to be integrated to make the regulation work. In terms of enforcing the new impediments established by Resolutions BCB no. 140/2021 and CMN no. 5,081/2023, the BCB's is working to pinpoint areas with signs of non-compliance with these resolutions. Financial institutions responsible for these operations are required to verify and provide explanations for any identified non-compliance. In cases where non-compliance is confirmed, institutions must declassify the operations. This measure incurs a substantial increase in costs for the borrower and may lead to the reporting of irregularities to other authorities. In 2021, as part of the BC# Sustainability initiative, the BCB announced the creation of the Sustainable Rural Credit Bureau, now referred to simply as the Rural Credit Bureau. This initiative involved the transformation of the SICOR,[18] a comprehensive data system containing detailed information on all rural credit contracts nationwide. The Bureau's implementation aims to verify rural credit impediments at the moment of contracting and after, in the monitoring process. For this to be feasible, the BCB is partnering with several institutions to integrate databases into SICOR, such as the SFB, FUNAI, the National Institute for Colonization and Agrarian Reform (*Instituto Nacional de Colonização e Reforma Agrária* - INCRA), IBAMA, ICMBIO, the National Water and Sanitation Agency (*Agência Nacional de Águas e Saneamento Básico* - ANA), and the Ministries of the Environment and of Justice. This process involves signing of agreements with government agencies and the collaboration between the BCB and experts from technical entities, enhancing the supervision of rural credit and PROAGRO.

The development of the Bureau also involves the complete disclosure of data on rural credit operations that receive any subsidy, which has been available since 2022 on the BCB's website. Additionally, the creation of the Bureau involves the development of a consultation service that integrates principles of Open Finance, allowing rural credit beneficiaries to share the registered data directly with third parties, eliminating the need for financial intermediaries

17 The term 'canceled CAR' refers to the revocation of the CAR due to the provision of false information, by judicial or administrative decision, or at the request of the owner/holder. This implies the loss of environmental regularity for the property, with possible legal implications. On the other hand, a 'suspended CAR' indicates a temporary interruption of the registry due to irregularities or issues that require corrections. Typically, this suspension allows the rural landowner to make necessary adjustments to the information, and the registry is reactivated once regularization is achieved (Lima 2022).

18 The Agricultural Activity Guarantee Program (*Programa de Garantia da Atividade Agropecuária* - PROAGRO) is a public policy that exempts beneficiary farmers from fulfilling financial obligations in working capital rural credit operations and compensates producers for their own resources used in operational expenses in the event of losses caused by climatic events. It operates in a manner akin to insurance, providing financial relief and support to farmers affected by adverse weather conditions.

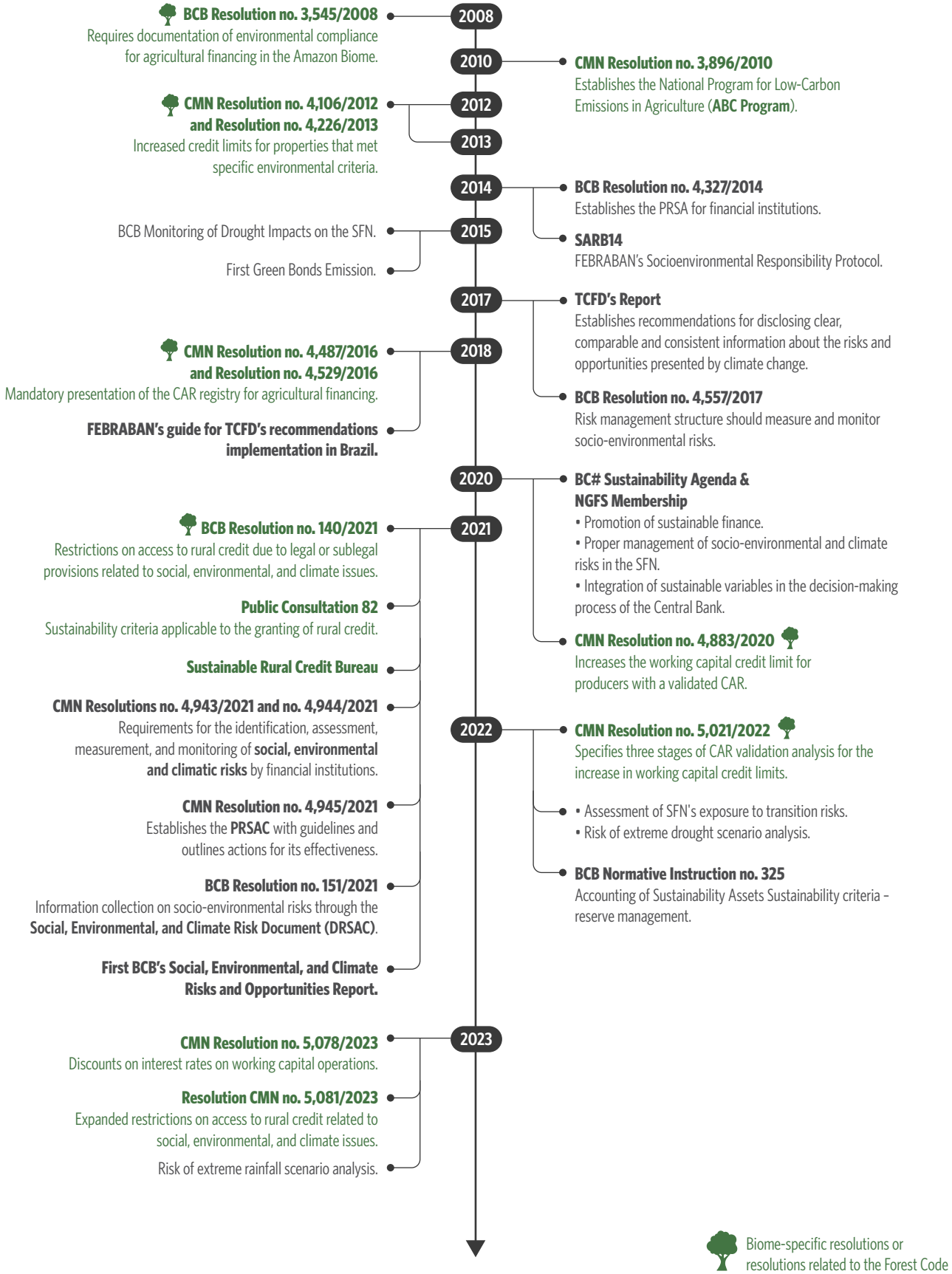
in the data-sharing process. Resolution BCB no. 204/2022 initiated this, enabling beneficiaries to access information related to their operations registered in SICOR and authorize third parties for specific purposes, such as obtaining information about properties, financed enterprises, and rural credit operations, as well as using data in certification and validation processes.

SICOR processes operations in real-time, conducting checks, data cross-references with sources external to the BCB, validating records, and attesting to the accuracy of information to ensure that formalized operations comply with rural credit regulations. The data collected during registration cover a broad spectrum and can provide information that highlights good environmental and sustainability practices for each operation. In addition to details about the funded operation, such as value, program, purpose, and beneficiary, the system also provides information on the financed product and agricultural specifics like the cultivation methods such as no-till, organic, and agroecological practices; integration types (if applicable), including crop-cattle, agroforestry systems, crop-forest; cultivation type, irrigation, etc. The availability of this information can enable the creation of sustainability parameters, which, in turn, can guide agricultural policymakers to direct resources to sustainable initiatives and offer additional incentives to producers who follow sustainability principles. Additionally, by making these parameters explicit, the BCB stimulates the financial system to offer more favorable conditions to producers with these characteristics, following the international trend of mitigating the social and environmental risk associated with granting credit.

The application of sustainability parameters will lead to various outcomes. Some enterprises cannot be financed due to the existence of legal or sublegal provisions that prohibit financing or exploitation of certain areas, as is the case with the restrictions outlined in Resolutions BCB no. 140/2021 and CMN no. 5,081/2023. Other enterprises may be financed but with supervision alerts due to potential social or environmental risks, such as legal restrictions or characteristics of higher risk. There will also be enterprises eligible for incentives due to compliance with social, environmental, or climate sustainability parameters. The goal is to promote more responsible and sustainable agricultural practices in accordance with Central Bank regulations.

It is important to emphasize that these regulatory measures aim to promote sustainability in rural credit, with a focus on environmental preservation, protection of conservation areas, and respect for social rights. However, the effectiveness of these measures depends on adequate oversight and the adoption of sustainable practices by rural producers. A joint effort among the financial sector, regulatory bodies, development institutions, and producers is necessary to ensure compliance with these regulations and promote a more sustainable and responsible agriculture.

Figure 5. The Financial System and BCB's Steps Towards Sustainability, 2008-2023



Note: *Information in green refers to the regulatory process in rural credit and information in black refers to the general regulatory improvements towards sustainability.*
Source: *CPI/PUC-Rio with data from BCB and FEBRABAN, 2024*

Key Takeaways

Brazil has implemented various environmental regulations, policies and plans to address the pressing challenge of mitigating emissions and nature loss. Many of these have been formulated as command-and-control policies. A more comprehensive and complementary approach for addressing deforestation and conversion of native vegetation is also advancing, which includes land tenure regulation and financial incentives.

The BCB plays a crucial role in leading the national financial sector towards sustainable financing. Within its BC# Agenda, launched in 2020, the Sustainability Agenda has put in place initiatives that seek to promote sustainable finance and reduce social, environmental and climate related risks to the economy and the financial system. When it comes to regulation, the BCB has approved a series of norms to enhance the rules for financial institutions to identifying, measuring, assessing, monitoring, controlling, and mitigating social, environmental and climate risks by financial institutions, including deforestation. Additionally, financial institutions are required to implement and disclose their actions on the Social, Environmental and Climate Responsibility Policy, which includes social, environmental, and climatic principles and guidelines that they must adhere to in carrying their activities. The BCB has also expanded the disclosure requirements on risks and opportunities arising from social, environmental and climate issues, based on TCFD recommendations, which have been gradually implemented since 2021. When it comes to supervision, the BCB has established actions to structure and expand the collection of information on socio-environmental risks to conduct climate stress tests on physical risks under climatic scenarios and to implement macroeconomic models to assess financial stability. It is important to mention that the BCB's supervision already assesses credit exposure of financial institutions associated with deforestation.

The BCB has also adopted a specific strategy for rural credit, a pivotal component considering the country's emission and nature loss profile, which is predominantly associated with changes in land use and the agricultural sector. The conditions for credit lines defined within the scope of the Brazilian Agricultural Plan are subject to approval by the CMN and are registered by the BCB in the MCR. These measures have included regulations to which all financial institutions, private or public, operating within the SNCR must adhere to. Their aim is to align agricultural financing with sustainability goals and restrict the access to credit for farmers who do not comply with environmental criteria. The measures implemented in 2008, which required documentary evidence of environmental compliance and rural property registration for financing agricultural activities in the Amazon biome, led to a reduction in the volume of credit granted between 2008 and 2011, with an estimated deforested area 60% smaller than it would have been in the absence of the policy, if one considers the baseline deforestation in 2008.

Validation and analysis of the CAR are crucial for the implementation of the resolutions related to the rural credit policy. The CAR is an electronic registration system that maps and documents information about rural properties, including their vegetation coverage, land use, and preservation areas. Currently, the rural credit policy restricts credit to properties without a CAR registry, or with a CAR that has been cancelled or suspended; are located within protected areas, indigenous territories and/or quilombola communities; or have embargoes from IBAMA due to the economic use of illegally deforested areas throughout all biomes and/or for having subjected workers to conditions akin to slavery. Properties that have completed the CAR analysis and are in compliance with the Forest Code are eligible for interest rate discounts on working capital operations and for increased working capital credit limits.

Commitment to transparency and information disclosure has enabled the development of robust mechanisms for tracking progress. The creation of the Rural Credit Bureau and improvements of the credit operations registry system (SICOR) are essential to verify rural credit impediments at the time of contracting, as well as for monitoring. SICOR processes operations in real-time and provides detailed information on the financed product and agricultural production characteristics. In this regard, partnerships with other institutions, such as IBAMA, INCRA, and SFB, are fundamental in the modernization of the system by integrating new databases.

The BCB has an active participation in international discussion forums, such as NGFS, FSB, BCBS, and G20, which has been instrumental in fostering knowledge-sharing. These platforms serve as valuable opportunities for exchanging best practices, assimilating lessons learned, and staying informed about global trends.

Achieving the goals outlined in the latest Social, Environmental, and Climate Risks and Opportunities Report from the BCB, released in October 2023, is crucial for further improving sustainable finance in the SFN and managing climate risks. Among the ongoing activities, enhancing qualitative information disclosure by financial institutions based on TCFD recommendations is fundamental. The second phase, currently underway, addresses the quantitative aspects of such recommendations. It has been postponed incorporating recent international trends, such as the sustainability disclosure standards issued by the International Sustainability Standards Board and the Basel Committee on Banking Supervision's approach to climate-related risks. Although the delay was strategic, it is vital not to miss the timing to ensure that the quantitative aspects are promptly disclosed for the financial system to incorporate them. Additionally, other key goals include enhancing the climate risks stress tests, ensuring their continuous improvement, and estimating the effects of socio-environmental risks on the economy and the SFN.

Policy Recommendations

The BCB should engage its counterparts in mitigating deforestation and conversion related financial risks and impacts. As a pioneer in financial regulation on rural credit, the BCB has the opportunity to play a leading role in working with its counterparts regionally and globally to contribute in the design of measures to mitigate deforestation and conversion related financial risks and impacts. Deforestation and conversion are crucial issues to address for solving the twin crises on climate change and nature loss, and the experience on regulation formulation, implementation, monitoring and assessment of its impacts is and will continue to be of great importance for central banks and financial regulators in countries facing similar challenges regionally, such as the case of Colombia, Perú and Argentina, and those countries importing commodities associated with deforestation and conversion, such as those within the European Union. The presidency of Brazil in the G20 and the prioritization of sustainable development as the second most important issue in the agenda represents an opportunity to showcase the experience of the BCB, share the challenges and gaps to be filled, as well as the upcoming progress in the implementation.

As the global financial sector continues to adapt to sustainability challenges, the BCB should stay abreast of any new international guidelines. This includes the recent recommendations from the Taskforce on Nature-related Financial Disclosures (TNFD) framework, released in September 2023. Like the TCFD, the TNFD encourages organizations to integrate nature-related issues into decision-making processes, providing a comprehensive risk management and disclosure framework for identifying, assessing, managing, and reporting on nature-related dependencies, impacts, risks, and opportunities. Given its alignment with previously established frameworks like TCFD and ISSB that the BCB is already working on incorporating, a gradual integration of new guidelines should be implemented in the coming years. **The BCB has the opportunity to expand all the financial regulation and supervision tools at its disposal, beyond rural credit, to mitigate deforestation and conversion associated risks, and ensure consistency with monetary policy**.

Regarding the rural credit policy, the BCB must continue its regulatory agenda, ensuring the implementation of current resolutions and addressing pending matters. Among the ongoing measures, it is imperative to implement favorable credit conditions to producers adopting sustainable practices, and to enforce the social, environmental, and climatic impediments to credit access (CMN Resolution no. 5,081/2023). The definition of sustainable practices must align with other government initiatives, notably the forthcoming Sustainable Taxonomy of the Ministry of Finance's Ecological Transformation Plan, announced in 2023, in which the BCB is participating in discussions as a member of the interagency working group. The taxonomy must ensure a unified criterion to be applied across public policies and entities, including rural credit.

The improvements should also involve measures to effectively prevent environmental illegalities, such as including credit restrictions for any producer involved in illegal deforestation, and not only those with environmental embargoes. The integration of auxiliary datasets into the SICOR within the scope of the Rural Credit Bureau, made possible through partnerships with entities, such as IBAMA, was a crucial initial step in monitoring socio-environmental irregularities in credit access. However, there is still room for improvement. The use of modern remote sensing systems through satellite imagery, such as those provided by INPE, MAPBIOMAS and other prestigious data institutions, can be important allies in identifying deforestation on rural properties.

Ensure that rural credit aligns with the Forest Code to guarantee that rural properties comply with environmental legislation. This can be achieved by encouraging registration in the CAR or incentivizing producers to join the regularization program in the case of environmental liabilities, as has been done in the most recent resolutions. However, while the BCB can play a role in encouraging compliance through incentive measures and credit access restrictions, the effectiveness of these measures requires validation of the CAR. This, in turn, requires actions from federal and state governments, as the validation of CAR information relies on these instances and the CAR registry alone is insufficient for ensuring environmental compliance, since producers self-declare the information. As in the case of detecting deforestation, remote sensing tools can also aid in analyzing CAR information.[19]

The BCB has taken significant steps to push the sustainability agenda, signaling a necessary shift to the national financial system and recognizing the urgency of addressing climate risks. While these efforts are crucial for adapting to a changing environmental landscape, there's potential for the BCB to further strengthen its actions. Enforcing existing measures, particularly by ensuring compliance with the environmental legislation and pressing for concrete, measurable actions from financial institutions to reduce carbon emissions and avoid deforestation, would play a decisive role in mitigating climate change, solidifying BCB's commitment to sustainability goals.

19 The SFB has developed a system to streamline and expedite the registration analysis process by using remote sensing images as reference for assessing the information declared in the CAR, known as dynamic analysis. This tool aims to bring efficiency and cost reduction to the states while ensuring better legal certainty for both the state agency analyst and the rural producer.
Dynamic analysis was anticipated to bring significant advancements to the Forest Code agenda in 2022. However, only São Paulo has successfully implemented the tool. Other states report various difficulties, casting doubt on the possibility of significant progress in registration analyses in the short term (Lopes, Segovia, and Chiavari 2023).

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