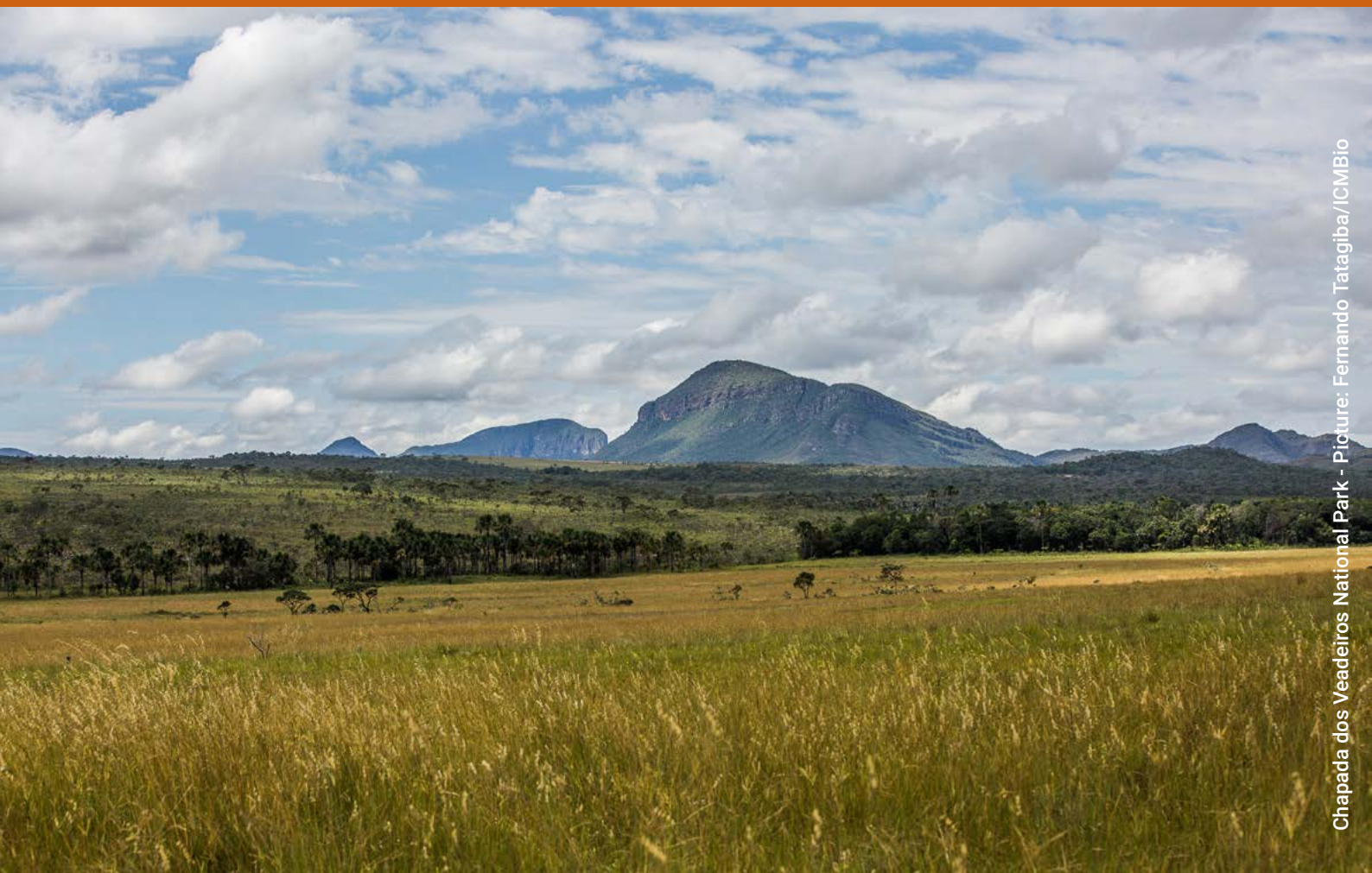
PPCERRADO

Action Plan for Deforestation and Fire Prevention and Control in the Cerrado Biome

ACTION PLAN FOR DEFORESTATION AND FIRE PREVENTION AND CONTROL IN THE CERRADO BIOME (PPCerrado)

4th Phase (2023 to 2027)



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ACTION PLAN FOR DEFORESTATION AND FIRE PREVENTION AND CONTROL IN THE CERRADO BIOME (PPCerrado)

Brasilia –
Federal District
MMA
2023

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Miriam Belchior

Executive Secretary of the Ministry of the Environment and Climate Change
João Paulo Capobianco

Extraordinary Secretary for Deforestation Control and Territorial Environmental Planning (SECD/MMA)
André Lima

Technical Coordination of the Office of the Chief of Staff of the Presidency of the Republic

Deputy Secretary of Environment, Climate, Agriculture, and Foreign Affairs of the Department of CCPR Special Coordination and Monitoring
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Advisor of the Special Department CCPR Governmental Analysis
Karen de Oliveira Silverwood-Cope

Technical Coordination of the Ministry of Environment and Climate Change (MMA)

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Raoni Guerra Lucas Rajão

General Coordinator of REDD+ and Economic Instruments (DPCD/SECD/MMA)
Márcia Catarina David

General Coordinator for Deforestation Combat (DPCD/SECD/MMA)
Renê Luiz de Oliveira

(DPCD/SECD/MMA)
Diego Henrique Costa Pereira

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Bruno Siqueira Abe Saber Miguel

General Coordinator for the Allocation of Public Forests (DOT/SECD/MMA)
Nazaré Lima Soares

SECD/MMA's Chief of Staff
João Paulo Sotero de Vasconcelos

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Antônio Carlos Martinez Sanches (SECD/MMA)
Bráulio Ferreira de Souza Dia (SBio/MMA)
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Graphic design and layout
Renata Fontenelle

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List of Acronyms	
Abema	Brazilian Association of State Environmental Entities
Abin	Brazilian Intelligence Agency
ANM	National Mining Agency
Anater	National Rural Extension Agency
APP	Permanent Preservation Area
Ater	Technical Assistance and Rural Extension
ASV	Vegetation Suppression Authorization
BCB	Central Bank of Brazil
BD Queimadas	Fire Data Platform
BNDES	Brazilian Development Bank - BNDES
CAR	Rural Environmental Registry
CCPR	Office of the Chief of Staff of the Presidency of the Republic
CDB	Convention on Biological Diversity
Cenima	National Center for Environmental Information and Monitoring
Censipam	Amazon Protection System Management and Operational Center
CNUC	National Register of Conservation Units
Conab	National Supply Company
Conabio	National Biodiversity Commission
Conaredd+	National Committee for REDD+
COP	Conference of the Parties
Deter	Real-Time Deforestation Detection System
Embrapa	Brazilian Agricultural Research Corporation
Embratur	Brazilian Agency for Promoting International Tourism
ENREDD+	Brazilian National Strategy for Reducing Emissions of Greenhouse Gases from Deforestation and Forest Degradation, Forest Carbon Stocking, Sustainable Forest Management and Forest Carbon Stock Enhancement (ENREDD+).
EPANB	National Biodiversity Strategy and Action Plan
FCO	Constitutional Financing Fund of the North
FNDD	National Fund for Diffuse Rights

List of Acronyms	
FNDF	National Fund for Forestry Development
FNMA	National Environmental Fund
FNRB	National Benefit Sharing Fund
FNSP	National Public Security Force
FREL	Forest Reference Emissions Leveis, ou níveis de referência de emissões florestais
Funai	National Indigenous Foundation
GEE	Greenhouse Gases
Ibama	Brazilian Institute of Environment and Renewable Natural Resources
ICMBio	Chico Mendes Institute of Biodiversity Conservation
ICV	Life Center Institute
Incra	National Institute of Colonization and Agrarian Reform
Inpe	National Institute of Space Research
LDN	Land Degradation Neutrality
LULUCF	Land use, land use change and forestry
Mapa	Ministry of Agriculture and Livestock
MCTI	Ministry of Science, Technology, and Innovation
MD	Ministry of Defense
MDIC	Ministry of Development, Industry, Trade and Services
MEC	Ministry of Education
MF	Ministry of Finance
MJSP	Ministry of Justice and Public Security
MIDR	Ministry of Integration and Regional Development
MGI	Ministry of Management and Innovation in Public Services
MMA	Ministry of Environment and Climate Change
MME	Ministry of Mines and Energy
MPA	Ministry of Fishing and Aquaculture
MPI	Ministry of Indigenous Peoples
MPO	Ministry of Planning and Budget

List of Acronyms	
MRV	Measurement, Reporting and Verification
MT	Ministry of Transportation
MTur	Ministry of Tourism – MTur
NAF	Federative Coordination Group
NDC	Nationally Determined Contribution
NMA	Monitoring and Evaluation Center
PAA	Food Acquisition Program
PCHs	Small Hydroelectric Power Plants
PCT	Traditional Peoples and Communities
PF	Federal Police
PGPM-Bio	Minimum Price Guarantee Policy for Sociobiodiversity Products
PGTEC	Socio-environmental and Territorial Management Plan for Tackling the Climate Crisis
Plano ABC	Low Carbon Agriculture Plan
PN	National Park
PNAE	National School Feeding Program
PNGATI	National Policy for Territorial and Environmental Management of Indigenous Lands
PNMC	National Policy on Climate Change
PPA	Multi-Year Plan
PPCDAm	Action Plan for Deforestation Prevention and Control in the Legal Amazon
PPCDQs	State Plans for Deforestation and Fire Prevention and Control
PPCerrado	Action Plan for Deforestation and Fire Prevention and Control in the Cerrado Biome
Prodes	Satellite Monitoring of Deforestation in the Brazilian Amazon Forest
Prevfogo	National Center to Prevent and Combat Forest Fires
PRF	Federal Highway Police
Programa Bolsa Verde	Environmental Conservation Support Program
Pronaf	National Program for Strengthening Family Agriculture
PSA	Payment for Environmental Services

List of Acronyms	
REDD+	Reducing greenhouse gas emissions from deforestation and forest degradation, considering the role of conserving forest carbon stocks, sustainably managing forests and increasing forest carbon stocks
RFB	Brazilian Revenue Service
RPPN	Private Natural Heritage Reserve (a type of conservation unit titled and recorded on private land)
RAMSAR	Convention on Wetlands of International Importance
SECD	Extraordinary Department for Deforestation Control and Territorial Environmental Planning
Sicar	National Rural Environmental Registry System
Sinaflor	National System for Controlling the Source of Forest Products
Sisbin	Brazilian Intelligence System
Sisfogo	National Fire Information System
TIs	Indigenous Lands
UAS	Authorizations for alternative land use
UC	Nature Conservation Unit
UFMG	Federal University of Minas Gerais
UHEs	Hydroelectric Power Plants
UNFCCC	United Nations Framework Convention on Climate Change
UNCCD	United Nations Convention to Combat Desertification, Land Degradation and Mitigate the Effects of Droughts
Zarc	Agricultural climate risk zoning
ZEE	Ecological-Economic Zoning

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SUMMARY

1. EXECUTIVE SUMMARY

The Cerrado is an incredibly complex and diverse biome, comprising various ecosystems with different phytophysiognomies, and is one of the most important biodiversity hotspots in the world. It plays a vital role as a producer and supplier of fresh water and acts as a rainfall connector for all other Brazilian biomes, making its management essential for maintaining the water regime both within and beyond the region. Despite its environmental significance and covering 23.3% of Brazil's territory, the Cerrado accounted for more than 40% of all deforestation in the country between 2019 and 2022. From 2003 to 2022, 12% of its native vegetation (24 million hectares) — an area equivalent to the size of the state of São Paulo — was lost. As of 2020, 49% of the biome's original native vegetation remained, while 29% and 14% were occupied by pasture and agricultural crops (including planted forests), respectively.

Approximately half of the deforestation in the Cerrado is in compliance with current environmental legislation. Properties registered in the Rural Environmental Registry (CAR) still hold 30 million hectares of surplus legal reserves (UFMG, 2023). Legally converting these areas could lead to continued deforestation rates in the biome exceeding 10,000 sqkm annually beyond 2050, even under a policy of zero illegal deforestation, potentially generating 5.6 billion tons of CO2e emissions. Legal and illegal deforestation, which negatively impacts climate change, has already significantly extended the dry season and increased year-round temperatures, reducing both surface and underground water availability in various regions of the biome. The rainy season in the Cerrado has been delayed by an average of 1.4 days per year, leading to a cumulative delay of about 1 month and 26 days since 1980. As a result, global changes are expected to severely affect corn production, as 80% of this crop is grown during the second harvest, with the biome contributing more than half of the country's total corn production. Therefore, the future of the Cerrado demands solutions beyond addressing illegal deforestation. It also requires alternative measures within the current legislative framework to manage legal deforestation through mechanisms beyond command and control, in order to achieve zero deforestation by 2030.

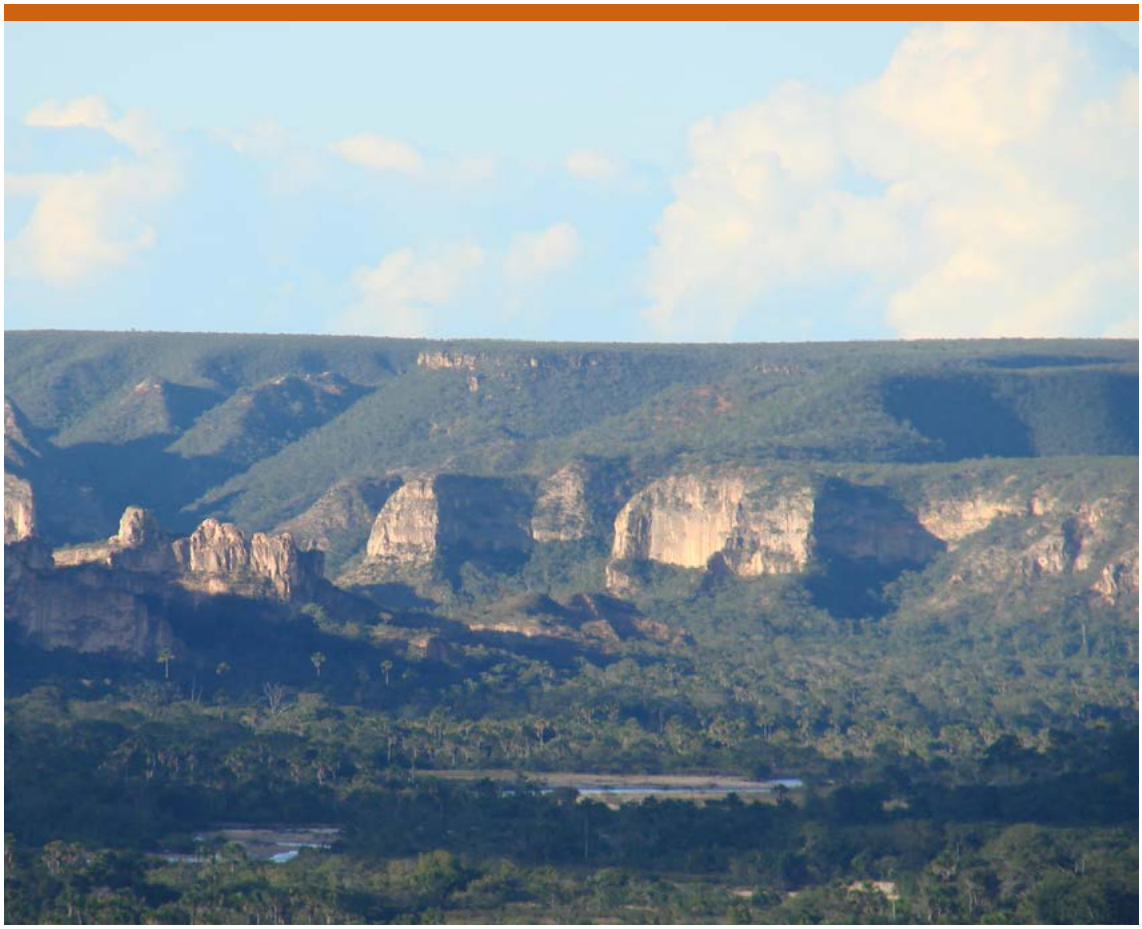
The 4th phase of the Action Plan for Deforestation and Fire Prevention and Control in Cerrado Biome (PPCerrado) is the result of the consolidation of the guidelines defined by the Technical Group on the Environment of the 2022 Government Transition Commission and the contributions of the various ministries that make up the Executive Subcommittee. The document was developed based on the experience accumulated by the federal government during the three previous phases, alongside ongoing dialogue with civil society and academia. This dialogue took place on various occasions, --notably during the Technical-Scientific Seminar on Data Analysis of Deforestation in the

Cerrado, held on July 11, 2023, and through contributions submitted during the public consultation phase of the preliminary document. The plan's actions are structured in line with the guidelines of Decree No. 11367/2023, divided into four main thematic axes: i) sustainable production activities; ii) environmental monitoring and control; iii) land and territorial planning; and iv) regulatory and economic instruments, all aimed at reducing deforestation and implementing the actions covered by the other axes.

Among the main expected results and lines of action set out in the 4th Phase of the PPCerrado, it is worth highlighting, in the context of Axis I, the promotion of sustainable livestock and grain production to reduce pressure on critical deforestation areas (2.1.1)[1], the strengthening and expansion of access to markets and public policies for family farming (2.1.2), and the expansion of technical assistance through rural technical assistance organizations (3.2.1). In Axis II, the key actions include implementing a system to control the environmental origin and traceability of agricultural and livestock products (5.2.1.1), strengthening fire monitoring and control through the implementation of integrated fire management (6.1 and 6.2), and integrating data on deforestation authorizations, infraction notices, and embargoes generated by the states into Sicar, to distinguish legal from illegal deforestation (7.1 and 8.2.1.1). In Axis III, emphasis should be placed on actions aimed at identifying and regularizing Indigenous Lands, Quilombola Territories, and Territories of Traditional Peoples and Communities (10.2.1). Specifically regarding the water issue, Objective 12 of Axis III was proposed to carry out territorial planning and implement instruments already provided by law to ensure the role of natural infrastructure (native vegetation in maintaining and recovering the water regime and water quality). Within this objective, actions will focus on preparing and reviewing the ecological-economic zoning (EEZ) of the Cerrado states, considering the possibility of increasing the Legal Reserve requirement (12.1.1), defining priority areas for Legal Reserve compensation (12.1.2), increasing requirements for the conservation and recovery of permanent preservation areas and aquifer recharge zones (12.1.3), and improving and implementing forest replacement requirements (12.1.4). These measures are already provided for in Law No. 12651/2012, but lack effective implementation. Additionally, it is proposed to revise the agricultural climate risk zoning (Zarc) for major agricultural crops (soy, corn, and sugarcane) and planted forests, guiding the expansion of these activities based on water availability, the quality of the biome's water, and the effects of climate change and deforestation (12.2.1). This will include incorporating native vegetation conservation criteria at the property and micro-basin levels in the evaluation process for granting irrigation licenses (12.3.1), as well as improving water resource monitoring (12.3.2), in order to promote the conservation of native vegetation beyond what is required by current legislation.

1 Line of Action code in Annex I - Summary Table of Strategic Objectives, Expected Results, Lines of Action, Targets, and Indicators.

Finally, Axis IV proposes actions to create the “Biomes Fund” to support conservation in the Cerrado and other biomes (13.1.2), establish norms and tax incentives for bioeconomy and sociobioeconomy products (13.3.1), and strengthen Pronaf to finance family farming (13.4.1). It also aims to progressively align rural credit with the goal of zero deforestation (13.4.2), expand financing for the recovery of pastures and degraded areas (13.4.3), and implement the PSA law, environmental reserve quota, and other legal reserve compensation instruments to encourage the conservation of surplus native vegetation (13.1.3, 13.9.1, and 13.9.2). Additionally, it seeks to standardize regulations for issuing and integrating permits for land use suppression and alternative land use (13.16.1).



Vão dos Buracos, Chapada Gaúcha/MG. Picture: Paulo Henrique de Souza/Funatura

2. POLITICAL AND INSTITUTIONAL CONTEXT OF THE 4th PHASE OF PPCERRADO (2023-2027)

2.1. Biome characterization

The Cerrado evolved on the Crystalline Shield of South America, one of the oldest surfaces on the planet. The biome occupies 23.3% of Brazil's national territory and is present in all regions of the country, spanning parts of the states of Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, São Paulo, Paraná, Bahia, Piauí, Maranhão, Rondônia, Pará, Tocantins, and the Federal District (IBGE, 2019). It also has discontinuous enclave areas within other biomes, forming ecotones or transition zones rich in biodiversity (Sick, 1997; Ab'Saber, 2003; Graeff, 2015). Due to its evolutionary history, geology, and topography, the Cerrado's soils are diverse but predominantly characterized by low nutrient availability, a result of long weathering and high leaching rates.

In addition, the Cerrado has a wide variety of plant formations (phytophysiognomies), including grassland, shrub, forest, paludicola, rupicolous, and mixed formations. The structural differences in the vegetation also influence the diversity of uses and management practices by traditional populations and indigenous peoples throughout the biome. The most common phytophysiognomy in the biome is the "Cerrado stricto sensu," characterized by dense vegetation at eye level, with species that have xerophytic features, twisted trunks, and thick, bark-covered stems. Of the total remaining native vegetation in the Cerrado, 58% has some type of vegetation cover, with a predominance of trees over 5 meters tall and canopy cover greater than 10% (FAO, 2015; Hansen et al., 2013; Potapov et al., 2021).

The well-defined seasonality of rainfall, characterized by distinct dry and rainy seasons, the relatively low soil fertility, and the occurrence of fires act as selective factors influencing biomass investment strategies in root systems. In particular, in the Cerrado, grassland, shrub, and forest physiognomies tend to allocate a higher proportion of biomass to underground systems compared to aboveground vegetation. Deep roots, coupled with deep soils and microclimatic conditions that affect decomposition rates, contribute to significant carbon stocks in the form of soil organic matter. This makes the conservation of the Cerrado critical in mitigating climate change on a global scale (Terra et al., 2023).

Beyond its biological richness, the Cerrado's native vegetation plays a central role in maintaining the water regime within and beyond its boundaries. The biome is located above the largest and deepest freshwater aquifers on the continent: Guarani, Urucuia, and Bambuí.

These aquifers were formed by water percolating through ancient, highly leached soils, filtered continuously over millions of years, creating a large but finite reserve. Due to the

Cerrado's critical hydrological role, several important tributaries of the continent's largest river basins originate in the biome: the Amazon, Tocantins-Araguaia, Western Northeast (or Mid-North), Parnaíba, São Francisco, Paraná, Paraguay (Pantanal), and part of the Eastern Atlantic basin.

The Cerrado's native vegetation also provides a vital environmental service by transporting atmospheric moisture on a continental scale. Popularly known as "flying rivers," these channels, through which humid air masses are carried, follow paths that are relatively flexible in width and intensity. Moisture from ocean evaporation, large water bodies, and evapotranspiration from dense vegetation guides the course of these flying rivers. The interaction between humid atmospheric masses, terrain, and vegetation cover exerts a clear influence on this process. Evapotranspiration from both vegetation and soil plays a crucial role in maintaining the electrostatic balance of the atmospheric air column, which directly affects the formation and precipitation of rain clouds. This relationship makes the increasing deforestation of the Cerrado critically concerning in relation to meteorological mega-phenomena such as the South Atlantic Convergence Zone (SACZ) over the Center-South of the country, and the Intertropical Convergence Zone (ITCZ) over the Mid-North, particularly the Matopiba region (which includes parts of the states of Maranhão, Tocantins, Piauí, and Bahia) (Rivero, Inpe, 1991; Escobar et al., 2019; Verdan, 2022).

The lack or deficiency of vegetation cover, along with low evapotranspiration rates and the heat generated from solar reflection on exposed and unprotected land, leads to the increasing formation of "pockets" of heat and aridity, with clear origins in deforestation and land degradation (Allen et al., 2002; Pravalie, 2016; Vieira et al., 2017). These conditions are driven by human activities and have a significant and visible impact on atmospheric warming, exacerbated by the concentration of greenhouse gases (Ataíde, 2012; Rodrigues et al., 2022). In years when these pockets of heat and aridity form in the Center-South and Mid-North regions, the "flying rivers" are disrupted, negatively affecting the circulation of humidity on a continental scale (Salati, 1978; Caballero et al., 2022). The intermittency of the "flying rivers" can result in both a lack of rainfall where it is normally expected and needed (e.g., northern region of the state of Paraná, western São Paulo, Triângulo Mineiro, southern region of the state of Goiás, and the edges of the Pantanal) and the concentration of rainfall in specific areas with convection reliefs, leading to disasters and even chaotic situations (e.g., various locations along the Atlantic coast; Zona da Mata in the state of Alagoas and Pernambuco; the cocoa regions of the states of Bahia and Espírito Santo; Serra dos Órgãos; Serra do Mar; and the eastern portions of the Paulista and Meridional plateaus) (Valverde, 2007; Marengo et al., 2015).

2.2. Environmental commitments

Brazil has a long history of debate surrounding the need to conserve both forest and non-forest formations in the Cerrado. The Forest Code of 1934, despite its name, introduced obligations to conserve "forests and other forms of vegetation recognized as useful to the lands they cover" (art. 2, Decree No. 23793/1934), a terminology that was also adopted by the Forest Code of 1965. Currently, the Native Vegetation Protection Law, Law No. 12651/2012 (commonly known as the Forest Code), serves as the primary national legislation establishing guidelines for the conservation of the Cerrado and other biomes in Brazil. The law mandates that every rural property must maintain at least 20% of its area with native vegetation as a Legal Reserve. For properties located in the Legal Amazon with Cerrado vegetation, this requirement increases to 35%. Additionally, as per art. 13.II of the current Forest Code, if recommended by the state's Ecological-Economic Zoning (ZEE), the Legal Reserve area can be increased by up to 50% of the federally mandated percentage to meet biodiversity protection goals or reduce greenhouse gas emissions. In a more restrictive example, the state of Piauí, through State Law No. 5699/2007, raised the Legal Reserve requirement to a minimum of 30% for properties in Cerrado areas.

The Forest Code also requires the protection of riparian forests, hilltops, and other sensitive areas as Permanent Preservation Areas (APPs). Specifically, APPs include marginal strips along watercourses, ranging from 30 to 500 meters depending on the river's width. Furthermore, according to art. 61-A.17, in consolidated areas within critical drainage basins, the Executive Branch may establish stricter guidelines for the conservation and restoration of native vegetation in APPs along rivers or in areas near rivers.

In recent decades, Brazil has taken the lead and internalized multilaterally established commitments that contribute to the environmental conservation of the Cerrado. The 1992 United Nations Conference on Environment and Development in Rio de Janeiro (Eco-92) directly influenced the creation of international conventions aimed at addressing three global challenges, which are clearly evident in the Cerrado: climate change, desertification, and biodiversity.

Within the framework of the United Nations Framework Convention on Climate Change (UN-FCCC), it is important to highlight the Nationally Appropriate Mitigation Actions (NAMAs) alongside the National Policy on Climate Change (PNMC), established by Law No. 12187, 29 December 2009. In this context, Brazil voluntarily committed to reducing greenhouse gas emissions by 36.1% to 38.9% of projected emissions by 2020. Additionally, national mitigation plans were developed for various sectors, including electricity generation and distribution, urban public transportation, industry, health services, and agriculture and livestock. Besides the goal of reducing deforestation in the Amazon by 80%, Brazil also aimed to reduce the annual loss of vegetation in the Cerrado by 40% by 2020, compared to the average loss between 1999 and 2008,

which was 9.4 thousand sqkm per year. In the year of the PNMC target, deforestation in the Cerrado was 7,900 sqkm, which was below Brazil's goal. However, since then, the deforested area has been increasing annually, with 10,700 sqkm of native vegetation lost in the biome in 2022 (Prodes/Inpe, 2023).

With the adoption of the Paris Agreement at COP 21 in 2015, Brazil's and other signatory countries' commitments were formalized through their Nationally Determined Contribution (NDC). Brazil's NDC proposed reducing greenhouse gas emissions by 37% compared to 2005 levels, with an even more ambitious indicative target set for 2030. Reducing deforestation is crucial to staying on track with emission reductions and meeting international commitments. Unlike the previous climate target, Brazil's NDC does not specifically outline the contributions of individual biomes toward achieving the overall climate goals. However, considering that 40% of the country's loss of native vegetation between 2012 and 2022 and 19% of CO2 emissions from land use change (LULUCF) occurred in the Cerrado, the conservation of this biome is essential for Brazil to meet its climate targets (Inpe, 2023; MCTI, 2021).

The United Nations Convention to Combat Desertification, Land Degradation, and Mitigate the Effects of Droughts (UNCCD) was also signed during Eco-92. The objectives of this convention include the prevention and/or reduction of land degradation, the rehabilitation of partially degraded land, the recovery of degraded land, and the prevention and mitigation of droughts. As one of Brazil's biomes within the arid typological-climatic spectrum, the Cerrado is a landscape of extreme natural fragility to aridity. This vulnerability is exacerbated by characteristics such as some of the highest temperature ranges recorded globally, a strict adaptation to the seasonality and concentration of rainfall, and a high diversity of fragile soils, often considered to have "low nutrient availability." Consequently, the Cerrado is home to some of the areas most at risk of desertification and soil degradation due to poor land use practices. Areas already at a concerning stage of degradation can be found in the states of Bahia, Minas Gerais, Mato Grosso do Sul, Tocantins, Maranhão, and especially the state of Goiás. These regions have a high concentration of plinthosols and quartzarenic soils, which are highly vulnerable to environmental damage when occupied without proper planning. Notably, the Gilbués region in the Cerrado of the state of Piauí, covering 6,200 sqkm, is the largest desertification center in the country (Simplicio et al., 2020).

During the 12th Conference of the Parties to the UNCCD Convention in Ankara, Turkey, in 2015, the Global Land Degradation Neutrality (LDN) Strategy was approved. At this conference, the Parties adopted a voluntary national LDN target, with Brazil committing to the strategy and setting its baseline in 2017. Unlike other conventions, the LDN target is unique in that it is not defined by numerical or quantitative goals, but by procedural and qualitative criteria. These processes are monitored through cyclically evaluated indicator systems, informed by a baseline or ground zero and its associated operating equations.

The third convention signed during Eco-92 was the Convention on Biological Diversity (CBD). The CBD's objectives are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising from the utilization of genetic resources. In 2013, Brazil adopted National Biodiversity Target 5 (Resolution No. 6 of Conabio), aiming to reduce deforestation by 50% between 2010 and 2020 as part of the National Biodiversity Strategy and Action Plan (EPANB). This was intended to contribute to the achievement of the 20 Global Biodiversity Targets (known as the Aichi Targets), which were adopted at COP-10 of the UN Convention on Biological Diversity in October 2010 in Nagoya, Japan. During COP 15 of the CBD, held in Montreal, Canada, in 2022, the Kunming-Montreal Global Framework was adopted, setting 23 targets for 2030. Among the targets set and adopted by Brazil, Target 2 aims to ensure that at least 30% of degraded areas are in the process of being restored by 2030, while Target 3 calls for the effective conservation of at least 30% of terrestrial and marine areas (CBD Decision 15/4). Despite the recognition of its unique evolutionary and adaptive significance, as evidenced by its natural history, and despite being one of the six biodiversity hotspots worldwide according to the CBD, the Cerrado remains one of the Brazilian biomes with the lowest percentage of areas under full protection. Currently, only 8.61% of the biome is legally protected by conservation units, with 2.72% under full protection conservation units and 5.66% under sustainable use conservation units, including Private Natural Heritage Reserves (RPPNs), which account for just 0.07% (MMA/CNUC, 2023). Additionally, indigenous lands cover 4.8% of the biome, and environmental requirements of the current Forest Code, such as Permanent Preservation Areas (APPs) and Legal Reserves, together represent approximately one-quarter of the total Cerrado biome (Dias & Klink, 2019).

In 2023, with the start of a new federal administration, a renewed commitment was made to reduce the loss of native vegetation in the Cerrado and achieve zero deforestation by 2030 across all biomes. Under the PPCerrado, zero deforestation refers to the elimination of illegal deforestation and the compensation of legally permitted native vegetation suppression, along with the greenhouse gas emissions it causes. This will be achieved by strengthening the implementation of forest legislation and increasing native vegetation stocks through economic incentives for conservation and sustainable forest management.

2.3. Governance of the 4th Phase of the PPCerrado

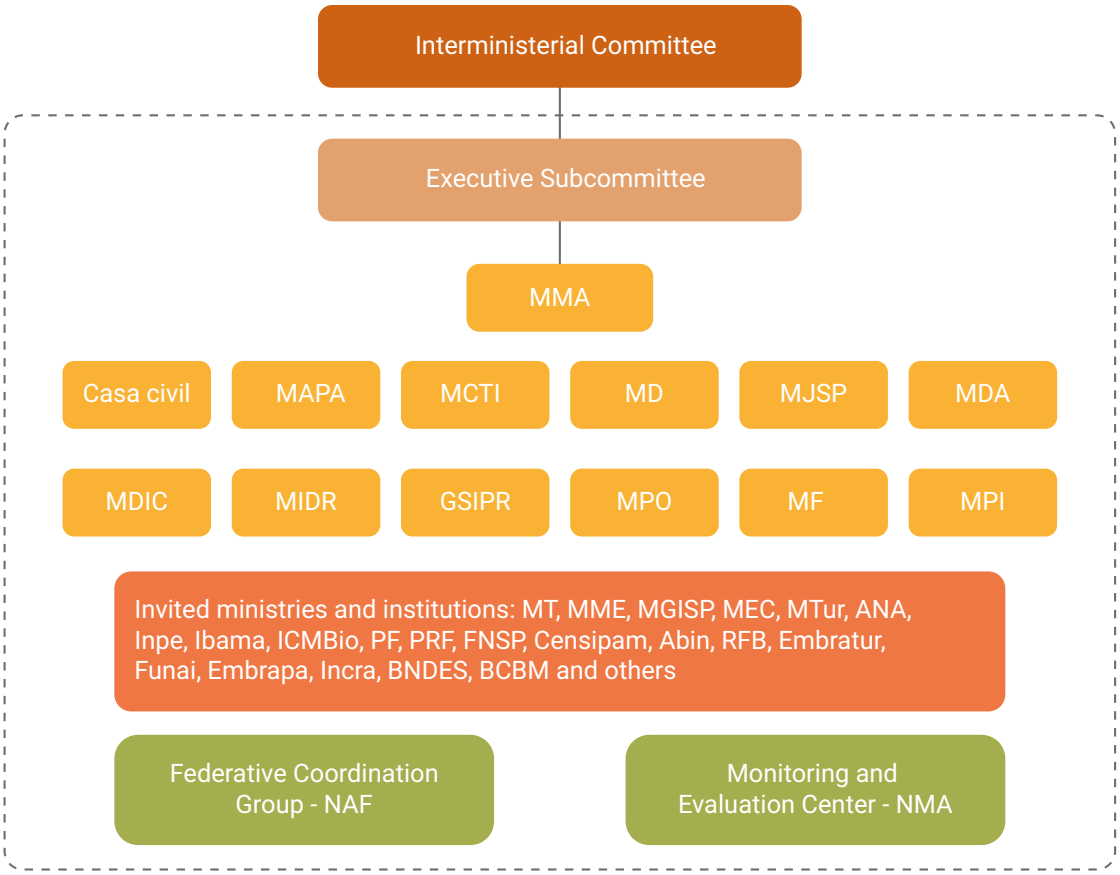
To demonstrate its commitment to biodiversity conservation and the responsible use of natural resources, and in response to the significant increase in deforestation rates in recent years, the federal government established the Permanent Interministerial Commission for the Prevention and Control of Deforestation through Decree No. 11367, 1 January 2023. This decree also updated the guidelines of Decree of 15 September 2010, which mandated the creation of the Action Plan for Deforestation and Fire Prevention and Control in all of Brazil's biomes.

The 4th phase of the PPCerrado will be implemented over five years (2023–2027), aligning its actions with the Multi-Year Plan (PPA). In coordination with other plans and public policies, the PPCerrado is designed to enable all ministries and other executing bodies to contribute toward the goal of achieving zero deforestation by 2030.

Institutional arrangement and governance model

The governance model for the 4th Phase of the PPCerrado adheres to the directives of Decree No. 11367/2023 and Decree of 15 September 2010. It is managed by the Interministerial Commission and led by the Executive Subcommittee, incorporating mechanisms for transparency and social participation (Figure 1).

Figure 1. Governance structure of the 4th phase of PPCerrado



In the realm of ministerial coordination, the Permanent Interministerial Commission for the Prevention and Control of Deforestation serves as the forum for deliberation, decision-making, and the development of strategic proposals for the new Action Plans. Chaired by the Civil House of the Presidency of the Republic (CC/PR) and supported by the Ministry of the Environment and Climate Change (MMA), the Interministerial Commission includes the participation of 17 other ministries.

The responsibilities assigned to the Interministerial Commission include the definition and coordination of actions to reduce deforestation rates throughout the national territory, evaluation, approval and monitoring of the implementation of the Action Plans for Deforestation Prevention and Control (for all Brazilian biomes) and the establishment of measures to overcome any difficulties in their implementation. The Interministerial Commission is also responsible for ensuring that the actions provided for in the Plans promote the development and integration of environmental protection systems and contribute to the conservation of biodiversity and the reduction of greenhouse gas emissions from deforestation, forest degradation and fires. For this reason, it is also the role of the Interministerial Commission to monitor the elaboration and implementation of public policies that affect the Action Plans, through coordinated actions with the States, the Federal District, and Municipalities.

In addition to the political-strategic scope represented by the Interministerial Commission, Decree 11367/2023 , also provided for a second level of governance, which is the Executive Subcommittee of the PPCerrado, composed of representatives from 13 ministries under the coordination of the MMA. Its task is to prepare the Action Plans for Deforestation Prevention and Control and submit them to the Interministerial Commission for approval.

The Executive Subcommittee also serves as a forum for technical discussions among the ministries and agencies invited to participate. Its goal is to thoroughly analyze the characteristics, challenges, and opportunities of each of the PPCerrado's thematic axes, generating input and defining the objectives, expected results, actions, targets, and indicators that will shape the Plan. This subcommittee provides another space for dialogue, planning, and discussion between federal government institutions.

To enable the integrated implementation of the PPCerrado with the states and municipalities, the Federative Coordination Group (NAF) will be established, with regular meetings between the MMA and the state departments of the environment. The NAF will act as a forum for information exchange and for identifying challenges and opportunities for joint action between the federal government and the states, with the support of the National Tripartite Commission, created by Complementary Law No. 140/2011.

In accordance with art. 11 of Decree No. 11367/2023, an annual monitoring report on the Plan's progress must be published, providing details on the implementation of the actions carried out by each member and guest of the Executive Subcommittee. To this

end, the Monitoring and Evaluation Center (NMA) will be established, coordinated by the Ministry of Environment and Climate Change (MMA), with participation from civil society and academia. The NMA will also have the ability to provide suggestions for adjustments to targets and indicators to enhance the measurement of the effectiveness of the Plan's actions. Both the NMA and the Federative Articulation Center (NAF) will serve as platforms for supporting future revisions, as outlined in art. 2, Decree No. 11367/2023, establishing a routine for generating information to continuously improve the Plan.

Instruments related to transparency and social participation were also designed to ensure proper disclosure and transparency of the Plan's actions, while expanding and strengthening channels for participation by states, the private sector, and organized civil society. Decree No. 11367/2023 provides for the following instruments for social participation: public consultations, technical-scientific seminars, and the preparation of follow-up and monitoring reports on the implementation of actions.

The 4th Phase of the PPCerrado was coordinated by the Extraordinary Secretariat for Deforestation Control and Territorial Environmental Planning (SECD/MMA), which developed the document based on: i) analysis of previous phases of the PPCerrado; ii) reports from the government transition working groups in the areas of environment, agriculture, justice, and indigenous peoples; iii) insights gathered during the Technical-Scientific Seminar; iv) contributions from meetings of the Executive Subcommittee; and v) technical meetings with states and civil society.

The Technical-Scientific Seminar on the Analysis of Deforestation and Fire Data in the Cerrado was held on July 11, 2023, in Brasilia-Federal District, with participation from representatives of federal and state governments, civil society, and academia. The seminar featured multiple presentations on the causes and consequences of deforestation in the biome. It also provided a platform for analyzing intra-regional social and economic dynamics, which helped anticipate preventive actions against the emergence of new deforestation frontiers in the Cerrado. Several presentations presented empirical evidence highlighting the relationship between deforestation and water availability in this biodiversity hotspot.

In addition, the objectives, expected results, and actions of the PPCerrado were discussed in both collegiate and bilateral meetings, as well as thematic workshops, with members of the Executive Subcommittee and invited ministries and agencies, under the coordination of the MMA and the CCPR. Between June and August 2023, eight meetings were held between the MMA and representatives of state environmental agencies working in the biome. As part of these discussions, a working group was formed between the MMA and the Brazilian Association of State Environmental Entities (Abema). This group provided the ministry with contributions that included an analysis of deforestation dynamics and proposals for short- and medium-term measures to reduce illegal deforestation in the biome. Two specific meetings were also held with the states that make up the Matopiba region,

which includes parts of the states of Maranhão, Tocantins, Piauí, and Bahia. In addition to these meetings, several discussions were held with civil society organizations, and a public hearing was conducted in the Chamber of Deputies to publicize and launch the preliminary version of the plan for public consultation. During the public consultation process, 186 contributions were received and reviewed from citizens, non-governmental organizations, the private sector, academia, and government entities.

Buriti palms in the Grande Sertão Veredas Mosaic/MG. Picture: Paulo Henrique de Souza/Funatura

3. POLICIES FOR DEFORESTATION CONTROL IN THE CERRADO

3.1. Federal policies for deforestation control in the Cerrado

The PPCerrado, like the plans for other biomes, is considered a key instrument for implementing the PNMC, with a focus on mitigating greenhouse gas (GHG) emissions related to land use, land use change, and forests. In addition, the PPCerrado contributes to the implementation of the National Strategy to Reduce Greenhouse Gas Emissions from Deforestation and Forest Degradation, Conserve Forest Carbon Stocks, Sustainably Manage Forests, and Increase Forest Carbon Stocks in Brazil (ENREDD+). The National Plans for Deforestation and Fire Prevention and Control, particularly the PPCerrado, also serve as instruments of the National Policy to Combat Desertification, aligning with the National Native Vegetation Plan and the National Biodiversity Policy. Through these efforts, the PPCerrado operates transversally, supporting various national and international environmental commitments made by Brazil.

The federal government launched 1st Phase of the PPCerrado (2010-2011) as part of discussions surrounding the National Climate Change Plan and the nationally appropriate actions Brazil presented at COP 15 in 2009. During this phase, actions were distributed across four thematic axes: Protected Areas and Land Use Planning; Monitoring and Control; Promotion of Sustainable Production Activities; and Environmental Education. The thematic organization of the deforestation prevention and control plans into axes reflects the understanding that permanently reducing deforestation requires more than environmental enforcement alone.

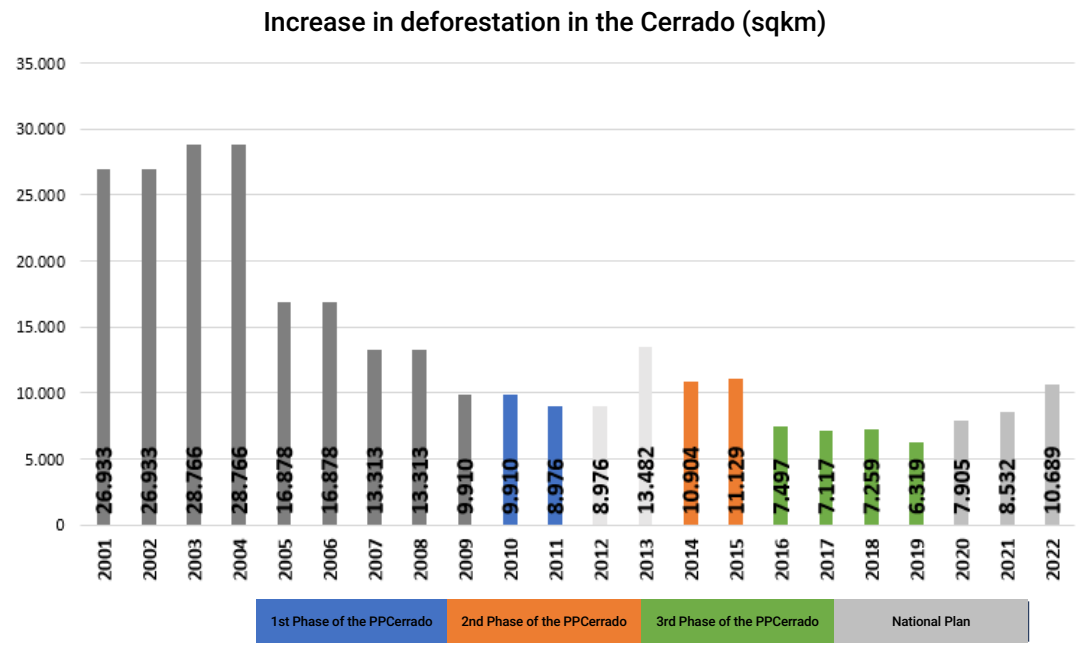
In the 2nd Phase (2014-2015), the Environmental Education axis was removed, although actions related to this theme were still incorporated into the other three axes. During the 3rd Phase (2016-2020), the three existing axes were maintained, and a new axis was introduced to focus on the development of rules and economic, fiscal, and tax instruments aimed at combating deforestation in all its forms, including both prevention and control. This new axis consolidated innovative initiatives from the other axes, specifically addressing the creation of related normative and economic measures. Table 1 presents some of the key results achieved in the previous phases of the PPCerrado.

Table 1. Main results of phases I, II and III of the PPCerrado (2010-2020), categorized by the axes of the 4th Phase.

MAIN HISTORICAL RESULTS OF THE PPCerrado
Axis 1: Sustainable production
Cerrado products included in the Minimum Price Guarantee Policy for Sociobiodiversity Products (PGPM-Bio)
Technical Assistance and Rural Extension (ATER) in sustainable activities for more than 100,000 families
Training provided to over 2,000 families in ATER for forest and community management
Training more than 13,000 producers in sustainable agricultural and livestock technologies
Axis II: Environmental monitoring and control
Implementation of the Rural Environmental Registry (CAR)
Development of the National Integrated Fire Management Policy and implementation of integrated fire management in federal areas (conservation units, indigenous lands, and quilombola territories)
Monitoring deforestation in the Cerrado: Prodes Cerrado / Deter Cerrado
Assessment of land use and cover in the Cerrado: TerraClass Program
More than 20,000 areas embargoed
Axis III: Land and territorial planning
Declaration of traditional ownership of indigenous lands
Development of Land and Environmental Management Plans for Indigenous Lands (PNGATI)
Strengthening the management of Conservation Units
Creation of the Ecological-Economic Macrozoning for the São Francisco River Basin
Axis IV: Rules and economic instruments
More than 4,000 families benefited from the Bolsa Verde Program
Expansion of ENREDD+ to the Cerrado
Development of the Reference Level for Forest Emissions for the Cerrado
Federal District (DF) and Tocantins (TO) became eligible for REDD+ funding
Biodiversity conservation actions implemented in private areas

Figure 2 shows a continuous reduction in deforestation in the Cerrado between 2010 and 2011. Although this reduction mostly occurred before the implementation of 1st Phase of the PPCerrado, it can be attributed to the strengthening of environmental monitoring and enforcement efforts across the country. Between 2012 and 2013, the PPCerrado was temporarily discontinued and, in 2013, there was a 50% increase in deforestation. During the 2nd and 3rd Phases of the PPCerrado, deforestation in the Cerrado decreased by 42%, reaching a historic low of 6,300 sqkm in 2019. However, following the revocation of the PPCerrado by Decree No. 10142/2019, deforestation rates began to rise again, reaching almost 10,700 sqkm.

Figure 2. Record of deforestation rate registered by Prodes/Inpe.



Source: Chart prepared by the MMA based on the Prodes deforestation rate calculated by Inpe.

With the publication of Decree No. 11367/2023, the PPCerrado was reinstated, along with plans for other biomes, marking the start of the 4th phase of the plan. The new PPCerrado aims to align with the PPCDAm, which will be in force from 2023 to 2027, to coincide with the Multi-Year Plan (PPA) submitted to Congress in August 2023. The plan for the Cerrado is structured around four thematic axes, which also guide the PPCDAm and the plans for other biomes:

i. Sustainable Production;

ii. Environmental Monitoring and Control;

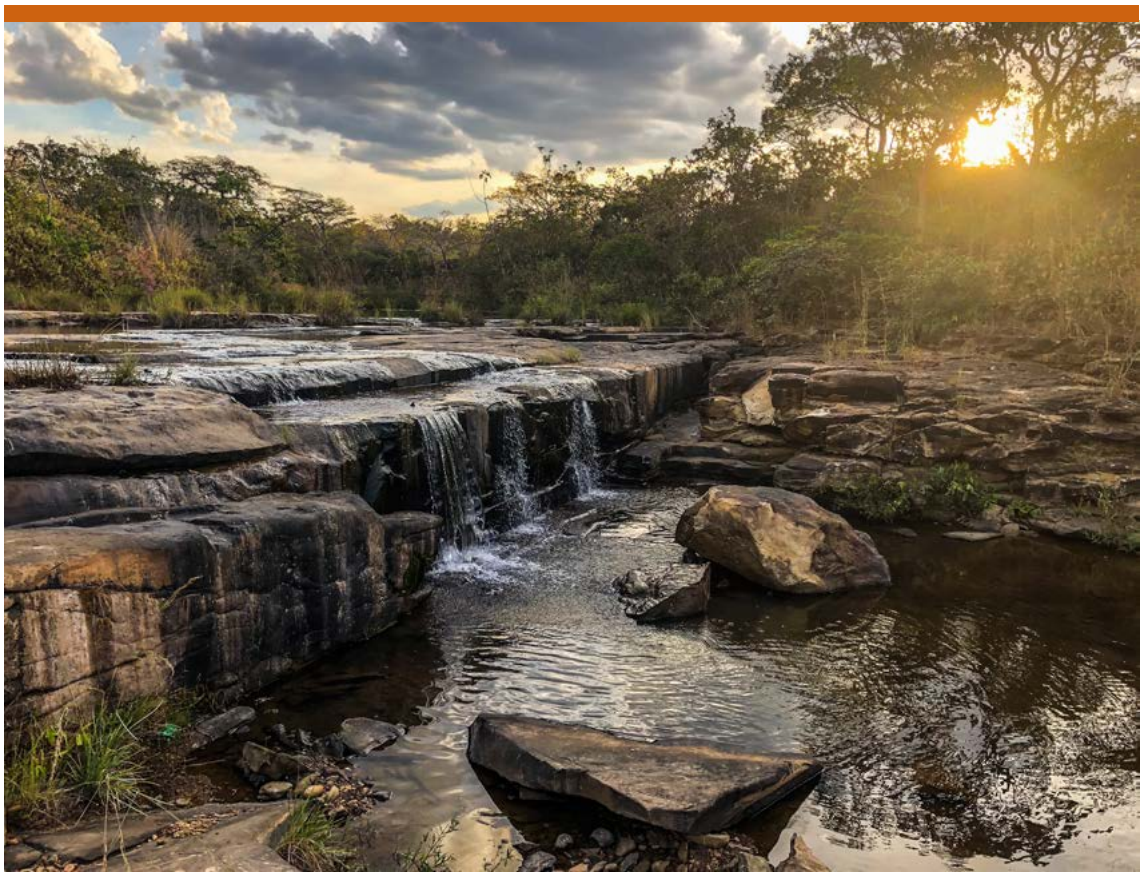
iii. Land and Territorial Planning;

iv. Regulatory and economic instruments aimed at reducing deforestation and supporting the implementation of actions across the other axes.

3.2. State plans for deforestation control in the Cerrado

Given the shared responsibilities between the federal government, states, and municipalities, the involvement of state actors is crucial for the success of policies aimed at controlling deforestation and fires, particularly in the Cerrado. Under the current legal framework, defined by Complementary Law No. 140, 8 December 2011, the states are responsible for issuing permits for vegetation suppression and controlled burning on rural properties within their territories. As a result, they are also responsible for supervising activities that impact native vegetation. The Federal Government, on the other hand, is responsible for issuing permits for areas under federal control, such as CUs, and for vegetation suppression in projects licensed under its jurisdiction.

The states within the Cerrado biome, through the Abema, have presented the Ministry of the Environment and Climate Change (MMA) with a set of environmental commitments. These include the creation or updating of state plans for deforestation and fire prevention and control. These actions reflect a regional consensus that long-term deforestation control can only be achieved with the involvement of all levels of government and through a balance between economic development, forest conservation, and territorial guarantees for traditional peoples and communities. This cooperation with the states is also key to achieving the goal of zero deforestation by 2030.

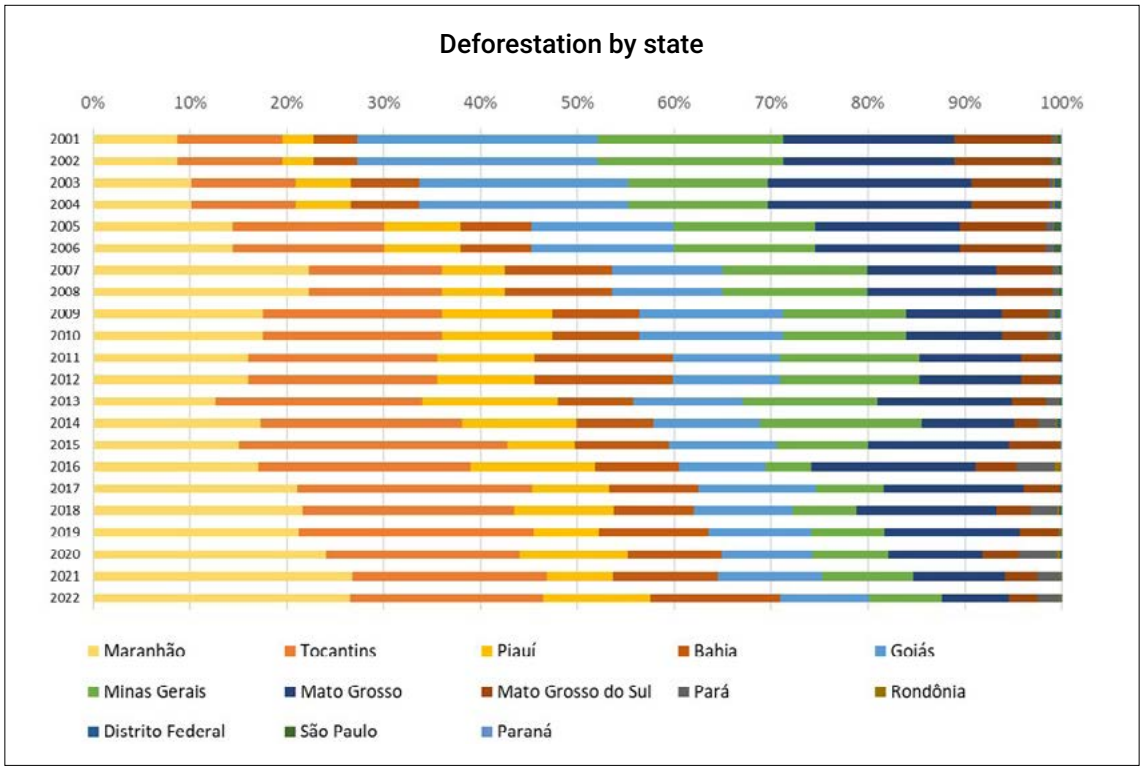


Peruaçu Caves National Park. Picture: Fernando Tatagiba

4. CAUSES OF DEFORESTATION AND FIRES IN THE CERRADO

Unlike the Amazon, deforestation data for the Cerrado is more recent. The Cerrado monitoring system (Prodes/Inpe Cerrado) presented its first results in 2018, with the release of a base map showing accumulated deforestation up to 2000 and biannual deforestation maps for 2002, 2004, 2006, 2008, 2010, and 2012. Annual deforestation data for the biome only became available in 2013. This data revealed that the Cerrado currently has the highest rate of deforestation among Brazilian biomes, having lost 12% of its remaining native vegetation over the past two decades. Between 2003 and 2022, 246,000 sqkm were converted, an area equivalent to the size of the state of São Paulo (Inpe/Prodes, 2023). By 2020, the biome retained 49% of its original native vegetation, with 29% and 14% of its land used for pasture and agricultural crops (including planted forests), respectively (Inpe/Embrapa/TerraClass, 2023).

Figure 3. Historical contribution of each state in the Cerrado to total annual deforestation (%).



Source: Chart created by the MMA using Prodes/Inpe data on deforestation in the Cerrado (Prodes/Inpe).

During the first period of reduced deforestation, between 2004 and 2012, there was a noticeable shift in deforestation from the central region of the biome to the northernmost region (Figure 3). Until 2004, the states of Goiás, Minas Gerais, and Mato Grosso were responsible for around 65% of deforestation. By 2005, this figure dropped to 55%, and from 2007 onwards, the states of Maranhão, Tocantins, Piauí, and Bahia (Matopiba region) accounted for more than 50% of deforestation in the biome. In 2022, deforestation in the Cerrado occurred predominantly in areas registered with INCRA as private plots (63.5%), but significant deforestation also took place in conservation units (7.4%), undesignated federal public lands (6.1%), settlements (3.6%), indigenous lands (0.7%), quilombola territory (0.3%), and the remaining percentage occurred in areas with no land information (Table 2).

Table 2. Percentage of deforestation by land categories in the Cerrado states (Prodes/Inpe 2022).

State	Quilombola Territory	Indigenous Land	Conservation Unit*	Settlement	Undesignated Public Land	Private Areas	Others
Bahia			24.85%	0.74%		69.17%	5.24%
Federal District			95.48%			0.29%	4.23%
Goiás	0.61%	0.02%	6.68%	5.68%	0.04%	63.17%	23.80%
Maranhão	0.10%	1.86%	2.57%	3.94%	0.83%	69.74%	20.97%
Minas Gerais	0.21%	0.06%	2.48%	2.64%		58.32%	36.28%
Mato Grosso do Sul		0.34%	1.79%	0.93%		91.80%	5.13%
Mato Grosso	0.07%	2.64%	3.99%	11.31%	8.39%	58.49%	15.11%
Pará		0.26%		6.66%	66.79%	12.56%	13.72%
Piauí	0.01%		2.54%	1.35%	0.11%	72.42%	23.58%
Paraná			54.63%			45.36%	
Rondônia		0.03%			99.96%		
São Paulo			1.65%			73.28%	25.07%
Tocantins	1.05%	0.05%	9.68%	3.00%	18.32%	52.45%	15.45%
Category contribution (%)	**0.32%**	**0.71%**	**7.39%**	**3.58%**	**6.14%**	**63.47%**	**18.39%**
*Including environmental protection area							

Source: Prodes/Inpe 2022. The area coverage data by land ownership category was calculated by the MMA using shapefiles of Indigenous Lands from Funai (data obtained in April 2023), Conservation Units/CNUC (data obtained in April 2023), and quilombola territory and settlements from Incra, SIGEF, and SNCI (data obtained in April 2023, with information on Glebas from November 2021 provided by Incra).

Based on studies presented during discussions held by the PPCerrado Executive Subcommittee at the Technical-Scientific Seminar, as well as contributions from Cerrado state departments of the environment, Abema, and civil society, four main causes of deforestation and fires of native vegetation in the Cerrado were identified: 1) the difficulty in monitoring the legality of deforestation linked to production chains; 2) the low level of recognition of collective territories and conservation units; 3) agricultural expansion, land speculation, and ineffective water management; 4) inadequate fire management. Each of these issues is discussed in detail below.

Chapada dos Veadeiros National Park. Picture: João Paulo Sotero

4.1. Difficulty in monitoring the legality of deforestation linked to production chains

The Cerrado biome plays a crucial role in Brazil's agricultural and livestock production. According to data from the Municipal Agricultural and Livestock Production (IBGE, 2022), 54% of the value of agricultural production and 44% of the cattle herd come from municipalities within the biome. Grain production in the Brazilian Cerrado is also considered the most efficient globally, and this economic performance can coexist with efforts to conserve the biome. The National Supply Company (Conab) estimates that the productivity of the soybean crop in the 2022/23 season will range between 3,508 kg/ha and 4,020 kg/ha in the main producing states (Conab, 2023). In comparison, the estimated average productivity of soybeans in the U.S. during the same period is 3,330 kg/ha (USDA, 2023). Technological advancements and favorable weather conditions, particularly regular rainfall, have ensured excellent production conditions in Brazil. This trend is similar for corn and cotton, where the Brazilian Cerrado holds significant competitive advantages over other countries.

The importance of agricultural and livestock activities is evident in the pattern of land use, where the expansion of arable areas has led to the conversion of primary vegetation directly into agricultural land. Data from the 2018/2020 TerraClass Project for the Cerrado biome shows that, between 2018 and 2020, pasture areas expanded by more than 1 million hectares, while areas of "temporary crops of more than 1 cycle" increased by over 2.64 million hectares during the same period. These expansions involved the conversion of both primary and secondary native vegetation, as well as previously anthropized areas (Inpe/Embrapa/TerraClass, 2023). Soybean cultivation, in particular, has seen significant growth in the Cerrado. The area dedicated to soybean farming increased from 20.5 million hectares in 2018 to 23.41 million hectares in 2021, representing an approximate 13% growth (Municipal Agricultural Production - IBGE, 2022).

In the period corresponding to Prodes 2022, 71% of the deforestation observed in the biome occurred within properties registered in the Rural Environmental Registry (CAR), excluding any overlaps with conservation units (including APAs), indigenous lands, and settlements. Currently, the federal government does not have official consolidated data on the compliance of agricultural and livestock production with environmental legislation. However, several studies by academia and civil society indicate that a significant portion of agricultural production is associated with illegal deforestation, often due to non-compliance with the legal requirements to conserve native vegetation on the property. Approximately 20% of properties in the Cerrado biome experienced deforestation after 2008, totaling 10 million hectares. In 36% of these properties, vegetation suppression occurred without adhering to the minimum legal reserve requirements, which vary between 20% and 35%, depending on the state. For soy-producing properties, 23% were deforested after 2008, with 52% of that deforestation occurring in violation of the legal reserve requirements. This suggests that 22% of soy production in the biome potentially occurs on properties with illegal deforestation after 2008 (Rajão et al., 2020). Despite this, properties registered in the Rural Environmental Registry (CAR) collectively have a

surplus of legal reserve areas amounting to 30 million hectares, holding an estimated carbon stock of 5.6 billion tons of CO_2e (UFMG, 2023)[2].

Even properties with native vegetation exceeding the conservation requirements set by the Forest Code must still obtain authorization for vegetation suppression or alternative land use from the relevant environmental authority. Under the current legal framework established by Complementary Law No. 140, 8 December 2011, the states are responsible for issuing permits for suppression and alternative land use for agricultural and livestock activities, while the federal government handles authorizations for areas under its jurisdiction, such as protected areas and projects licensed under its authority. Despite the responsibility of the states, the Ministry of the Environment and Climate Change (MMA), as the central body of the National Environmental System, is responsible for planning, coordinating, supervising, and controlling the federal government's environmental guidelines.

In this context, Ibama coordinates the National System for Controlling the Origin of Forest Products (Sinaflor), established by Ibama Normative Instruction No. 21/2014, in compliance with Law No. 12651/2012. Sinaflor integrates the control of the origin of wood, charcoal, and other forest products or by-products, serving as the national hub for Vegetation Suppression Authorizations (ASV) and Alternative Land Use Authorizations (UAS).

In recent years, several Brazilian states have made significant strides in terms of transparency and the integration of ASVs and UASs data into Sinaflor. Currently, the states of Minas Gerais, Tocantins, the Federal District, Maranhão, Piauí, Rondônia, Paraná, Amapá, Amazonas, and Roraima use Sinaflor natively (i.e., they enter data directly into the system without relying on a state intermediary) to manage ASVs and UASs. Other states, such as Espírito Santo, Goiás, Santa Catarina, São Paulo, and Rio Grande do Sul, have integrated their own systems with Sinaflor and regularly send authorization data. The states of Mato Grosso and Pará are currently in the integration phase (see Table 3). Despite progress, a significant portion of permits for vegetation suppression are still not available in the federal system, due to both a lack of integration and the failure of states and municipalities to provide adequate and complete data. Some municipalities even issue ASVs without proper control or delegation from the states, which is in direct violation of Complementary Law No. 140/2011, which clearly states that the primary responsibility for issuing vegetation suppression authorizations for agriculture and livestock purposes in rural properties lies with the states. An additional issue is that only 24% of the authorizations in state databases include geospatial information (polygons) for the areas subject to suppression, while the remaining authorizations either lack geospatial data altogether or only provide a pair of geographic coordinates (points). This severely hinders the ability to verify the legality of deforestation. This lack of compliance with legal responsibilities, coupled with the absence of integrated data, makes it nearly impossible for federal agencies, the financial sector, and production chains to effectively monitor deforestation, which in turn facilitates illegal activities. Special attention should

2 Estimate provided by DCPD/SECD/MMA, based on the parameters of the new National FREL submitted to the UNFCCC, available at: https://redd.unfccc.int/media/documento_1012639_brazil_national_frel.pdf

be given to an intermediate category of deforestation known as "apparently legal" deforestation. This refers to deforestation that appears formally legal on the surface but involves irregularities and fraud. These practices make it nearly impossible for federal agencies to conduct supplementary control, as the states where deforestation is most prevalent often fail to provide precise and complete information, which further complicates efforts to effectively monitor and regulate deforestation in the Cerrado.

Table 3. Number of vegetation suppression authorizations (ASVs) and alternative land use authorizations (UASs) present in the states' databases and in Sinaflor.

State	State points	State polygons	Sinaflor	Level of integration
BA		651	87	Native (Partial)
DF			101	Native
GO	3	139	440	Native
MA			641	Native
MG	5074		1437	Native
MS			4098	Integrated
MT		581	370	Integrated
PR			6	Native
PI			187	Native
RO	4	12	0	Native
SP		223	650	Integrated
TO			2659	Native
Total	**5081**	**1606**	**10676**	

Source: Sinaflor data, as of October 23, 2023, was analyzed by Cenima/Ibama. The state data, including point-format (pairs of geographic coordinates) and polygon information, was obtained by the Centro de Vida Institute through consultations with open databases and requests for access to information. In the state of Bahia, partial integration with Sinaflor occurs because currently only authorizations for vegetation suppression that generate woody material are recorded in the system.

To estimate the level of legality of deforestation, the analysis considered cases where deforestation identified by Prodes/Inpe in 2022 took place on properties registered in the Rural Environmental Registry (CAR) and had a valid permit recorded in Sinaflor.

In 2022, 19% of the total deforestation in the Cerrado occurred on properties registered in the CAR with valid suppression permits, suggesting it was likely legal[3]. However, since integration into Sinaflor is incomplete in several states, the actual level of legal deforestation may be higher when data from state systems are considered. For instance, according to the State Department of the Environment of Bahia (Sema-BA), suppression authorizations issued in 2021 and 2022 accounted for 44% of the total deforestation recorded by Inpe's Prodes system in the Cerrado between August 2020 and July 2022 (Prodes/Inpe, 2023; Sema-BA, 2023).

Based on these various data sources and analyses, it is estimated that at least half of the deforestation in the Cerrado is illegal, either due to the absence of proper authorization or failure to meet the legal reserve requirements set by law. Additionally, given the risk of legal uncertainty when some ASVs and UASs do not fully comply with current legislation, it is essential to establish national-level rules and infra-legal normative parameters to standardize the requirements for issuing and validating these authorizations. In addition, it is crucial to enhance monitoring and control efforts in the Cerrado, not only by environmental agencies but also by financiers of production chains and buyers of agricultural commodities, who can be held accountable for illegal deforestation under current legislation. This need is becoming increasingly urgent due to the rising demands from the financial sector and both national and international markets, which require full traceability of production to ensure compliance with environmental regulations.

Corn crop in Maracaju/MS. Picture: Bruno Abe Saber

3 Analysis conducted by the National Center for Environmental Information and Monitoring (Cenima/Ibama), based on data from Sinaflor and Sicar as of October 23, 2023. All CAR registrations with "Active" and "Pending" statuses were considered, including overlaps with settlements and conservation units. Deforestation data comes from the 2022 Prodes Cerrado Program

4.2. Low level of recognition of protected areas

The land dynamics in the Cerrado are characterized by a relatively low percentage of protected areas. For instance, approximately 8% of the biome is covered by Conservation Units, 4.4% by Indigenous Lands, and just 0.25% by quilombola territories, totaling less than 13% of the biome's overall area. This limited coverage of protected areas and the lack of comprehensive mapping for territories belonging to traditional peoples and communities contrasts sharply with the 54% of the biome's area registered as private properties in the Land Management System (SIGEF) and the National Property Registration System (SNCI), both managed by INCRA. Moreover, 23% of the biome's area lacks clear domain information, potentially encompassing undemarcated territories of traditional peoples and communities, state public lands, military areas, and other unidentified regions[4], including private possessions and properties. This situation presents significant challenges for both biodiversity conservation and the recognition of the rights of indigenous peoples and traditional communities.

According to the National Register of Conservation Units (MMA/CNUC), there are 481 Conservation Units in the Cerrado, covering 178,000 sqkm. Of these, 154 are designated as full protection units (32%) and 327 as sustainable use units (68%). Among the sustainable use categories, Environmental Protection Areas (APAs) dominate, accounting for around 70% of the Conservation Units. In the Prodes 2022 period, Environmental Protection Areas (APAs) accounted for 99% of the deforestation within protected areas, with 705 sqkm occurring in state APAs, 75 sqkm in federal APAs, and 8 sqkm in municipal APAs. Following APAs, National Parks and State Parks experienced the largest deforested areas, with 3.89 sqkm and 1.89 sqkm, respectively (MMA/CNUC, 2023).

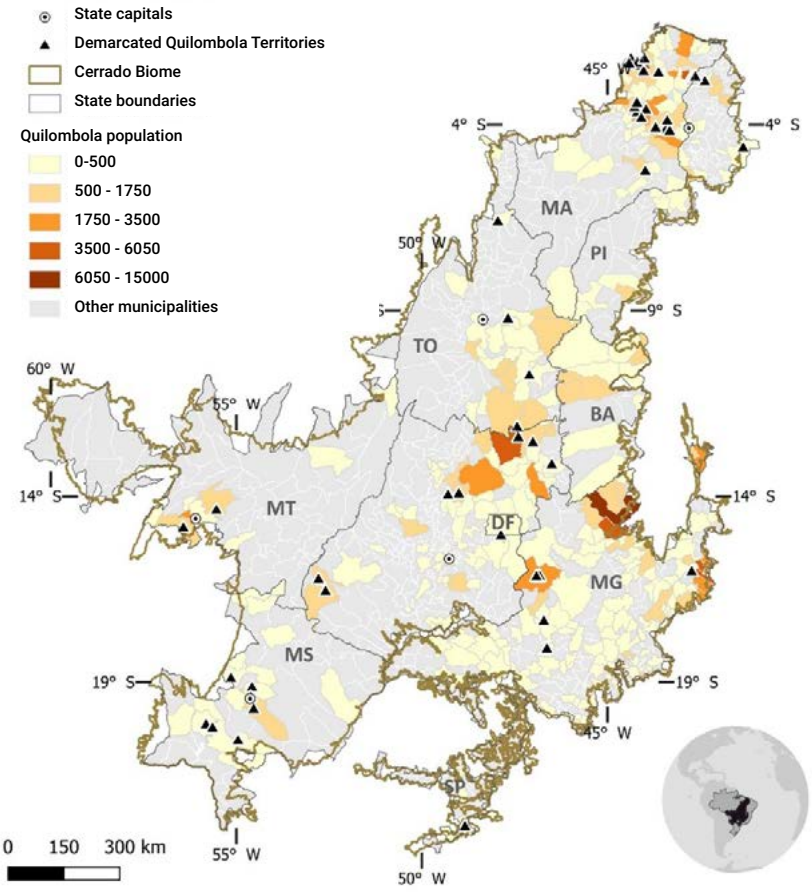
Deforestation within Conservation Units represented 7.4% of the total deforestation recorded in 2022 and was confined to a few units, aligning with the proportion of the biome covered by CUs. The Rio Preto APA in Bahia alone accounted for 41% of the deforestation in this category, with the 10 most deforested PAs contributing to 91% of the total. This high concentration highlights the fragility of APAs as a conservation tool, particularly because APAs allow private properties within their boundaries, and the legal reserve requirement in these areas is limited to between 20% and 35% of rural properties. In contrast, Indigenous Lands in the Cerrado offered much stronger protection against deforestation than the CUs. Only 0.71% of the deforestation recorded in 2022 occurred within Indigenous Lands, which cover 4.4% of the biome. This data emphasizes the critical role of indigenous peoples as guardians not only of the Amazon but also of the Cerrado.

Additionally, according to the 2022 Demographic Census, 14% of Brazil's quilombola population resides in municipalities predominantly located in the Cerrado biome (Brasil/IBGE, 2023). This quilombola population in the Cerrado totals approximately 186,000

4 The area coverage data by land ownership category was calculated by the MMA using shapefiles of Indigenous Lands from Funai (data obtained in April 2023), Conservation Units/CNUC (data obtained in April 2023), and quilombola territory and settlements from Incra, SIGEF, and SNCI (data obtained in April 2023, with information on Glebas from November 2021 provided by Incra).

people, primarily concentrated in the states of Minas Gerais, Maranhão, and Goiás. Despite this, only 0.25% of the Cerrado is designated as quilombola areas. While the state of Maranhão has a substantial number of quilombola territories demarcated in municipalities with the presence of these communities, many municipalities with significant quilombola populations in other states, such as in northern region of the state of Minas Gerais, northern region of the state of Goiás, and Tocantins lack territorial recognition. This lack of recognition extends to other traditional peoples and communities in the Cerrado as well (IPAM, ISPN, and Rede Cerrado, 2023).

Figure 4. Presence of quilombola population in the municipalities of Cerrado and demarcated Quilombola Territories.



Source: IBGE, 2023 - Demographic Census 2022.

It is important to note that the Cerrado contains at least 7 million hectares of unallocated federal public land, representing 3.4% of the biome. This area could potentially be much larger due to the lack of consolidated information on state public lands. These unallocated areas present both a threat and an opportunity. In 2022, approximately 6.5% of the deforestation in the Cerrado occurred on undesignated federal public lands, suggesting that these areas are particularly vulnerable to deforestation driven by speculative land grabs by the private sector. However, these same federal lands offer a significant opportunity for expanding Conservation Units and recognizing the ancestral rights of indigenous peoples and traditional communities, particularly quilombolas. By allocating these lands for conservation and the recognition of traditional rights, deforestation could be reduced while protecting the traditional ways of life of Cerrado populations.

A babassu coconut breaker in the Chapada Limpa Extractive Reserve/MA. Picture: Palé Zuppani/MMA Archive

4.3. Agricultural expansion, land speculation and ineffective water management

The Cerrado has had large areas used for agriculture and livestock since before the 1940s, particularly in the states of São Paulo, Minas Gerais, Goiás, and parts of Mato Grosso do Sul. However, from the 1960s onward, the implementation of government programs to stimulate the occupation of Central Brazil, along with the construction of the BR-010 highway between Belém and Brasilia, spurred migration towards the northern regions of this biome. Public investments, particularly through Embrapa, focused on adapting soybeans to the Cerrado's climate and soil, further intensifying agricultural expansion, particularly in the 2000s. It wasn't until 2015, however, that an Agricultural and Livestock Development Plan was formally established for the region through Presidential Decree No. 8447, 6 May 2015. This plan became known as "Matopiba," an acronym for the states of Maranhão, Tocantins, Piauí, and Bahia. In the same year, the Ministry of Agriculture, Livestock, and Supply published a list of 337 municipalities included in the Matopiba Agricultural Development Plan (MAPA Ordinance No. 244, 12 November 2015).

By 2002, deforestation in the Cerrado had become more dispersed, occurring across both the central and northern regions of the biome. In 2012, with the creation of the list of priority municipalities for the Cerrado under MMA Ordinance No. 97, deforestation had already shifted towards the northern regions of the biome, though higher-intensity patches were still present in the state of Minas Gerais and the northern region of the state of Goiás. Today, deforestation is predominantly concentrated in the northern part of the Cerrado, with lower-density patches in the northern region of the state of Goiás and northwestern region of the state of Minas Gerais. Approximately 70% of the converted area has been recorded in the states that make up the Matopiba region.

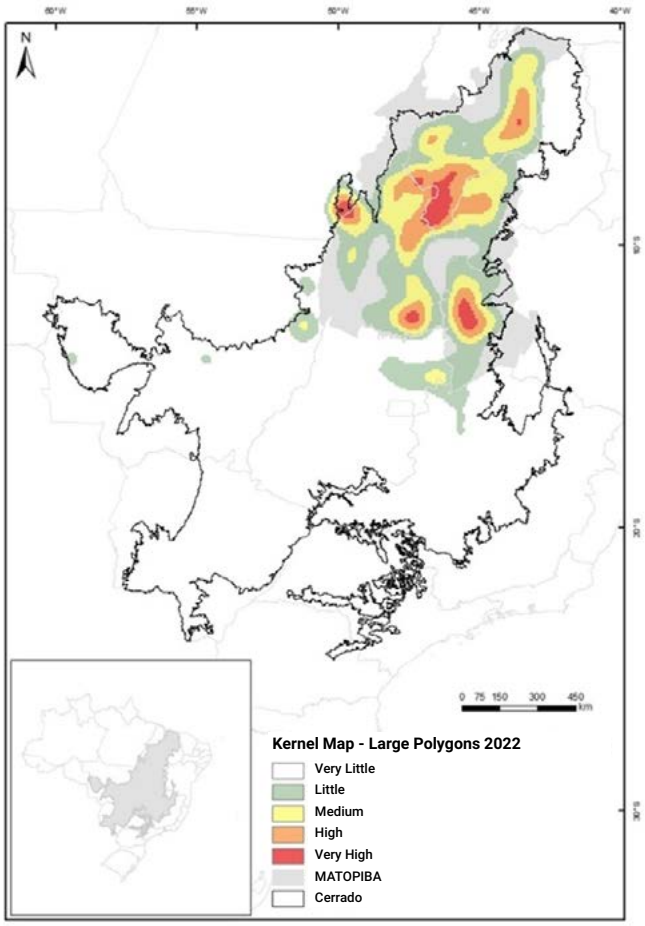
Historically, deforestation in the Cerrado has been concentrated in areas larger than 10 hectares. However, in the past four years, deforestation has increasingly occurred in polygons larger than 100 hectares, indicating significant capital investment in land acquisition and vegetation clearing over large areas each year. In the most recent period, deforestation in polygons larger than 100 hectares accounted for more than half (51%) of the total deforestation, the highest percentage recorded to date (Figure 5). This large-scale deforestation is mainly concentrated in the Matopiba region, particularly along the borders between the states of Tocantins, Maranhão, and western Bahia, where soybean cultivation is rapidly expanding.

Figure 5. Evolution of the size of deforestation polygons in the Cerrado between 2002 and 2022.

Year	less than 10ha	10 to 100ha	greater than 100ha	small (< 10 ha)	medium (10 - 100ha)	Large (> 100ha)
2002	12,39%	42,19%	45,42%			
2004	14,35%	37,54%	48,11%			
2006	18,03%	42,62%	39,35%			
2008	22,10%	40,00%	37,90%			
2010	21,67%	40,29%	38,04%			
2012	14,14%	37,48%	48,38%			
2013	21,57%	37,26%	41,17%			
2014	24,28%	38,24%	37,48%			
2015	21,23%	39,39%	39,38%			
2016	20,05%	36,66%	43,29%			
2017	21,38%	37,60%	41,02%			
2018	24,85%	37,93%	37,21%			
2019	22,05%	37,31%	40,65%			
2020	23,54%	34,14%	42,32%			
2021	23,45%	35,30%	41,26%			
2022	18,04%	30,79%	51,17%			

Source: Chart created by the MMA using Prodes/Inpe data on deforestation in the Cerrado (Prodes/Inpe).

Figure 6. Concentration of large deforestation polygons in the Cerrado, according to Prodes/Inpe 2022.



An analysis of the land market in relation to the expansion of soybean cultivation in the Cerrado supports the argument that much of the deforestation in the biome, particularly in Matopiba, is driven by speculative activity. In 2017, of the 3.9 million hectares occupied by soybeans in Matopiba, 26% were on land with medium or low agricultural suitability due to climatic and topographical constraints. Of this total soybean area, 66% came from native vegetation cleared after 2001. Despite this trend of soy expansion through deforestation in Matopiba, the Cerrado as a whole has 28.4 million hectares of highly suitable pasture areas (Davis, 2022; Schüler and Bustamante, 2022). This stock of already consolidated, highly suitable land is more than enough to double the size of soybean cultivation in the Cerrado without further deforestation.

The continued deforestation for agriculture in the Cerrado becomes more understandable when viewed through the lens of the land market, particularly in Matopiba. The average price of agricultural land in the Cerrado municipalities is R$16,776 per hectare, while in the Matopiba region, the price drops to R$7,704 per hectare. Areas of native vegetation are even cheaper, averaging R$3,633 per hectare across the Cerrado, and only R$1,688 per hectare in Matopiba. Finally, pasture areas have an average cost of R$8,657 per hectare in the Cerrado and R$3,038 per hectare in Matopiba municipalities (Agrianual, 2021). Given that the average price of land with native vegetation in Matopiba is nearly 10 times lower than the average price of agricultural land in the Cerrado, there is a strong economic incentive for companies specializing in "agricultural development" to deforest these areas for speculative purposes.

While this brings immediate financial returns for investors, the expansion of the agricultural and livestock frontier in the Cerrado is causing long-term environmental damage, particularly as climate risks increase. The accelerated deforestation in the region has led to changes in landscape processes, such as the rapid lowering of the water table and the heating and aridification of the soil surface. These changes result in losses of biodiversity, organic matter, and biomass, often leading to systemic desertification phenomena. These environmental impacts are already exacerbating the consequences of climate change and will continue to do so in the future. Between 1961 and 2019, the Cerrado experienced an increase in maximum and minimum temperatures of between 2-4°C and 2.4-2.8°C, respectively. This temperature rise has increased the vapor pressure deficit, which, in turn, has caused a reduction in air humidity by approximately 15% over the period (Hofmann et al., 2021). Between 1985 and 2018, there was an 18% to 25% reduction in the flow of several rivers monitored in the Cerrado (Salmona et al., 2023). This decline in water availability is also evident in aquifers used for irrigation. For instance, in western Bahia, between 2011 and 2018, the level of the Urucuia aquifer dropped by more than 7 meters in some areas, increasing the costs of water extraction and leading to water restrictions in the region (Marques et al., 2010).

While global climate change has played a significant role in reducing water availability in the Cerrado, deforestation has been responsible for 57% of this impact (Salmona et al., 2023). The conversion of diverse Cerrado vegetation into pasture or agricultural land has led to an increase in average temperatures by 0.6 to 3.5°C, while reducing evapotranspiration by 10% to 44% (Rodrigues et al., 2022). Ironically, while agricultural and livestock expansion is the primary driver of these changes in the Cerrado's water regime, it is also the economic activity most affected by these very changes. During the first harvest, approximately 60.5% of the land used for the double soybean-maize cropping system experienced decreased rainfall in the decade from 2009 to 2019, while more than half (53.4%) of these areas also experienced higher temperatures compared to the previous decade (1999-2009). The situation is even more challenging in areas reliant on a long rainy season for two rainfed crops. Maximum temperatures have increased in 84.3% of the lands used for double cropping, and 61% of these areas also saw a reduction in rainfall. The rainy season in the Cerrado has been delayed by an average of 1.4 days per year, leading to a cumulative delay of about 1 month and 26 days since 1980. Climate change, primarily driven by deforestation, directly impacts the viability of the second crop, which relies on a prolonged and stable rainy season (Rodrigues et al., 2022; Leite-Filho, 2022). These changes are especially detrimental to corn production, as 80% of the crop is grown during the second harvest, and the Cerrado is responsible for over half of Brazil's total corn production (IBGE, 2023).

In addition to the delayed start of the rainy season, observed trends indicate statistically significant reductions in rainfall in the Cerrado. Annual rainfall has been decreasing by approximately 100 mm per decade. The increase in temperature and the decline in water availability are directly linked to local vegetation loss, with a heightened risk of rainy seasons starting more than two weeks late, annual rainfall decreasing by more than 200 mm, and air temperatures rising by over 1°C. In areas with over 60% native vegetation, the risk of these negative climatic factors occurring together is around 8%. However, in areas with less than 20% remaining native vegetation, this risk more than triples (Leite-Filho et al., 2021). Given that reduced rainfall affects both surface water and aquifers, there are also limitations to adopting irrigation as a sustainable adaptation measure.

The worsening of global climate change, combined with local deforestation effects, points to a growing water deficit scenario in the Cerrado in the coming decades. It is estimated that by 2050, 93% of the watersheds analyzed in the Cerrado will experience significant reductions in flow, with losses of up to 33% of what is currently considered normal (Salmona et al., 2023). This situation is further exacerbated by increasing demand for water for hydroelectric power generation. In 2021, the Cerrado biome had 35 large hydroelectric plants (HPPs) and 352 small hydroelectric plants (SHPs). In addition, 115 more HPPs and 228 SHPs are currently under construction or in advanced planning stages (Ferreira et al., 2022). Indeed, social problems and conflicts over water security and access are already being felt in various regions of the Cerrado, affecting both agricultural activities and urban water supply. These issues have been widely reported

since the mid-2010s in places such as Brasilia, Goiânia, Curitiba, Belo Horizonte, and rural areas in northeastern region of the state of Goiás, southwestern region of the state of Mato Grosso do Sul, northwestern region of the state of São Paulo, and western region of the state of Bahia, and others. Even if illegal deforestation is completely controlled in the biome, the possibility of legally obtaining suppression authorization for 34.7 million hectares means that deforestation rates of over 10,000 km² could persist beyond 2050. This underscores that the current implementation of the Forest Code in the Cerrado is insufficient to sustain the region's water regime. It is therefore urgent to review the territorial planning of the biome, particularly in Matopiba, by: installing more intensive hydrological monitoring networks; implementing compensatory mechanisms and economic incentives that account for the socio-environmental costs of suppression authorizations and the benefits of conserving native vegetation; and preparing new Ecological and Economic Zoning (EEZ) plans that incorporate the scientific evidence obtained in recent years.

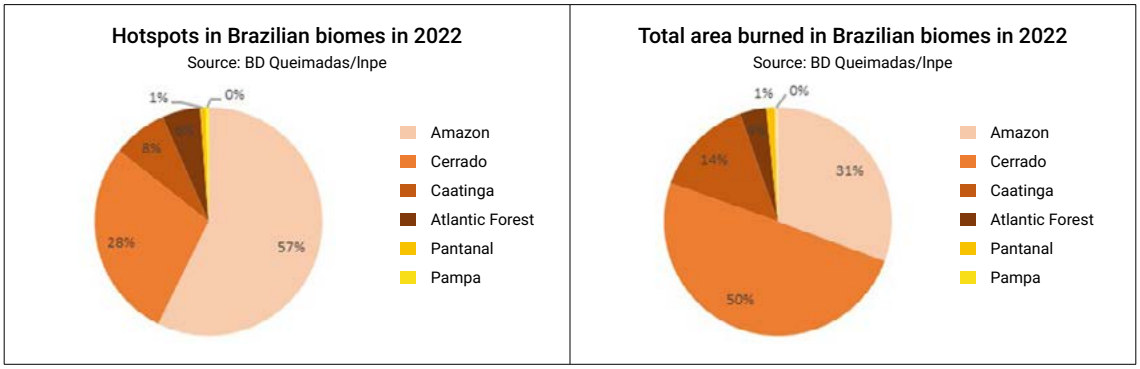
Family Farming in the Cerrado. Picture: Fernando Tatagiba

4.4. Improper fire management

Forest fires have been a persistent concern for the Brazilian government due to the various problems they cause. In addition to biodiversity loss, fires impact transportation and energy distribution systems, causing damage to the grid and leading to unwanted blackouts. Fires also interfere with land and air transportation, potentially causing road and airport closures, while severely compromising air quality and the health of populations exposed to atmospheric pollutants and gases from biomass burning or forest fires.

According to data available on the Inpe Data Platform (BD Queimadas/Inpe), between January 1 and December 31, 2022, 200763 fires were detected across Brazil, with 56885 of these occurring in the Cerrado — 28% of the total. In terms of burned area, the Cerrado accounted for almost 50% of the total burned area in Brazil in 2022. Of the 250,707 sqkm of total burned area in Brazil, 124,855 sqkm were in the Cerrado (Figure 7).

Figure 7. Distribution of hotspots and burned area in Brazilian biomes in 2022.

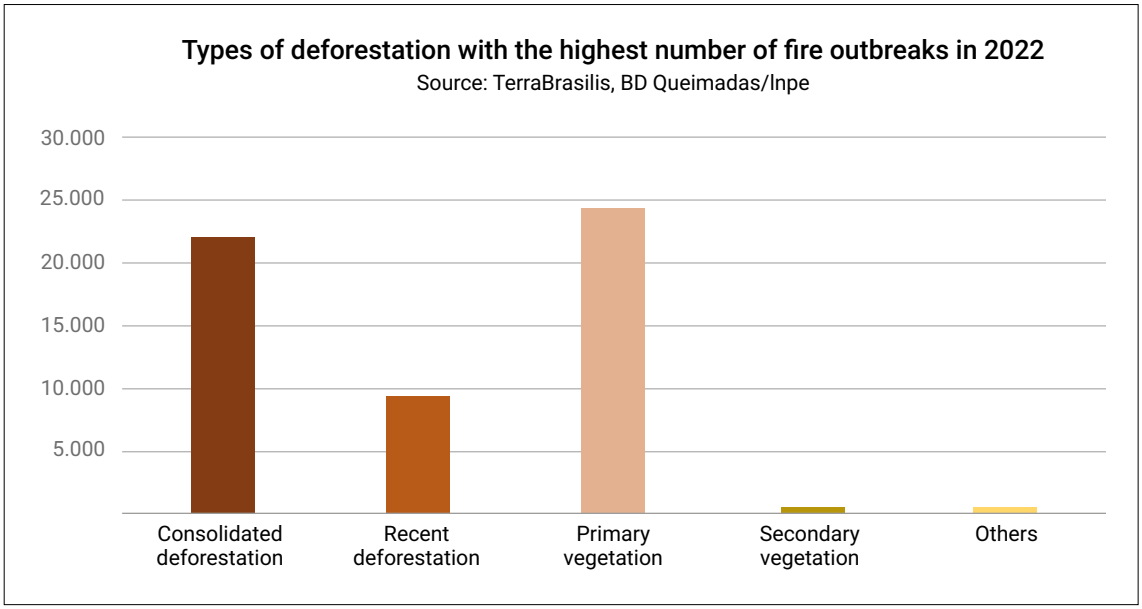


Fire is a natural part of the Cerrado's ecology, aiding in seed germination, particularly for species with impermeable seeds that require thermal shock to break vegetative dormancy. It also helps clear grass and undergrowth, creating space for the germination of other species. Fire plays a key role in the traditional practices of indigenous populations, who have lived in the Cerrado for thousands of years. It stimulates the growth of fruit-bearing species and promotes the regrowth of grasses that attract herbivores for hunting. In the Cerrado's natural ecology, lightning is the only natural source of fire, and it typically coincides with rainfall. As a result, natural fires usually occur during the seasonal transitions in May or September, alongside lightning storms (Mistry, 1998; Schmidt and Eloy, 2020).

However, despite being a natural element, fire has become increasingly frequent, intense, and destructive in the Cerrado. This shift is due to three main factors: global climate change, deforestation, and inadequate fire management and usage practices. Global climate change, driven by the accumulation of greenhouse gases, has led to a rise in average global temperatures, intensifying the impact of fire in the region. This impact is even more severe in areas with lower water availability and a wide temperature range, making the Cerrado more vulnerable to fire (Bustamante, 2012). With climate change, phenomena like El Niño, caused by the abnormal warming of Pacific waters, are occurring more frequently and with greater intensity, leading to droughts and amplifying the impact of fires (Li et al., 2021). As noted earlier, deforestation also alters the regional climate by reducing water availability and lengthening the dry season. This combination of deforestation, El Niño events, and global warming increases the Cerrado's vulnerability to fires. It is estimated that climate changes observed between 2001 and 2019 account for 56% of the increase in high-intensity fires in the Cerrado. Even in scenarios with low deforestation rates (strong governance), high-intensity fires are projected to increase by 95% in the Cerrado by 2050 due to rising global temperatures (Oliveira et al., 2022).

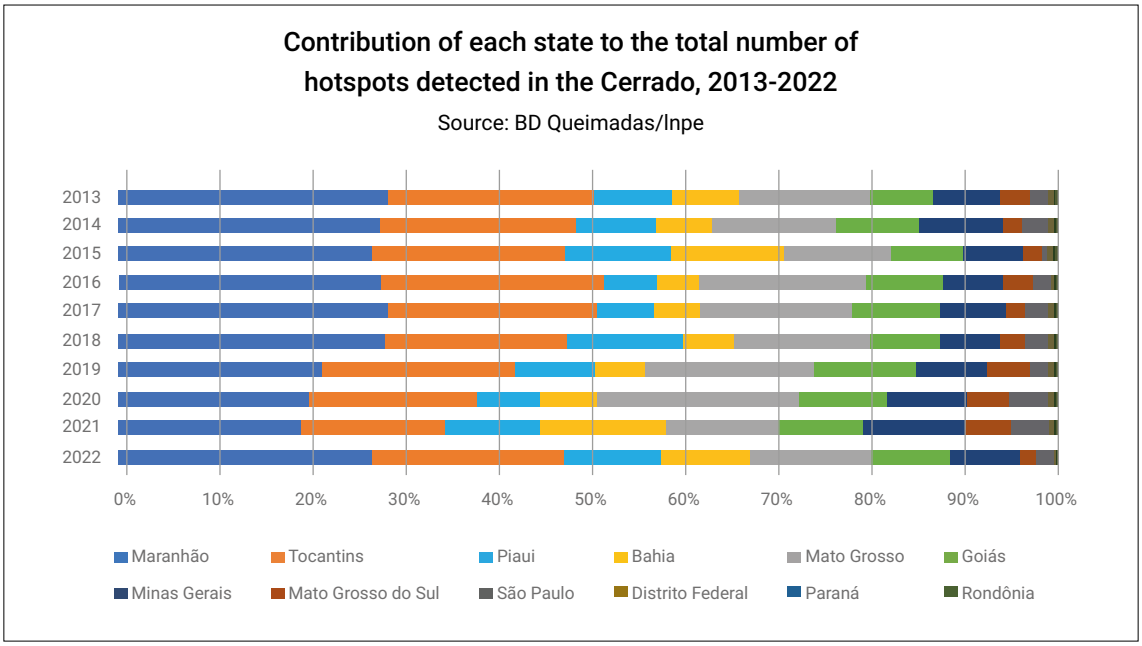
The intensification of fires is also closely linked to the deforestation process in the biome. Fires in recently deforested areas (within the last five years) account for 16% of the total, while 43% of fires occur in areas of native vegetation. The 43% of fires that occur in areas of native vegetation may be associated with both deforestation processes and natural fires. Additionally, 39% of fires were detected in areas of consolidated deforestation, and the remaining 2% occurred in areas of secondary vegetation or other land uses, mostly related to agricultural and livestock practices (Figure 8). When focusing on high-intensity fires, which typically occur during the dry season and are largely caused by human activity, 96% of the total burned area impacts native vegetation. Recent deforestation in neighboring areas is responsible for 38% of the occurrence of these high-intensity fires (Oliveira et al., 2022).

Figure 8. Distribution of hotspots detected in 2022 according to deforestation classes.



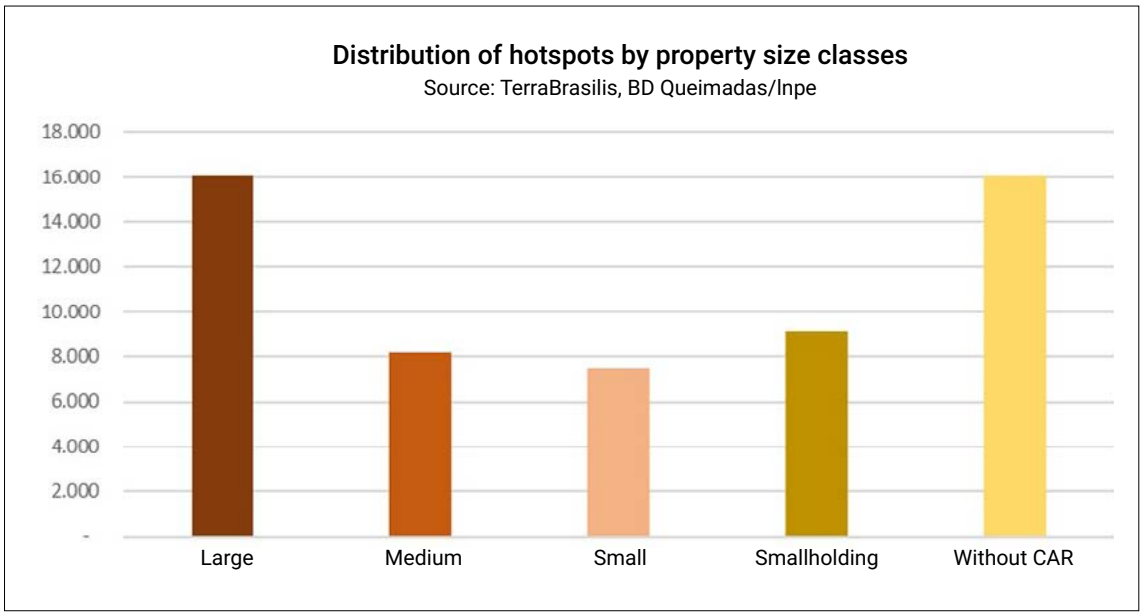
The occurrence of hotspots is not uniform across the Cerrado, with a higher concentration in states that have higher levels of deforestation (Figure 9). Aside from the state of Mato Grosso, most of the hotspots have been concentrated in the Cerrado areas within the Matopiba region. Over the past ten years, more than half of the hotspots detected in the biome were located in Matopiba, and in 2022, this figure increased to 2/3 of the total, or 38,392 of the 56,885 hotspots detected.

Figure 9. Contribution of states in relation to the total number of hotspots detected in the Cerrado between 2013 and 2022.



The spatial analysis of hotspots in relation to properties registered in the Rural Environmental Registry (CAR) highlights the connection between fires and agricultural and livestock activities. Of the total hotspots observed in the Cerrado in 2022, 43% (24,211 hotspots) were detected on medium and large farms, and 29% (16,633 hotspots) occurred on small properties and smallholdings. The remaining 28% (16,045 hotspots) were found in areas not registered in the CAR.

Figure 10. Distribution of hotspots detected in 2022 by rural property size classes.

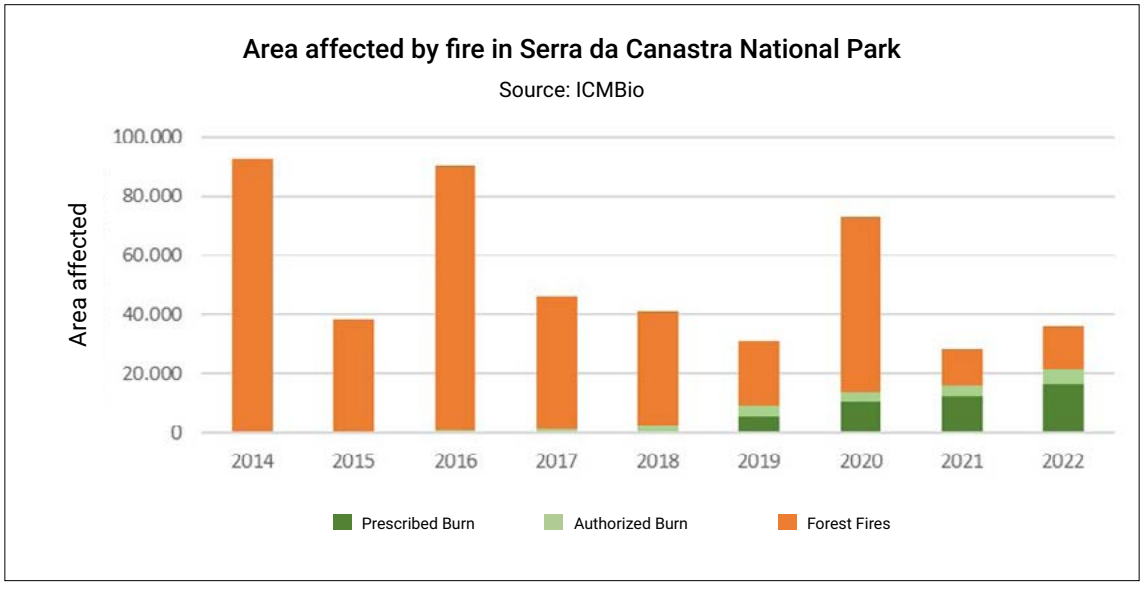


Inadequate fire management and use practices have contributed to the increasing frequency and impact of forest fires. As previously mentioned, fire is a natural part of the Cerrado's ecology; suppressing fire — even from natural causes — can disrupt the ecosystem and lead to excessive biomass growth, creating conditions for more intense fires. The increase in dry biomass can lead to high-intensity fires that exceed the Cerrado's natural resilience to fire. To prevent these negative impacts, it is crucial to advance the implementation of integrated fire management, which includes practices like controlled and prescribed burning. These controlled fires are typically low in temperature and only affect the undergrowth and the outer bark of trees. By reducing excess biomass, the likelihood of large, destructive fires is minimized.

There are positive examples of integrated fire management in both Cerrado conservation units and private areas that demonstrate the effectiveness of these practices in reducing the impact of fires on native vegetation. Some protected areas managed by ICMBio (federal conservation units), Prevfogo/Ibama, and the National Foundation for Indigenous Peoples (FUNAI) (indigenous lands) have been monitoring and evaluating the actions carried out under the integrated fire management approach.

These integrated fire management actions include training, raising awareness, building firebreaks, developing burning calendars, and carrying out controlled and prescribed burns, among other measures. A notable example is Serra da Canastra National Park (NP) in Minas Gerais, which has historically been affected by large fires during the dry season, causing significant damage to its fauna and flora. In 2017, ICMBio began implementing integrated fire management in the park, which included prescribed burning, community awareness initiatives, and issuing permits for pasture renewal burns for non-indemnified residents. Since then, the number of areas burned for authorized pasture renewal and prescribed conservation burns has increased. By 2021, in addition to satellite monitoring from Inpe, ICMBio began using the Fire Panel of the Amazon Protection System's Management and Operational Center (Censipam) and a fire spread simulation system developed by the Federal University of Minas Gerais (UFMG), in collaboration with Inpe. These tools will eventually be integrated into the National Fire Information System (Sisfogo). This change in the fire regime led to a significant reduction in the total area affected by forest fires. In 2021 and 2022, the area impacted by forest fires was smaller than the area subjected to prescribed and authorized burns. Other examples of successful integrated fire management include Chapada das Mesas National Park in the state of Maranhão, Serra Geral Ecological Station in the state of Tocantins, and Serra do Cipó National Park in the state of Minas Gerais.

Figure 11. Area affected by fire in the Serra da Canastra National Park, between 2014 and 2022.



In addition to conservation units, integrated fire management with prescribed burning has also proven effective in private areas. Properties participating in integrated fire management programs, supported by firefighters, have seen an average 50% reduction in the area burned compared to previous years (Oliveira et al., 2021). Prescribed and authorized burns are typically conducted at the end of the rainy season, when moisture levels in the vegetation are still high enough to reduce the risk of fires spreading into uncontrolled forest fires. During this period, the fire moves quickly, primarily affecting grasses, which minimizes environmental damage and the health risks for people living in or near the affected areas.

In summary, creating a mosaic of areas burned at different times promotes biodiversity conservation, particularly the conservation and maintenance of fauna. In addition, prescribed burning facilitates the preparation and execution of more strategic and efficient firefights, reducing both the time and effort required. The duration of firefights has decreased from an average of 10 to 15 days to just 2 to 3 days per event. By fragmenting the available fuel, prescribed burns help limit the spread of fire and prevent large-scale wildfires. Thus, integrated fire management, combined with the reduction of both legal and illegal deforestation, is essential to mitigate the increasing risk of large forest fires in the Cerrado due to climate change.

Chapada dos Veadeiros National Park. Picture: Fernando Tatagiba/ICMBio

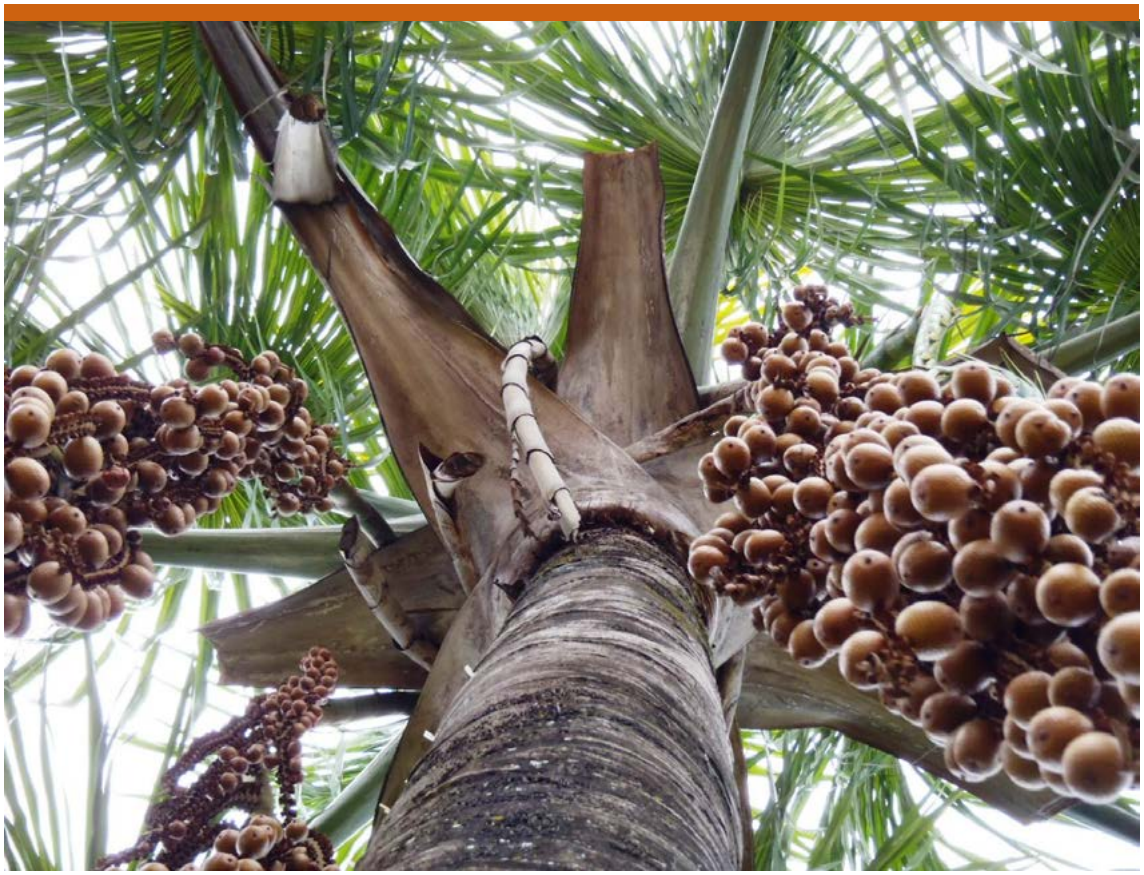
5. AXES AND STRATEGIC OBJECTIVES OF THE 4TH PHASE OF THE PPCERRADO

By analyzing the deforestation dynamics and adhering to the guidelines of Decree No. 11367/2023, the Interministerial Commission has established Strategic Objectives, Expected Results, and Lines of Action, along with the associated targets and indicators, as outlined in Annex I - Summary Table of the 4th Phase of the PPCerrado. These components form the structure of the PPCerrado, ensuring interoperability and guiding public policies to reduce deforestation in the biome. The strategic objectives for the 4th phase of the PPCerrado are summarized in Table 4.

Table 4. Axes and Strategic Objectives of the 4th Phase of the PPCerrado.

Axes	Strategic Objectives
Axis I. Sustainable production	**Objective 1.** Sociobioeconomy promotion, sustainable forest management, and the recovery of deforested or degraded areas.
	Objective 2. Encourage sustainable agricultural and livestock activities.
	Objective 3. Expand research, knowledge production, training, and technical assistance for sustainable production activities.
Axis II: Environmental monitoring and control	**Objective 4.** Strengthen federal institutions and ensure accountability for environmental crimes and infractions related to deforestation, forest fires, and forest degradation in the Cerrado.
	Objective 5. Improve the capacity for monitoring, analysis, prevention, and control of deforestation, degradation, and production chains.
	Objective 6. Reduce forest fires.
	Objective 7. Improve and integrate state and municipal data on deforestation permits, embargoes, and infraction notices into federal systems.
	Objective 8. Strengthen coordination with the Cerrado states to promote actions for controlling deforestation, forest fires, and implementing the Native Vegetation Protection Law.

Axis III. Land and territorial planning	**Objective 9.** Ensure the allocation of public lands for protection, conservation, and sustainable use of natural resources, particularly for indigenous peoples, quilombola communities, traditional peoples, and family farmers.
	Objective 10. Expand and strengthen the management of protected areas.
	Objective 11. Coordinate and align the planning of major infrastructure and development projects with the goal of zero deforestation by 2030.
	Objective 12. Carry out territorial planning and implement legal instruments to ensure the role of native vegetation in maintaining and restoring the water regime, as well as water quality and quantity.
Axis IV. Rules and economic instruments	**Objective 13.** Create, improve, and implement regulatory and economic instruments to control deforestation and conserve biodiversity.



Species Mauritia flexuosa (Buriti). Picture: João Paulo Sotero

Based on the proposals for expected results and the lines of action established, the framework will be supplemented with targets and indicators. These should serve as guidelines for internal planning by all ministries and related bodies, with clearly identified targets, indicators, actors, and partners. These targets and indicators will be used to monitor and evaluate the PPCerrado. As the plan is implemented, especially within the Monitoring and Evaluation Center, new indicators and targets will be developed and presented. These will be subject to evaluation and incorporation during the plan's annual update, as outlined in art. 2, Decree No. 11367/2023.

After this brief overview of the general structure, the foundations of each axis are presented, along with the main lines of action that form the core pillars supporting the plan (see Annex I).

Fruits of the Cerrado: barú (Dipteryx alata), marmelada-de-cachorro (Albertia edulis), pimenta-de-macaco (Xylopia aromatica), and cajuí (Anacardium humilé). Picture: João Larroca

5.1. Axis I - Sustainable production

Reconciling economic production with environmental conservation is the main challenge for the sustainable production activities axis of the PPCerrado. For the Cerrado, this reconciliation is pursued through three strategic objectives:

> **Objective 1. Sociobioeconomy promotion, sustainable forest management, and the recovery of deforested or degraded areas:** this objective focuses on expanding production opportunities within socio-biodiversity and sociobioeconomy value chains;
>
> **Objective 2. Stimulate sustainable agricultural and livestock activities:** with an emphasis on grain and meat production, accelerating production verticalization through integration, productive intensification, environmental regularization, and minimizing the expansion into new areas;
>
> **Objective 3. Expand and strengthen research, knowledge production, training, and technical assistance for sustainable production activities:** this serves as a support strategy for achieving Objectives 1 and 2.

Strategic Objective 1 aims to promote the sociobioeconomy and socio-biodiversity, sustainable forest management, and the recovery of deforested or degraded areas. A significant challenge under this objective is the lack of visibility and support for the economy associated with native species and sociobioeconomy products. The Cerrado is widely recognized as a production biome; however, many existing economic and social arrangements that are not linked to global trade chains receive minimal support from the state and are overlooked by society. As a result, these sectors lack strong institutional and regulatory incentives, along with market dynamics that would ensure their competitiveness and market power. The Cerrado is considered one of the regions with the greatest biodiversity in the world, with estimates of a flora with more than 12 thousand species, 4 thousand of which are endemic (Martinelli and Morais, 2013). However, the Production of Vegetable Extraction and Forestry (PVES) (IBGE, 2021), the main national information source on the economic use of plant species, records data on just over three dozen native species with economic value, amounting to a production value of R$ 270.1 million in municipalities located fully or partially within the Brazilian Cerrado (including transition areas between biomes like Cerrado and Caatinga).

The diversification of bioeconomy production in the Cerrado is a public policy issue that needs to be addressed. This will require measures such as the promotion of native species, particularly in the food sector, to cater to the growing awareness among urban consumers about the benefits of a more diverse, nutritious, and functional diet. The state has a key role in advancing institutional conditions that support the economic use of native species. To this end, initiatives like the National Sociobioeconomy Program will be implemented, alongside actions to improve statistics on native product production, encourage applied research into topics like the food uses of native species and their

Golden grass crafts. Picture: Fernando Tatagiba

applications across industries, and promote agro-industries and bio-industries within the sociobioeconomy (1.1.1).

Another important issue for the sociobioeconomy and family farming is the strengthening of collective organizations. The experience in the Cerrado shows the power of community and cooperative structures for organizing production and accessing both institutional and private markets. Whether it's the production of Cerrado fruits in northern region of the state of Minas Gerais, the braiding of golden grass in Jalapão (TO), or the babassu plantations in the states of Maranhão, Tocantins, and Piauí, social organization plays a crucial role. Public policies should stimulate and support the production and marketing of sociobioeconomy products. In this context, the PPCerrado includes lines of action aimed at strengthening collective and community organizations, as well as the policies and programs they rely on, such as PAA, PNAE, PGPM, PGPM-Bio, and the Family Farming Seal (1.1.2). Additionally, the plan promotes sustainable businesses and the creation of green jobs, while strengthening the bioeconomy, agroecological transition, and ethnodevelopment (1.1.3).

Collective and community organization also plays a key role in valuing local or traditional knowledge and in securing access to production resources. Unlike the Amazon, where public lands dominate, extractivism in the Cerrado is conducted in close connection with private property and enterprises. As such, access to natural resources is a critical factor in the social organization of extractive workers. An emblematic example is the Interstate Movement for Free Babassu, organized by women babassu coconut breakers. Through their advocacy, they have won rights to access babassu groves in various municipalities in Maranhão and the state of Piauí, including the legal right to free access granted under State Law No. 7888/2022. Guaranteeing rights of access to natural resources is an

inter-federative agenda that must be reinforced as part of a strategy for environmental conservation and the inclusion of small producers and traditional populations in the Cerrado (3.3.1).

In the context of sustainable forest management, training and the dissemination of good sustainable extraction practices are essential for expanding and improving the quality of work, while also adding value to products. A significant portion of the information on economically valuable species has been organized into guides and booklets or is in the process of being recorded through ongoing initiatives like the National Forest Inventory. However, applying this knowledge depends on forming strategic partnerships and advancing institutional innovations, such as participatory management and certification processes, which empower family farming (1.3.1, 3.1.1, and 3.2.1).

At a time when job insecurity and job loss are global trends, creating green jobs through sustainable businesses presents a strategic opportunity for conserving biomes. Green job creation in family farming, linked to sustainable tourism, sustainable extraction, agroecology, organic production, agroforestry, and the productive recovery of degraded areas, should be central to discussions about ecological transition. This approach must be supported by robust training and technical assistance programs (1.1.3, 1.2.1, 3.1.1, and 3.2.1).

In the native vegetation recovery sector, the National Plan for Native Vegetation Recovery (Planaveg), initiated in 2017, estimated the potential creation of up to 191,000 direct and indirect jobs, which should be encouraged. Progress in implementing Planaveg, defining priority areas for recovery, and adopting new mechanisms like public land concessions for restoration are key initiatives for promoting large-scale recovery, benefiting job and income generation in rural areas (1.4.1). Additionally, the inclusion and promotion of native products as key inputs in gastronomy, particularly in association with tourism promotion both in Brazil and abroad, are other important initiatives for enhancing the value of these products. Actions in this direction have the potential to expand the economic use of native species and increase awareness of these foods, positioning the Cerrado as a region rich in unique flavors and resources (1.2.1 and 3.2.1).

Strategic Objective 2 aims to stimulate sustainable agricultural and livestock activities, focusing on grain and meat production and accelerating the verticalization of production, with an emphasis on integration, productive intensification, and reducing the opening of new areas. The primary goal is to promote initiatives that reduce pressure on critical deforestation areas. Unlike the Amazon, the Cerrado experiences high productivity in grain crops alongside an uncontrolled rise in deforestation in recent years. Global demand, which supports the country's competitive supply and contributes significantly to national income, also drives the opening of new areas, leading to indiscriminate deforestation of native vegetation. This trend is exacerbated by the low average land prices in the Matopiba region and the lack of standardization for ASVs and UASs in the biome. Given that deforestation is legally permitted on up to 80% of properties, a balanced approach is needed to protect the biome while maintaining Brazil's competitive position

in global trade (2.1.1). Striking the ideal balance between expanding and consolidating the agricultural and livestock frontier in the Matopiba region and conserving the Cerrado is essential to ensuring the biome's capacity to sustain water, climate, and biodiversity systems. This balance must align with the goal of zero deforestation by 2030, a target set by the President of the Republic (and also reflected in Objective 12).

Part of this challenge involves ensuring the natural and climatic conditions necessary to maintain productivity in the medium and long term. The consequences of deforestation, as previously discussed, must be factored into future production scenarios. Brazil urgently needs to adopt a strategy for conserving its natural infrastructure to safeguard production, productivity, and price stability, especially given that the recurring effects of extreme weather events on food inflation have been highlighted by the Central Bank of Brazil (BCB, 2019; 2022; 2023). The public debate on legal deforestation should not only focus on the percentage that can be authorized but also on how much should be authorized within a specific time frame. This consideration must include, at a minimum, an evaluation and prioritization of areas that have already been converted, as established by the Forest Code, as well as crop projections, compensatory proposals, and integrated planning within territorial, environmental, and hydrological units, such as watersheds (2.1.1).

However, building consensus for the protection of the Cerrado requires the debate to extend beyond permissible deforestation. Institutional and technological innovations are crucial. A significant portion of grain production in the Cerrado already occurs on converted areas. It is essential to prioritize and accelerate production on these areas through regulatory incentives, the adoption of existing technologies, and the development of new production technologies that enhance cost-effectiveness, productivity, and profitability. The expansion of grain production in already-open areas should be a priority for economic, agricultural, and environmental policies. This would be a key factor in adding value to low-carbon agriculture. Accelerating production in these areas is not only vital for the grain sector but could also significantly benefit cattle farming in the Cerrado, which still experiences low productivity levels and suffers from environmental degradation of pastures (2.1.1, 3.1.1, and 3.2.1).

Integration could be the most effective strategy for achieving vertical production growth in the Cerrado. Through the ABC Plan (2010-2020), Brazil has integrated over 10.7 million hectares of land (Mapa, 2023). However, there is a need to accelerate and expand production in these integrated areas. One of the main opportunities for the Cerrado lies in Crop-Livestock Integration (CLI), enabling vertical production of grains and meat without opening new areas. Currently, promising technologies are already in use, such as the "boi safrinha," which, according to an impact assessment by Embrapa Cerrados, occupied an area of 3 million hectares during the 2019/2020 harvest. This approach has shown positive economic impacts, including gains in productivity and revenue, as well as an environmental benefit known as “land sparing,” due to the maintenance of perennial pastures left unoccupied during drought periods (Embrapa, 2023) (2.1.1, 3.1.1, and 3.2.1).

In addition to production-related measures, progress in implementing the Forest Code is crucial to adding environmental value to agricultural and livestock products, improving reputational gains, and maintaining and expanding markets. The analysis and validation of the CAR, a responsibility of the states, is a key step for subsequent initiatives that will promote environmental regularization, productive reintegration, and the integration of properties into the Cerrado landscape. It also allows for the measurement and quantification of efforts to generate environmental services (2.1.2). Another critical action is the implementation and promotion of integrated fire management practices, especially in areas of extensive livestock farming (2.1.3).

Initiatives for traceability, certification, and the commercial promotion of sustainable and livestock agriculture are equally important and should align with national policies and regulations. Given Brazil's natural capital, productive capacity, and technological expertise, the country is well-positioned to lead efforts to expand the supply of products with high sustainability standards, securing markets and setting benchmarks for global trade (2.1.1).

Babassu coconut mesocarp - Extremo Norte do Tocantins Extractive Reserve.
Picture: Palé Zuppani/MMA Archive

5.2. Axis II - Environmental monitoring and control

The proportion of illegally cleared areas in the Cerrado is lower compared to the Amazon due to less protective legislation. However, as mentioned in the previous chapter, it is estimated that at least half of the deforestation in the biome occurs without authorization. Environmental control — through planning and implementing repressive actions — is essential to prevent, curb, and discourage this trend. Additionally, it is crucial to increase the production of information and improve the integration of databases and monitoring systems to better plan and execute these measures, and to support decision-making. Utilizing spatial intelligence is key to optimizing the limited human and financial resources available for this purpose. There is also the issue of "apparently legal deforestation," which occurs within the limits set by the Forest Code but does not comply with legal and regulatory requirements, such as forest and environmental compensation, environmental licensing, or compliance with Environmental Impact Assessment (EIA/Rima), among other irregularities.

It is important to note that environmental control actions are not the exclusive responsibility of the Federal Government or its institutions, such as federal environmental agencies, the Federal Police (PF), and the Armed Forces. The states and municipalities play a crucial role in this regard, as Complementary Law No. 140/2011 distributes clear and significant responsibilities to these entities for controlling deforestation and combating forest fires. The dynamics of deforestation and forest fires in the Cerrado differ from those in the Amazon, as deforestation is primarily concentrated in areas registered with Incra as private properties. This means that a significant number of Vegetation Suppression Authorizations (ASVs) and Alternative Land Use Authorizations (UASs) are issued by the states, and sometimes irregularly by municipalities, authorizing deforestation that must be monitored by the agencies responsible for issuing these permits. To address these challenges, the "Environmental Monitoring and Control" axis of the 4th Phase of the PPCerrado outlines five strategic objectives:

> **Objective 4.** Strengthen federal institutions and ensure accountability for environmental crimes and infractions related to deforestation, forest fires, and forest degradation in the Cerrado;
>
> **Objective 5.** Improve the capacity for monitoring, analysis, prevention, and control of deforestation, degradation, and production chains;
>
> **Objective 6.** Reduce forest fires by implementing integrated fire management;
>
> **Objective 7.** Improve systems and integrate state and municipal data on deforestation authorizations, embargoes, and infraction notices into federal systems;
>
> **Objective 8.** Strengthen coordination with the Cerrado states to promote actions to control deforestation, forest fires, and implementation of the Native Vegetation Protection Law.

Strategic objective 4 aims to increase the performance and capacity of the federal institutions responsible for investigating and enforcing deforestation. To this end, the

aim is to strengthen the actions of the institutions in the face of deforestation and illegal fires (4.1.1), ensure accountability for environmental crimes and infractions related to deforestation, fires, and forest degradation, advancing the use of remote systems on a large scale, and even artificial intelligence, to significantly increase the application of sanctions and precautionary measures such as land use embargoes (4.1.2), and strengthen the human and material resources (technological and logistical) available to tackle the issue (4.1.2). Among the goals set for these lines of action, we highlight the structuring of state governance centers in state intelligence, the holding of competitive examinations, the structuring of logistical support bases for enforcement, and the hiring of aircraft to fight fires in native vegetation.

Strategic objective 5 seeks to improve the capacity to control, prevent, analyze, and monitor deforestation, degradation, and production chains. To this end, this objective has 11 lines of action aimed at achieving four main results. The lines of action include improving Prodes, Deter, and TerraClass to support monitoring, enforcement, the national GHG inventory, and the National REDD+ Strategy (5.1.1.1); developing a system for automatic monitoring of compliance with embargoes that integrates data from the rural environmental registry and other federal and state data sources (5.1.1.2); and developing a system for traceability and control of the environmental origin of agricultural and livestock products (5.2.1.1). This strategic objective also includes actions aimed at improving the capacity to assess the impact of deforestation on the water regime (5.3), with a focus on encouraging an expansion of the data collection network for surface and underground water resources (5.3.1.1), and public calls for research dedicated to monitoring and analyzing the impact of climate change, deforestation, fires, and soil degradation on the water regime (5.3.1.2). In addition, the PPCerrado will support initiatives and promote the creation and strengthening of community networks to monitor deforestation and forest degradation, with the goal of protecting the environment in their territories (5.4).

Strategic objective 6 aims to reduce forest fires by implementing a framework of actions related to integrated fire management in the biome. This set of practices combines ecological, cultural, socio-economic, and technical aspects in the execution, integration, monitoring, evaluation, and adaptation of actions regarding the use of fire, as well as in preventing and fighting forest fires. The objective is to help reduce forest fires and expand technical and scientific knowledge on the subject. A key pillar of this objective is strengthening the institutional capacity of the main federal institutions responsible for preventing and combating forest fires, such as ICMBio and Ibama, by reinforcing the Federal Brigades Program (6.1.1). Additionally, the objective includes promoting a range of actions and initiatives under the implementation of the National Integrated Fire Management Policy (6.1.2). It is worth noting that while the bill is still being processed, federal institutions are already carrying out actions in line with this upcoming policy. Lastly, there is a need to enhance fire monitoring systems and track

the impacts of fires more effectively (6.1.3). These actions include the implementation of Sisfogo to generate daily alerts and integrate with state-controlled burning authorization bases (6.1.3.1), the implementation and enhancement of air pollution monitoring and the evaluation of the impact of fires on air quality (6.1.3.2), and the improvement of the BD Queimadas and Painel do Fogo platforms, as well as fire spread simulation systems (6.1.3.3) to assist in firefighting and fire prevention. Additionally, there will be research and studies to enhance knowledge on this topic, along with training programs to disseminate best practices and educational campaigns aimed at raising societal awareness of the impacts of forest fires (6.1.4).

Chapada dos Veadeiros National Park. Picture: Fernando Tatagiba/ICMBio

Strategic objective 7 addresses a critical issue across all Brazilian biomes: the integration of state data on suppression authorizations (ASVs), alternative land use authorizations (UASs), transport of forest products, infraction notices, and land use embargoes. Without strengthening Sinaflor and creating an integrated database of fines and embargoes by federal environmental agencies, along with the integration of data generated by states and municipalities, it will be impossible to definitively distinguish legal from illegal deforestation and enable coordinated action between the various agencies that make up the National Environment System.

Porquinhos Indigenous Land/MA. Picture: Felipe Werneck

Finally, strategic objective 8 aims to strengthen coordination with the Cerrado states to promote actions for controlling deforestation, forest fires, and implementing the Native Vegetation Protection Law. To achieve this, support will be provided to prepare State Plans for Deforestation and Fire Prevention and Control (PPCDQs) in the Cerrado (8.1.1). However, the most significant set of actions in this context is to support the states in implementing the Native Vegetation Protection Law through the National Rural Environmental Registry System (Sicar) and the Environmental Regularization Programs (PRA). The technological infrastructure for Sicar is managed by the Ministry of Management and Innovation in Public Services (MGI), while the MMA remains responsible for setting parameters related to the environmental policies supported by Sicar. All states are connected to Sicar, either by directly using the system or by sending information from their own systems to Sicar. In addition, 16 states use the CAR platform provided by the federal government, while the other states have their own systems that send data to

Sicar. In working with the states, the federal government will improve Sychar as a tool for controlling deforestation by integrating data on deforestation, fines, embargoes, and suppression authorizations (8.2.1). This will enable the qualification of authorized and unauthorized deforestation, as well as the monitoring of the proper execution of ASVs and UASs, providing a foundation for targeted actions using spatial intelligence by both the states and the federal government. Furthermore, solutions will be developed and made available to the states to improve the automation of the CAR analysis process and the preparation of environmental regularization proposals for properties, accelerating the environmental regularization process (8.2.2).

Environmental enforcement in the Cerrado. Picture: Vinícius Mendonça/Ibama

5.3. Axis III - Land and territorial planning

The goal of land and territorial planning in the Cerrado biome is to regulate and promote land rights, guiding the occupation and use of the territory on a sustainable basis. This approach seeks a broader perspective that acknowledges the diversity of the biome's ecosystems, the institutionality of land and territorial management, and the role of the private sector in sustainable production and shared responsibility for conserving natural resources, which is crucial to the production processes themselves. With this context in mind, this new phase of the PPCerrado will strengthen land and territorial planning efforts across the biome, particularly in the Matopiba region, to achieve three major objectives:

Objective 9. Ensure the allocation of public lands for the protection, conservation, and sustainable use of natural resources, especially for indigenous peoples, quilombola communities, other traditional peoples and communities, and family farmers;

Objective 10. Expand and strengthen the management of protected areas;

Objective 11. Coordinate and/or align the planning of major infrastructure and development projects in the region with the goal of zero deforestation by 2030;

Objective 12. Carry out territorial planning and implement instruments provided by law to ensure the role of native vegetation in maintaining and recovering the water regime and the quality and quantity of water.

Porquinhos Indigenous Land/MA. Picture: Felipe Werneck

The high rate of deforestation on public land in the biome highlights the vulnerability of certain portions of the territory to irregular use and occupation of public property. Therefore, to achieve objective 9 proposed by the action plan — addressing and overcoming the challenges posed by land grabbing and the need to protect public lands — progress must be made on two fronts: the allocation of federal and state public lands, reducing land insecurity (outcome 9.1); and improving the control of land information (outcome 9.2).

The approximately 7.13 million hectares of federal public land still unallocated in the Cerrado are concentrated primarily in the states of Tocantins (4.07 million hectares) and Mato Grosso (2.15 million hectares). These areas should be prioritized for action by the Technical Chamber for the Allocation and Landholding Regularization of Federal Rural Public Lands, allocating them for protection, conservation, and sustainable use through the creation and/or expansion of Conservation Units, the expansion of forest concession projects (both for production and forest restoration), and the recognition and landholding regularization of territories occupied by indigenous peoples, quilombola communities, and other traditional peoples and communities (9.1.1 and 9.1.2). This may also include the possibility of creating new settlements for family farmers, particularly those with an environmentally differentiated character (9.1.3).

In order to achieve the expected results, it is essential that federal and state institutions work to improve landholding regularization procedures, making them more agile and transparent (9.1.4), and act in coordination in the management of land conflicts, investing in permanent task forces that contribute to proper investigation and accountability in observed cases (9.1.6).

Additionally, progress must be made in structuring integrated information systems, with land, territorial, and registry data related to public lands and rural possessions and properties, in order to minimize insecurity and prevent illegal activities related to the use and occupation of the Cerrado. As part of this strategy, actions will need to be implemented to enhance information management and promote coordinated, permanent efforts to control the registration of native vegetation (9.2.4), ensure compliance with environmental resolution clauses concerning rural properties (9.2.5), address irregularities (9.2.1 and 9.2.2), and combat related fraud (9.2.3). An example of such fraud is the practice of "green land grabbing," where areas of native vegetation on public land — often occupied for decades by traditional peoples and communities — are declared in the Rural Environmental Registry as Legal Reserve areas for large private rural properties.

Another objective of the PPCerrado is to expand and strengthen the management of protected areas (objective 10), which involves valuing natural areas as key spaces for the conservation of biodiversity and ecosystem services (especially water production,

given the importance of this biome for national water security) and recognizing the rights of indigenous peoples and traditional peoples and communities over the lands they traditionally occupy.

While around half of the Cerrado's natural area has already been converted, only a small portion of the biome is legally protected in Conservation Units (CUs). When combined with Indigenous Lands and the small contingent of officially recognized Quilombola Territories, these protected areas total 12.7% of the biome's territory. Although the expansion of protected areas in the Cerrado in recent decades is evident, there are still significant gaps, especially when considering the commitments of the Global Biodiversity Pact and the Montreal-Kunming goals, which aim to conserve at least 30% of the earth's natural habitats, emphasizing areas of particular importance for biodiversity, ecosystems, and environmental services.

Furthermore, considering that Conservation Units (CUs) are still the target of a considerable portion of the deforestation recorded in the Cerrado in 2022, the urgency of effective actions to protect the 481 existing units in the biome is evident, with only 93 having management plans drawn up and 120 having management councils established. Special attention should be given to Environmental Protection Areas (APAs), which account for around 70% of the area occupied by Conservation Units in the Cerrado. These areas are critical for river springs and aquifer recharge but also experience a significant portion of deforestation observed in protected areas.

The proposed lines of action focus on creating and consolidating Conservation Units (10.1.1) and strengthening their management and governance (10.1.2), particularly in critical deforestation areas and high-priority regions for biodiversity and water resource conservation. This also includes a strategy to promote landholding regularization in protected areas and increase connectivity between natural areas through "Other Effective Area-Based Conservation Measures" (OMECs), such as mosaics, ecological corridors, Biosphere Reserves, and Ramsar Sites (10.1.2).

This territorial composition, focused on the conservation and sustainable use of natural resources, also includes Indigenous Lands (ILs), Quilombola Territories (QTs), and Territories and Areas Conserved by Indigenous Peoples and Traditional Communities (TICCAs). The lowest deforestation rates in 2022 were recorded in ILs (0.71%) and QTs (0.32%), demonstrating the essential role these territories play as allies in conservation.

The Cerrado is home to 99 ILs and 80 different ethnic groups. These lands are mainly distributed across the states of Maranhão, Tocantins, Goiás, Mato Grosso, and Mato Grosso do Sul, with an indigenous population of approximately 44,000 inhabitants. However, most ILs have yet to complete their landholding regularization processes, leading to serious conflicts that threaten the integrity of various indigenous groups.

In this context, the plan outlines actions to structure and accelerate the landholding regularization processes, from identification to titling and/or homologation (10.2.1), as well as to support the planning and territorial and environmental management of ILs and QTs (10.2.3). These actions aim to provide effective conditions for fulfilling the state's duty to guarantee these peoples' rights and access to their territories while increasing their capacity to defend, protect, conserve, and promote sustainable activities. In regions with high concentrations of deforestation and land conflicts, such as ILs in the states of Maranhão, Mato Grosso, and Mato Grosso do Sul, the plan proposes the immediate disintrusion of irregular occupations.

Furthermore, there is an urgent need to address the historic demand of traditional peoples and communities (PCTs) for the recognition and regularization of their territories, ensuring the preservation of their knowledge for environmental conservation and the sustainable use of natural resources.

Infrastructure work near the Wildlife Refuge Veredas in the Western Region of the state of Bahia. Picture: Rui Faquini/Arquivo MMA

According to the National Council of Traditional Peoples and Communities (CNPCT), there are several segments of traditional peoples and communities (PCTs) in the Cerrado. These include the coconut breakers, predominantly found in the babassu ecological region, particularly in the lowlands and chapadões regions of the state of Maranhão, the middle and lower reaches of the state of Parnaíba River in the state of Piauí, and the Bico do Papagaio region in the state of Tocantins; the geraizeiros, in the north and northwest region of the state of Minas Gerais and west of the state of Bahia; the fundo and fecho de pasto communities, mainly in western region of the state of Bahia; and the evergreen flower pickers, in the Diamantina region, in the southern part of the Serra do Espinhaço, state of Minas Gerais. These peoples face significant threats and conflicts, primarily driven by land grabbing and the expansion of agricultural monocultures, which have caused various socio-environmental impacts on their original territories. To address these challenges, the PPCerrado will prioritize actions to identify, regulate, demarcate, and regularize territories of occupation and collective use for traditional peoples and communities (10.2.2). It will also implement territorial and environmental management plans and provide economic and technological support, along with technical assistance (10.2.3). In addition, actions will focus on updating the Priority Areas for the Conservation, Sustainable Use, and Benefit Sharing of Biodiversity in the Cerrado (APCB) (10.1.1.2). This is a key public policy instrument for planning and implementing appropriate conservation, recovery, and sustainable use measures by gathering and processing spatial information on species and ecosystems and assessing conservation costs and opportunities.

Within the plan, the federal government's new approach to partnerships between the public and private sectors will be reinforced, particularly in relation to investments in development projects and major works under the new Growth Acceleration Program (PAC) in the region (objective 11). It is critical to improve planning and decision-making processes through the adoption of instruments such as Technical and Environmental Feasibility Studies (EVTEA) and Strategic Environmental Assessments (SEA). Additionally, the strengthening of environmental and territorial governance bodies will be essential to prevent and mitigate deforestation and greenhouse gas emissions resulting from changes in territorial dynamics in the areas influenced by major infrastructure and development projects (11.1.1).

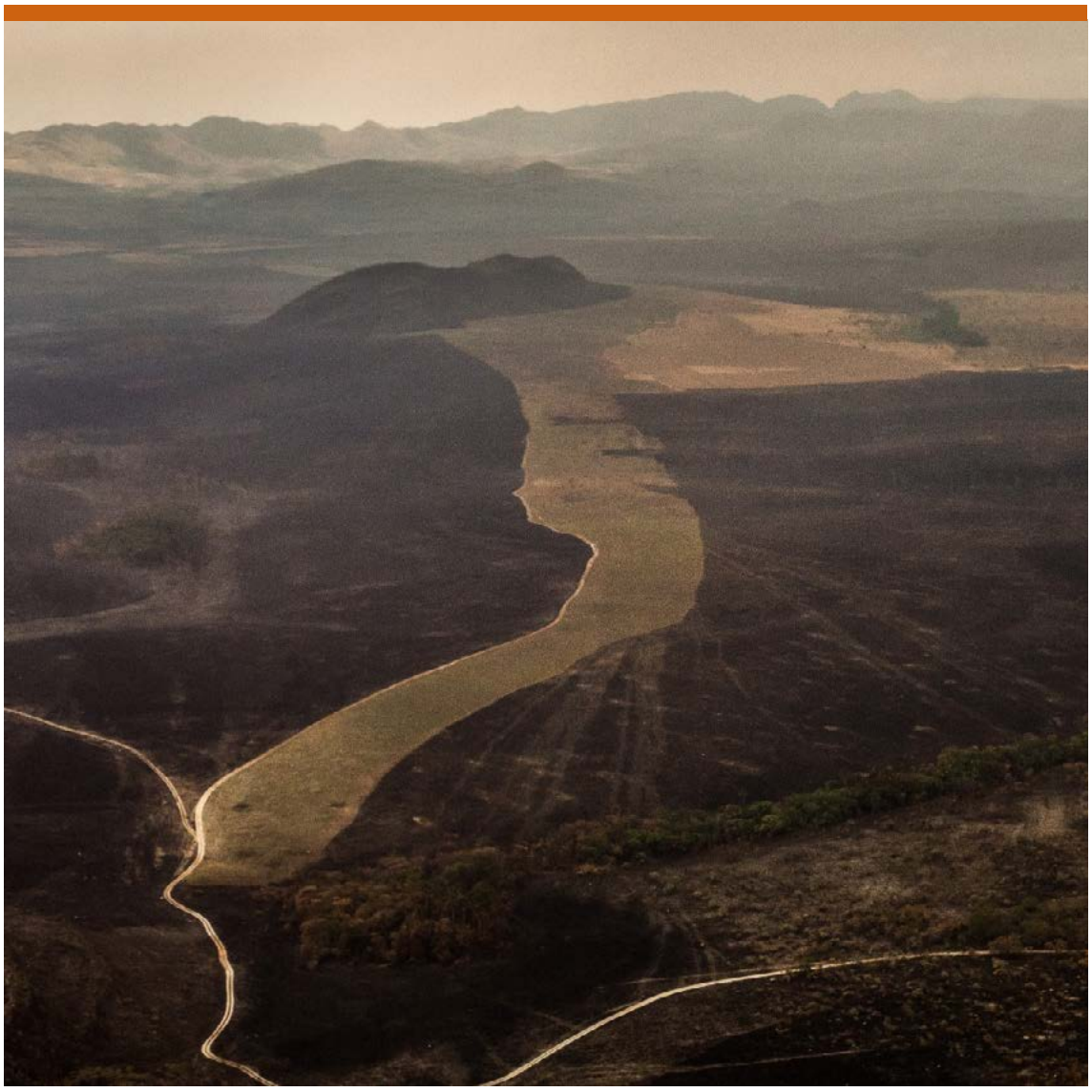
The new PAC presents innovative approaches by integrating environmental policy considerations into its structure. This is evident in several of the program's key axes: (i) efficient and sustainable transport, focusing on investments in logistics, including roads, railroads, and waterways; (ii) energy transition and security, with projects aimed at energy generation; and (iii) water for all, which encompasses water infrastructure projects, the revitalization of river basins, and efforts to improve water quality and conservation. These initiatives include the Water Producer program, which promotes public-private partnerships focused on water issues. This alignment offers an opportunity to integrate

the strategic objectives, results, and actions of the PPCerrado with the PAC's initiatives, further reinforcing the cross-cutting nature of public policies aimed at preserving the Cerrado biome.

Objective 12 emphasizes the importance of territorial planning and the implementation of existing legal instruments to ensure the role of native vegetation in maintaining and recovering the water regime and water quality and quantity in the Cerrado. The diagnosis shows that the current implementation of the Law on the Protection of Native Vegetation has been insufficient in protecting the region's water resources. Both legal and illegal deforestation, combined with climate change, have significantly lengthened the dry season, reducing surface and groundwater availability across the biome. Thus, it is vital to enforce territorial plans and instruments already outlined in environmental, agricultural, and water management legislation to safeguard the water regime and quality in the Cerrado. To address this, there is a renewed focus on updating the ecological-economic zoning (EEZ) for the 13 states that make up the Cerrado, which will provide guidelines and criteria to inform decisions based on territorial vulnerabilities and strengths (12.1.1). Notably, the Forest Code allows the EEZ to increase the minimum Legal Reserve percentage by up to 50% in specific regions to meet national biodiversity protection or greenhouse gas reduction targets. For the EEZ to effectively mitigate the impacts of unplanned occupation, particularly in the Matopiba agricultural and livestock frontier, it is crucial to review both existing and pending zoning regulations based on more recent scientific findings. This will help address the critical water issues brought about by climate change and deforestation over recent decades. Within the scope of the Native Vegetation Protection Law, a proposal will be developed to identify priority areas for Legal Reserve compensation, focusing on recovering spring areas, aquifer recharge zones, and wetlands. The plan will also prioritize the creation of ecological corridors and the conservation or restoration of vegetation, soil, and endangered ecosystems and species (12.1.2). Targets will be established for the recovery or conservation of riparian permanent preservation areas, as provided in Art. 61-A.17 of Law No. 12651/2012, specifically in critical river basins (12.1.3). Additionally, the forest replacement instrument will be improved to mitigate the negative effects of legal deforestation on the water regime (12.1.4).

It is essential to revise the agricultural climate risk zoning (Zarc) for key agricultural crops, such as soy, corn, and sugar cane, as well as forestry, to guide their expansion in alignment with water availability, the quality of the biome's water, and the effects of climate change and deforestation (12.2.1). Action plans related to water resource management will include criteria for conserving and restoring vegetation at both the property and micro-basin levels. These criteria will be incorporated into the evaluation process for granting irrigation licenses (12.3.1), encouraging the maintenance of surplus Legal Reserves and Permanent Preservation Areas for their water-providing

role. Information systems for managing surface, underground, and atmospheric water resources will also be structured to ensure better synergy between water use grants and deforestation authorizations (12.3.2.1). This integrated approach will promote the preservation of native vegetation beyond the limits established by the Native Vegetation Protection Law, recognizing these areas as vital green infrastructure for water production in agriculture and livestock and other uses.



Chapada dos Veadeiros National Park. Picture: Fernando Tatagiba

5.4. Axis IV - Rules and economic instruments

Regulatory and economic instruments are essential tools for encouraging environmental conservation and recovery, reducing deforestation and forest fires, promoting sustainable use, and implementing the actions outlined in the PPCDQs. For the PPCerrado, the actions proposed under Axis IV aim to promote the conservation of the biome, boost regional and local economic activities, strengthen the sustainability of global production chains, protect biodiversity, and guarantee the territorial rights of indigenous and traditional peoples and communities. Axis IV of the PPCerrado has as its main objective:

> **Objective 13.** Create, improve, and implement regulatory and economic instruments to control deforestation and conserve biodiversity.

Efforts to reduce deforestation in the Cerrado must take into account two important premises: 1) a significant portion of the biome is consolidated as private property, according to SIGEF and SNCI data; 2) deforestation is authorized on up to 80% of the area of these properties. Therefore, beyond command-and-control measures and appropriate regulations for authorizing vegetation suppression, the adoption of economic incentives and disincentives is necessary for the biome. These mechanisms should encompass governmental and intergovernmental assessments, regulations, and actions, as well as voluntary market initiatives.

A central issue to address in the PPCerrado is the lack of specific public funds and mechanisms at the federal level for its implementation. This is coupled with the limitation of applying a maximum of 20% of the Amazon Fund's resources to the axis related to monitoring and control. Support for the biome can come from various sources, such as climate funds, forestry funds, Constitutional Funds for the Midwest and Northeast, and the Amazon Fund, which can allocate up to 20% of its resources to other biomes for deforestation monitoring and control. However, inter-fund coordination is required to maximize the impact of these resources, and this alone will not be sufficient to meet the challenges or achieve the proposed sustainability goals (13.1.1). It is crucial to discuss specific funding sources tailored to conservation and natural resource protection in the Cerrado, considering the biome's socio-economic particularities. In addition to calling for increased public funding, opportunities for partnerships with private capital in production chains and the financial sector should be explored. Both centralized initiatives (such as creating a specific fund) and decentralized initiatives (led by states, municipalities, and private agents) should be encouraged, based on diverse arrangements and partnerships to finance the plan (13.1.2).

At the federal level, a relevant action is the establishment and expansion of tax and financial incentives related to the sociobioeconomy, the recovery of native vegetation, and sustainable production (13.3.1) and (13.4.1). One initiative currently underway and set to continue is the improvement of rural credit to create positive incentives for environmental conservation and sustainable production, including products related to socio-biodiversity (13.4.2). In the Cerrado, it is crucial to promote rural credit for productive recovery, integrating systems in critical deforestation areas (13.4.3). Another action that

could enhance the impact of the PPCerrado's conservation initiatives is the regulation of article 144 of Law No. 14133/2021, which outlines the establishment of variable remuneration in public contracts based on contractor performance. This performance-based compensation would be tied to targets, quality standards, sustainability criteria, and delivery timelines. Accordingly, one action for the PPCerrado is to evaluate the proposal of technical criteria to encourage the alignment of public contracts with deforestation reduction objectives and targets (13.5.1).

At the federal level, the implementation of the National REDD+ Strategy across all Brazilian biomes, in addition to the Amazon, is another initiative to be pursued. In the case of the Cerrado, progress made through the Prodes project in monitoring deforestation has enabled the development of a Forest Reference Emission Level (FREL). This marks the first requirement for Measurement, Reporting, and Verification (MRV) for REDD+ as a financial mechanism for climate and forests under the United Nations Framework Convention on Climate Change (UNFCCC). Submitted and evaluated in 2017, the FREL for the Cerrado set the precedent for Brazil's National FREL, with discussions and methodological improvements that allowed the monitoring of Brazilian forests to be expanded for result-based payments across all Brazilian biomes (13.8.1).

Despite the progress in the MRV process, eligibility and fundraising for the Cerrado states remain on the agenda. To improve cost-effectiveness of REDD+ grant resources, ENREDD+ Brazil has adopted a centralized MRV approach, performing forest monitoring and reporting on compliance with REDD+ safeguards. Additionally, CONAREDD+ decided on decentralized fundraising, beginning with the states of the Amazon biome, where quotas are shared between the states (60%) and the federal government (40%). The same approach was applied to the Cerrado biome, as outlined in Resolution No. 8, 29 August 2022. However, access to the raised funds occurs only after CONAREDD+ has assessed the eligibility of federal, state and municipal agencies. The eligibility rules, initially defined for the Amazon under Resolution No. 7, 6 July 2017, inspired the requirements for the Cerrado, outlined in Resolution No. 9, 29 August 2022, which include transparency, the structure and operation of public forest policies that can promote the achievement of REDD+ results (13.8.1).

CONAREDD+, re-established by Decree No. 11548, 5 June 2023, faces the challenge of promoting the eligibility of the Cerrado states. Direct or indirect participation in the Commission's work provides an opportunity for discussion and training, but additional means can be established to support the teams in the State Departments of the Environment to meet the fundamental requirements for REDD+ to function as part of their environmental and forestry policies. Furthermore, the discussion on a financing structure for REDD+ in the Cerrado should also be on the CONAREDD+ agenda, as the results achieved between 2011 and 2017 have not yet been compensated through payments (13.8.1).

Financing forest conservation, whether through recognition of contributions to reducing emissions or removing greenhouse gases, or through recognition for the provision of

environmental services, should be encouraged by the regulation of the carbon market and the Payments for Environmental Services Law (Law No. 14119/2021). To regulate the Brazilian Emissions Trading System, the federal government established a Working Group, which developed a regulatory proposal that was approved by the Senate and is currently being processed in the Chamber of Deputies as a proposal for a Substitute to Bill No. 412 of 2022. Carbon and environmental services markets are essential to the voluntary protection of the Cerrado's native vegetation. As discussed in Axis I on sustainable production activities, the adoption of sustainability "combos" like “pasture recovery + productive integration + conservation of surplus vegetation” relies on regulatory incentives offered to the market. In this context, carbon and environmental services markets can support the environmental value of agricultural and livestock products and strengthen initiatives like native forestry and public forest concessions for restoration. Additionally, they can help attract green investments to production chains that are committed to traceability programs and the creation of seals and certifications for environmental services and socio-environmental guarantees (13.13.1).

The carbon and environmental services markets could also support sociobioeconomy initiatives, including the social and productive organization of family farming, indigenous peoples, and traditional peoples and communities, as well as the environmental management of collective territories. Chains of sociobiodiversity products, agroecological and organic production, and agroforestry systems are activities that could be strengthened by government initiatives, particularly through the regulation and implementation of Law No. 14119/2021 and the Federal PES Program, the Bolsa Verde Program, and other Payment for Environmental Services initiatives at the state and municipal levels. The regulation of the carbon and environmental services market could also raise awareness about sustainable consumption in the domestic market, opening up trade opportunities for the supply of environmentally differentiated products (13.12.1, 13.12.2, and 13.12.3).

Government actions can induce private sector practices. A key innovation of the 2022/23 Safra Plan was the introduction of a more attractive interest rate for producers adopting sustainable practices on their properties. This move emphasized that sustainable practices should be central to the financial sector and companies aiming to eliminate deforestation from their production chains. Innovative financial solutions that catalyze private resources and expand and accelerate investments for ecological and productive transformation are crucial. The government must provide a favorable regulatory environment, supporting and encouraging private sector initiatives as a strategic means of implementing the PPCerrado (13.6.1 and 13.7.1).

The effectiveness of incentive actions fundamentally depends on an adequate regulatory framework for measures authorizing the suppression of native vegetation and alternative land use, as well as the protection and guarantee of territorial rights.

As discussed in the chapter on deforestation dynamics, a significant portion of deforestation in the Cerrado occurs with Vegetation Suppression Authorizations (ASV)

or Alternative Land Use Authorizations (UAS) issued by the states. However, there is currently no standardization of minimum criteria for evaluating and granting these authorizations, nor is there uniformity in how the information is made available. One of the objectives of the PPCerrado is to establish regulations to standardize the criteria for transparency and the official integration of data on the validity of authorizations, making them commonly accessible in a specific format. Given that the Forest Code mandates a Legal Reserve of at least 20%, there is an urgent need to better qualify, monitor, and compensate for authorized deforestation. This regulation, through a CONAMA Resolution, should guide the criteria for issuing authorizations not only in the Cerrado but across all biomes. It should also align with the Forest Code, particularly regarding the effective and sustainable use of already converted areas (art. 26.4.III) and the alternative use of areas to be cleared (art. 26.4.IV). Furthermore, it should define appropriate compensatory measures to mitigate the specific and systemic effects of deforestation and promote the recovery of deforested areas in the biome (13.16.1).

One of the major challenges for the Cerrado is creating incentives for compensating and recovering native vegetation. The Forest Code established legal mechanisms for compensating Legal Reserve liabilities, such as the acquisition of an Environmental Reserve Quota (CRA) (art. 48), leasing an area under an environmental easement or Legal Reserve (art. 66.5), and donating land within a Conservation Unit pending landholding regularization to the government (art. 66.5). Over the years, states have made progress in developing regulations for offsetting Legal Reserve liabilities. In 2018, the federal government published Decree No. 9640, which established the procedures for issuing, registering, transferring, using, and canceling the CRA. However, the judicialization of the concept of ecological identity has hindered significant progress in implementing the CRA instrument in recent years. In this regard, the conclusion of the judgment on the motions for clarification of the Direct Unconstitutionality Actions (ADIs 4901/DF, 4902/DF, 4903/DF, and 4937/DF) before the Supreme Court will be a crucial benchmark for resuming normative and operational actions to implement the CRA market. Nevertheless, other compensation and recovery actions can be promoted through a more consistent regulatory framework for authorizations to suppress vegetation, along with the articulation of economic and financial mechanisms. For instance, the Green Rural Producer's Certificate can be improved to incentivize compensation mechanisms in the Cerrado. Additionally, integrating instruments related to water usage rights and forest conservation in the Cerrado can be further explored (13.9.1 and 13.9.2).

Another key measure is the ongoing effort to approve the bill establishing the National Integrated Fire Management Policy (Bill 1818/2022), which is in the final stages of processing in the National Congress (13.13.1). The proposal aims to reduce the occurrence and impact of forest fires in the country while restoring the ecological and cultural role of fire. Through inter-institutional coordination for integrated fire management, the project goes beyond merely preventing and combating forest fires. It includes measures such as environmental education, prescribed and controlled burning, the promotion of alternatives to fire usage, holding individuals accountable for improper fire use, and the recovery of areas impacted by fires. The proposal recognizes

that addressing forest fires requires the structuring and preparation of institutions at local, regional, and national levels, along with the cooperation and coordination of federal agencies, civil society organizations, and private entities to implement integrated fire management effectively. In this sense, strengthening volunteer efforts to implement integrated fire management is also a vital measure, given the growing involvement of these groups in environmental conservation. Equally important is the continuous training of individuals directly involved in activities related to the management, prevention, and control of fire in the Cerrado (13.11.1).

Guaranteeing land rights is another essential component of sustainability, and one of the PPCerrado's initiatives aims to improve the rules and regulations for landholding regularization of quilombola territories. This action is particularly significant in light of the 2022 Census data recently released by the IBGE, which reveals that the country has more than 1.3 million quilombolas across 1,696 municipalities, yet only 12.6% of them live in officially recognized territories. Additionally, a key initiative for enhancing knowledge and recognition of territorialities is the proposal to create Centers for Environmental Education and Territorial Socio-Environmental Cooperation, which would bring together ideas, actions, and public policies (13.14.1 and 13.15.1).

Finally, it should be noted that the 1988 Federal Constitution, in its Title VIII (Social Order), Chapter VI (Environment), art. 225.4, recognized certain ecosystems, such as the Amazon Rainforest, the Atlantic Rainforest, Serra do Mar, Pantanal and the Coastal Zone, as national heritage. However, the Cerrado, along with the Caatinga and the Pampa, was not granted this status. To address this, the PPCerrado supports the Amendment to the Constitution Proposal No. 504/2010, which seeks to elevate the Cerrado to the category of Brazilian national heritage (13.11.3).

Serra da Canastra National Park/MG. Picture: Rui Faquini/MMA Archive

6. LITERATURE

AB'SÁBER, A. N. **Os domínios de natureza no Brasil:** potencialidades paisagísticas. São Paulo: Ateliê editorial, 2003.

ALLEN, R. et al. Surface Energy Balance Algorithms for Land (SEBAL). **Advanced training and users manual**, v. 1, Idaho Implementation, 2002.

ATAÍDE, K. R. P. **Modelagem de determinação da evapotranspiração real para o Bioma Cerrado por meio de dados de sensoriamento remoto orbital.** Tese (Doutorado em Geociências). Universidade de Brasília, Brasilia, 2012.

BUSTAMANTE, M. M. C et al. Potential impacts of climate change on biogeochemical functioning of Cerrado ecosystems. **Braz. J. Biol.,** 72 (3 suppl). 2012. Available at: https://doi.org/10.1590/S1519-69842012000400005. Access on: 14 Mar. 2023.

CABALLERO, C. B., ANDERSON, R.; TRENT, B. **Land use and land cover changes and their impacts on surface-atmosphere interactions in Brazil:** a systematic review. Science of The Total Environment, 808. 2022.

DAVIS, J. L. **Plataforma de contabilidade de emissões de carbono das florestas e outros usos do solo para avaliação de políticas públicas.** Tese (Doutorado em Engenharia de Produção). Escola de Engenharia, Universidade Federal de Minas Gerais, Belo Horizonte. 2022.

DIAS, B. F. S.; KLINK, C. Agricultura nos Cerrados: A Sustentabilidade que a gente não vê. p. TZ1-229. In: BARROS, Fernando; TELES, Yoko (ed.) **O Terceiro Salto:** A história dos brasileiros que fizeram o futuro chegar: trajetória cultural, econômica, ambiental e social do alimento no Brasil - A revolução da agricultura tropical sustentável. Brasilia: Instituto Fórum do Futuro, 2019. 264 p.

ESCOBAR, G. C. J.; MATOSO, V. **Zona de Convergência Intertropical (ZCIT):** critério de detecção para uso em centros operacionais de previsão de tempo. São José dos Campos: INPE, 2019.

FERREIRA, M. E. et al. Dams pose a criticai threat to rivers in Brazifs Cerrado hotspot. **Water 14**, n. 22 (2022): 3762. 2022.

FOOD AND AGRICULTURE ORGANIZATION (FAO). Global Forest Resources Assessment 2015.

FAO Forestry Paper n. 1. FAO: Rome, 2015.

GRAEFF, O. **Fitogeografia do Brasil:** uma atualização de bases e conceitos. Rio de Janeiro: Editora Nau, 2015. 552 p.

HANSEN, M.C. et al. **High-resolution global maps of 21 st-Century forest cover change.** 2013.

Available at: https://www.researchgate.net/publication/258529161_High-Resolution_Global Maps of 21 st-Century Forest Cover Change. Access on: 3 Jan. 2023.

HOFMANN, G. S.et al. The brazilian cerrado is becoming hotter and drier. **Global Change Biology**, 27 (17), 4060-4073. 2021.

INSTITUTO DE PESQUISA AMBIENTAL DA AMAZÔNIA (IPAM); INSTITUTO SOCIEDADE, POPULAÇÃO E NATUREZA (ISPN); REDE CERRADO. Tô no Mapa: Mapeamento de comunidades tradicionais: 5º relatório povoamento do App. 2023. Available at: https://tonomapa.org.br/wp-content/uploads/2023/07/To-no-mapa-relatorio-jul-2023-v-final.pdf. Access on: 21 Jul. 2023

LEITE-FILHO, A. T. et al. Deforestation reduces rainfall and agricultural revenues in the Brazil- ian Amazon. **Nat Commun**, 12, 2591, 2021. Available at: https://doi.org/10.1038/s41467-021-22840-7. Access on: 20 Feb. 2023.

LEITE-FILHO A. T. Interações entre desmatamento, mudanças climáticas e produção agrícola no cerrado e na Amazônia Brasileira. Tese (Doutorado em Análise e Modelagem Ambiental). Universidade Federal de Minas Gerais, Belo Horizonte, 2022.

LI, S. et al. Anthropogenic climate change contribution to wildfire-prone weather conditions in the Cerrado and Arc of deforestation. **Environmental Research Letters**, v. 16, n. 9. 2021. Available at: https://doi.org/10.1088/1748-9326/ac1e3a. Access on: 30 Mar. 2023.

MARENGO, J. A. et al. A seca e a crise hídrica de 2014-2015 em São Paulo. **Revista USP**, (106), p. 31-44, 2015. Available at: https://doi.Org/10,11606/issn.2316-9036.v0i106p31-44. Access on: 30 Jun. 2023.

MARQUES, E. A. G. et al. Analysis of groundwater and river stage fluctuations and their relationship with water use and climate variation effects on Alto Grande watershed, Northeastern Brazil. **Journal of South American Earth Sciences**, 103:102723, 2020.

MARTINELLI, G.; MORAES, M. A. **Livro vermelho da flora do Brasil**. Translation: Flávia Anderson, Chris Hieatt. Rio de Janeiro: Andréa Jakobsson: Instituto de Pesquisas Jardim Botânico do Rio de Janeiro, 2013. 1100 p. Available at: https://ckan.jbrj.gov.br/dataset/23f2e24c-5676-4acd- 83f0-03621 cba4364/resource/1 c77ec02-b490-4caa-83dc-33a418488c70/download/livro-vermelho-da-flora-do-brasil-2013.pdf. Access on: 15 Jul. 2023

MISTRY, J. Fire in the cerrado (savannas) of Brazil: an ecological review. **Progress in Physical Geography**, 22(4), 425-448.1998.

OLIVEIRA, A. S. et al. Costs and effectiveness of public and private fire management pro- grams in the Brazilian Amazon and Cerrado. **Forest Policy and Economics**, Volume 127, June 2021, 102447. 2021 Available at: https://www.sciencedirect.com/science/article/abs/pii/S1389934121000538. Access on: 24 Sep. 2023.

OLIVEIRA, U. et al. Determinants of fire impact in the Brazilian Biomes. Front. For. Glob. Change, 28 (5), 12 p. 2022. Available at: https://doi.org/10.3389/ffgc.2022.735017. Access on: 28 Apr. 2023

POTAPOV, P. et al. Mapping global forest canopy height through integration of GEDI and Landsat data. **Remote Sensing of Environment**, 253:112-165, 2021.

PRAVALIE, R.; PATRICHE, C; BANDOC, G. Quantification of land degradation sensitivity areas in Southern and Central Southeastern Europe. New results based on improving DISMED methodology with new climate data. Catena, v. 158, 2017, p. 309-320. 2017. Available at: https://doi.org/10.1016/j.catena.2017.07.006. Access on: 19 Aug. 2023.

RAJÃO, R. et al. The rotten apples of BraziTs agribusiness. Science, v. 369: 6501, pp. 246-248. DOI: 10.1126/science.aba6646. 2020. Available at: https://www.science.org/doi/10.1126/science. aba6646. Access on: 16 Jan. 2023.

RIVERO, S. N. F. **Simulações da Circulação Atmosférica no verão sobre a América do Sul com a Presença da Cordilheira dos Andes usando coordenadas ETA.** Tese de Mestrado em Meteorologia no Instituto Nacional de Pesquisas Especiais (Inpe), 1991. Repositório: sid.inpe.br/MTC-m13(5)80/2005/08.18.19.32.

RODRIGUES, A. et al. Cerrado deforestation threatens regional climate and water availability for agriculture and ecosystems. **Global Change Biology**, 28, n. 22, p. 6807-6822, 2022.

SALATI, E.. **Influência do desmatamento no ciclo da água na Amazônia**, Suplemento Cultural do Estado de São Paulo. 1978. Available at: https://www.scielo.br/j/aa/a/RW56TXsDscp4LvbBBybnJXj/?format=pdf&lang=pt. Access on: 12 Jul. 2023

SALMONA, Y. B. et al. A worrying future for river flows in the Brazilian Cerrado provoked by land use and climate changes. **Sustainability**, 15: 4251. 2023. Available at: https://doi. org/10.3390/sul 5054251. Access on: 17 Jun. 2023.

SCHMIDT, I. B.; ELOY, L. Fire regime in the Brazilian Savanna: Recent changes, policy and management. **Flora**, v. 268:151613, jul. 2020.

SCHLILER, J.; BUSTAMANTE, M. M. C. Spatial planning for restoration in Cerrado: balancing the trade-offs between conservation and agriculture. **Journal of Applied Ecology**, v. 59, n. 10, p. 2616-2626, 2022.

SICK, H. **Ornitologia brasileira**: uma introdução. Rio de Janeiro: Nova Fronteira, 1997. 912 p.

SIMPLICIO, A. A. F. et al. Erosion at hillslope and micro basin scales in the Gilbués desertifica- tion region, Northeastern Brazil. **Land Degradation & Development**, 32, n. 3:1487-1499, 2020.

TERRA, M. C. et al. The inverted forest: aboveground and notably large belowground carbon stocks and their drivers in Brazilian savannas. **Science of The Total Environment**, 867,161320, 2023.

UNIVERSIDADE FEDERAL DE MINAS GERAIS (UFMG). **Panorama do Código Florestal Brasileiro**. 2. ed. 2023 Available at: https://csr.ufmg.br/radiografia do cf/wp-content/uploads/2023/07/policy_brief_pt_2edC.pdf. Access on: 18 Oct. 2023.

VALVERDE, M. C. **Projeções de Mudanças Climáticas sobre o Nordeste Brasileiro dos Modelos do CMIP5 e do CORDEX**. FUNCAP. 2007. Available at: https://doi.org/10.1590/010277863132015 0150. Access on: 4 Sep. 2023.

VERDAN, I.; Silva, M. E. S. Variabilidade da zona de convergência do Atlântico Sul em relação a eventos ENOS de 2000 a 2021. **Revista do Departamento de Geografia**, 42, e193110, 2022. Available at: https://doi.Org/10.11606/eISSN.2236-2878.rdg.2022.193110. Access on: 15 Aug. 2023.

OTHER DOCUMENTS AND BASES CONSULTED

AGRIANUAL, 2021. **Anuário da Agricultura Brasileira**. São Paulo: Informa Economics IEG/FNP, 2020.

BRASIL. Banco Central do Brasil. Impacto do clima na inflação de alimentos. **Estudo Especial**, 57, 2019. Available at: https://www.bcb.gov.br/conteudo/relatorioinflacao/EstudosEspeciais/EE057 Impactos_do_clima_na_inflacao_de_alimentos.pdf. Access on: 6 Sep. 2023.

BRASIL. Banco Central do Brasil. **Relatório de Inflação**, vol. 25(2). Junho 2023. 81 p. Available at: https://www.bcb.gov.br/content/ri/relatorioinflacao/202306/ri202306p.pdf . Access on: 6 Sep. 2023.

BRASIL. **Banco Central do Brasil. Relatório de Riscos e Oportunidades Sociais, Ambientais e Climáticas**, vol. 2. Dezembro de 2022. Available at: https://www.bcb.gov.br/content/publicacoes/relatorio-risco-oportunidade/relatorio_riscos_oportunidades_sociais_ambientais_climaticas_0921.pdf. Access on: 6 Sep. 23.

BRASIL. Companhia Nacional de Abastecimento. **Informações Agropecuárias.** Safras. Séries Históricas. Conab. Available at: https://www.conab.gov.br/info-agro/safras/serie-historica-das-safras Access on: 6 Sep. 2023.

BRASIL. Empresa Brasileira de Pesquisa Agropecuária (Embrapa). **Soja em números.** Embrapa, 2023. https://www.embrapa.br/soja/cultivos/soja1/dados-economicos. Access on: 6 Sep. 2023.

BRASIL. Instituto Brasileiro de Geografia e Estatística (IBGE). **Censo Demográfico 2022.** Available at: https://censo2022.ibge.gov.br/panorama/. Access on: 6 Sep. 2023.

BRASIL. Instituto Brasileiro de Geografia e Estatística (IBGE). **Monitoramento da cobertura e uso da terra do Brasil:** 2016-2018. IBGE. Available at: https://biblioteca.ibge.gov.br/index.php/biblioteca-catalogo?view=detalhes&id=2101703. Access on: 4 Jun. 2020.

BRASIL. Instituto Brasileiro de Geografia e Estatística (IBGE). **Produção da extração vegetal e da silvicultura.** IBGE. 2021. Available at: https://www.ibge.gov.br/estatisticas/economicas/agricultura-e-pecuaria/9105-producao-da-extracao-vegetal-e-da-silvicultura.html Access on: 6 Sep. 2023.

BRASIL. Instituto Brasileiro de Geografia e Estatística (IBGE). **Produção Agrícola Municipal (PAM).** Available at: https://www.ibge.gov.br/estatisticas/economicas/agricultura-e-pecuaria/9117-producao-agricola-municipal-culturas-temporarias-e-permanentes.html?=&t=publicacoes. Access on: 6 Sep. 2023.

BRASIL. Instituto Nacional de Pesquisas Espaciais (Inpe); Empresa Brasileira de Pesquisa Agropecuária (Embrapa). **Programa TerraClass**, 2023. Available at: https://www.terraclass.gov.br/helpers/terraclassdata4download/docs/Nota%20Tecnica%20TerraClass%20Cerrado%20 2020%20v2.pdf. Access on: 31 Aug. 2023.

BRASIL. Instituto Nacional de Pesquisas Espaciais (Inpe). **Plataforma de Dados sobre Queimadas (BD Queimadas/Inpe),** 2023. Available at: http://terrabrasilis.dpi.inpe.br/queimadas/portal/. Access on: 11 Sep. 2023.

BRASIL. Instituto Nacional de Pesquisas Espaciais (Inpe). **Programa de Monitoramento do Desmatamento da Floresta Amazônica Brasileira por Satélite (Prodes/Inpe),** 2023. Available at: http://www.obt.inpe.br/OBT/assuntos/programas/amazonia/prodes. Access on: 5 Oct. 2023.

BRASIL. Ministério da Agricultura, Pecuária e Abastecimento. Plano ABC (2010-2020). **Resultados do Plano.** Mapa. Available at: https://www.gov.br/agricultura/pt-br/assuntos/sustentabilidade/agricultura-de-baixa-emissao-de-carbono/plano-abc/acoes-do-plano Access on: 6 Sep. 2023.

BRASIL. Ministério da Ciência, Tecnologia e Inovações (MCTI). **Relatórios de referência setorial.** MCTI, 2021. Available at: https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/publicacoes/relatorios-de-referencia-setorial/pdf/invetario4/lulucf-jan21.zip. Access on: 2 Sep. 2023.

BRASIL. Ministério do Meio Ambiente (MMA). **Painel Unidades de Conservação Brasileiras.** MMA. Available at: https://cnuc.mma.gov.br/powerbi. Access on: 14 Aug. 2023.

BRASIL. Ministério do Meio Ambiente (MMA). **Plano de Ação para Prevenção e Controle do Desmatamento e das Queimadas no Cerrado (PPCerrado) e Plano de Ação para prevenção e controle do Desmatamento na Amazônia Legal (PPCDAm):** fase 2016-2020. Brasilia: MMA, 2018. 3v.

BRASIL. Ministério do Meio Ambiente (MMA). **Plano Nacional de Adaptação à Mudança do Clima:** estratégia geral, v. 1: Brasilia: MMA, 2016. 44p.

BRASIL. Ministério do Meio Ambiente (MMA). **Plano Nacional de Recuperação da Vegetação Nativa (Planaveg).** Brasilia: MMA, 2017. 73 p.

BRASIL. Ministério do Meio Ambiente (MMA). **Plano Nacional para o Controle do Desmatamento Ilegal e Recuperação da Vegetação Nativa (2020-2023).** Brasilia. MMA, 2020, 29p.

Projeto MAPBIOMAS, 2023. **MapBiomas** Água**.** Available at: https://plataforma.agua.mapbiomas.org/water/-14.321749/-48.349346/4.2/biome/3/biome/waterClassification/2022/2022. Access on: 4 Sep. 2023.

UNITED STATES OF AMERICA. U.S Department of Foreign Agricultural Service. **United States Soybean Area, Yield and Production.** USDA. Available at: https://ipad.fas.usda.gov/country-summary/Default.aspx?id=US&crop=Soybean. Access on: 6 Sep. 2023.

LEGISLATIVE DOCUMENTS

Federal Constitution of Brazil

BRASIL.[Constituição (1988)]. **Constituição da República Federativa do Brasil de 1988**. Brasilia, DF: Presidência da República. Available at: https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Access on: 18 Oct. 2023.

Ordinary Laws and Complementary Law

BRASIL. **Lei Complementar No. 140**, de dezembro de 2011. Provision for cooperation between the Federal Government, States, Federal District, and Municipalities in administrative actions related to the exercise of shared responsibilities, in accordance with article 23.III , VI, and VII and sole paragraph of the Federal Constitution. These responsibilities include the protection of outstanding natural landscapes, environmental protection, combating pollution in all its forms, and preserving forests, fauna, and flora; and amendment to Law No. 6938, 31 August 1981. Brasilia: Federal Official Gazette of 9 December 2012. Available at: http://www.planalto.gov.br/ccivil_03/leis/LCP/Lcp140.htm. Access on: 30 Apr. 2023

BRASIL. **Lei Estadual No. 5.699**, de 26 de novembro de 2007 (Piauí). Amendment to Law No. 5178, 27 December 2000, and other provisions. Available at: http://www.semar.pi.gov.br/core/legislacao. Access on: 18 Oct. 2023.

BRASIL. **Lei Estadual No. 7.888**, de 9 de dezembro de 2022 (Piauí). Recognition of traditional activities of collecting and breaking babassu coconuts as cultural heritage of the state of Piauí, including the products resulting such activities and the traditional way of producing.

BRASIL. **Lei No. 12.187**, de 29 de dezembro de 2009. Establishment of the National Policy on Climate Change - PNMC and other provisions. Brasilia: Federal Official Gazette of 30 December 2009 - Extra edition. Brasilia: Federal Official Gazette of 30 December 2009. Available at: https://www.planalto.gov.br/ccivil_03/_ato2007-2010/2009/lei/H2187.htm. Access on: 13 Apr. 2023

BRASIL. **Lei No. 12.651**, de 25 de maio de 2012. On the protection of native vegetation; amendment to Laws No. 6938, 31 August 1981, 9393, 19 December 1996, and 11428, 22 December 2006; revocation of Laws No. 4771, 15 September 1965, and 7754, 14 April 1989, and Provisional Measure No. 2166-67, 24 August 2001; and other provisions. Brasilia: Federal Official Gazette of 28 May 2012. Available at: http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2012/lei/l12651.htm. Access on: 14 May 2023.

BRASIL. **Lei No. 14.119**, de 13 de janeiro de 2021. Institution of the National Payment Policy for Environmental Services; and amendment to Laws No. 8212, 24 July 1991, 8629, 25 February 1993, and 6015, 31 December 1973, to adapt them to the new policy. Brasilia: Federal Official Gazette of 14 January 2021. Available at: https://www.in.gov.br/en/web/dou/-/lei-n-14.119-de-13-de-janeiro-de-2021-298899394. Access on: 7 Feb. 2023.

Decrees

BRASIL. **Decreto No. 10.142, de 28 de novembro de 2019**. Establishment of the Executive Committee for Controlling Illegal Deforestation and Restoring Native Vegetation (REVOKED). Brasilia: Federal Official Gazette of 29 November 2019. Available at: http://www.planalto.gov.br/ccivil_03/_ato2019-2022/2019/decreto/D10142.htm. Access on: 15 Dec. 2022.

BRASIL. **Decreto No. 11.367, de 1.° de janeiro de 2023**. Establishment of the Permanent Interministerial Commission for the Prevention and Control of Deforestation, reenactment of the Action Plan for Deforestation Prevention and Control in the Legal Amazon - PPCDAm, and provision for the Action Plans for the Prevention and Control of Deforestation in the Cerrado, in the Atlantic Forest, in the Caatinga, in the Pampa and in the Pantanal. Brasilia: Federal Official Gazette of 2 January 2023 - Extra edition. Available at: http://www.planalto.gov.br/ccivil_03/_ato2023-2026/2023/decreto/D11367.htm. Access on: 12 Mar. 2023.

BRASIL. **Decreto No. 11.548, de 5 de junho de 2023**. Establishment of the Committee for Brazilian National Strategy for Reducing Emissions of Greenhouse Gases from Deforestation and Forest Degradation, Forest Carbon Stocking, Sustainable Forest Management and Forest Carbon Stock Enhancement - REDD+. Available at: http://www.planalto.gov.br/ccivil_03/_ato2023-2026/2023/decreto/D11548.htm. Access on: 18 Oct. 2023.

BRASIL. **Decreto No. 23.793, de 23 de janeiro de 1934**. Approval of the Forestry Code. [REVOKED] Available at: http://www.planalto.gov.br/ccivil_03/decreto/1930-1949/d23793.htm. Access on: 18 Oct. 2023.

BRASIL. **Decree No. 8.447, de 6 de maio de 2015**. On the Matopiba Agricultural and Livestock Development Plan and establishment of its Management Committee [REVOKED]. Available at: https://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2018/Decreto/D9640.htm. Access on: 18 Oct. 2023.

BRASIL. **Decreto No. 9.640, de 27 de dezembro de 2018**. Regulation of the Environmental Reserve Quota, established by art. 44, Law No. 12651, 25 May 2012. Avaiulable at: https://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2018/Decreto/D9640.htm. Access on: 18 Oct. 2023.

BRASIL. **Decreto s/n, de 15 de setembro de 2010**. On the Action Plan for Deforestation and Fire Prevention and Control in the Cerrado Biome - PPCerrado, amending the Decree of 3 July 2003, which institutes the Permanent Interministerial Working Group.

Other normative acts

BRASIL Ministério do Meio Ambiente (MMA). **Resolução CONAREDD+ No. 7, de 6 de julho de 2017.** Definition of rules for the eligibility of Amazonian states and federal entities to access and receive payments for results of reducing emissions from deforestation in the Amazon biome. Available at: http://redd.mma.gov.br/images/central-de-midia/pdf/Documentos/conaredd-resolucao-no7-elegibilidade-20170719-final.pdf. Access on: 24 Oct. 2023.

BRASIL. Ministério do Meio Ambiente (MMA). **Resolução CONAREDD+ No. 8, de 29 de agosto de 2022.** On the distribution of the limits for collecting payments for results of reducing emissions from deforestation in the Cerrado biome from 2011 to 2017 and from 2018 to 2020. Available at: http://redd.mma.gov.br/images/conaredd/conaredd-res8-limites-cerrado.pdf. Access on: 24 Oct. 2023.

BRASIL. Ministério do Meio Ambiente (MMA). **Resolução CONAREDD+ No. 9, de 29 de agosto de 2022.** Definition of rules for the eligibility of the Cerrado states and federal entities to access and receive payments for results of reducing emissions from forest degradation in this biome. Available at: http://redd.mma.gov.br/images/conaredd/conaredd-res9-elegibilidade-cerrado.pdf. Access on: 24 Oct. 2023.

BRASIL. Ministério da Agricultura, Pecuária e Abastecimento (MAPA). **Portaria No. 244, de 12 de novembro de 2015**. On the municipalities of the states of Bahia, Maranhão, Piauí and Tocantins, covered by the Matopiba Agricultural Development Plan (PDAMatopiba). Available at: https://pesquisa.in.gov.br/imprensa/servlet/INPDFViewer?jornal=1&pagina=8&- data=13/11/2015&-captchafield=firstAccess. Access on: 18 Oct. 2023.

BRASIL. **Projeto de Lei No. 1.818, de 2022**. Establishment of the National Policy for Integrated Fire Management; and amendment of Laws No. 7735, 22 February 1989, 12651, 25 May 2012 (Forest Code), and 9605, 12 February 1998. Available at: https://www25.senado.leg.br/web/atividade/materias/-/materia/153865. Access on: 8 Feb. 2023.

BRASIL. **Projeto de Lei No. 412, de 2022.** Regulation of the Brazilian Emissions Reduction Market (MBRE), provided for by Law No. 12187, 29 December 2009, and amendment of Laws No. 11284, 2 March 2006; 12187, 29 December 2009; and 13493, 17 October 2017. Available at: https://www25.senado.leg.br/web/atividade/materias/-/materia/151967. Access on: 18 Oct. 2023.

BRASIL. **Proposta de Emenda à Constituição (PEC) No. 504, de 2010.** On the amendment of art. 225.4 of the Federal Constitution, to recognize the Cerrado and Caatinga biomes as national heritage. Available at: https://www.camara.leg.br/proposicoesWeb/fichadetramitacao?id- Proposicao=483817. Access on: 18 Oct. 2023.

ANNEX I – Summary Table of strategic objectives, expected results and action guidelines

Summary Table Axis I – Sustainable Production							
Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
Objective 1. Sociobioeconomy promotion, sustainable forest management, and the recovery of deforested or degraded areas.	1.1 Bioeconomy, socio-biodiversity, and agroecological transition expanded and strengthened in the Cerrado	1.1.1. Design and implement programs and actions to support the bioeconomy in the Cerrado.	1.1.1.1. Design and implement the National Sociobioeconomy Program.	a) Number of program design and implementation phases achieved b)Program implemented	2024	SBC-MMA	MCTI/ MIDR/ MDS/MDIC/ MPI
			1.1.1.2. Strengthen 400 family farming cooperatives, associations, organizations, and community-based enterprises to expand production, add value, and access public policies and markets.	Number of cooperatives, organizations, and enterprises strengthened per year	2027 (100/ year)	Incra, Conab e SFDT- MDA	SBC and SBio - MMA/ Fiocruz
			1.1.1.3. Expand the inclusion of five socio-biodiversity products and improve national, regional, and sectoral statistics.	a) Number of new socio-biodiversity products included in national, regional, and sectoral statistics b) Number of steps taken to improve statistics	2027	SBC - MMA/IBGE -MPO	Conab - MDA /SBio - MMA
			1.1.1.4. Promote and coordinate sociobioeconomy public policies, with a focus on innovation, training, job qualification and protection, access to markets, job creation, and income generation.	Number of articulated public policies/projects	2027	SBC and SBio -MMA	MCTI / ICMBio
			1.1.1.5. Implement a technological program offering machinery, equipment, and tools for structuring and qualifying production chains in the Cerrado's socio-biodiversity bioeconomy.	Normative act establishing the program published	2024	MDIC	
			1.1.1.6. Develop and implement the Bioeconomy and Regional Development Program.	Bioeconomy and Regional Development Program developed and implemented	2027	MIDR	SBC - MMA

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		1.1.2. Strengthen, expand, and adapt government procurement policies and programs (PAA, PNAE, PGPM, PGPM-Bio, and Family Farming Seal).	1.1.2.1. Increase subsidies and purchases of agroecological and socio-biodiversity products by 30%.	Percentage annual increase in subsidies and purchases of agroecological and socio-biodiversity products	2027	Conab and SEAB - MDA	SBC and SNPCT -MMA
			1.1.2.2. Increase access by 60% to subsidy and government procurement programs for indigenous peoples, traditional and quilombola peoples and communities, family and peasant farming, and community enterprises.	Percentage annual increase in access to government procurement programs	2026	Conab, SEAB and Seteq - MDA	SBC and SNPCT -MMA
			1.1.2.3. Set up the Indigenous Intercultural Technical Assistance and Rural Extension Program.	Percentage of indigenous farmers/producers with access to Indigenous ATER.	2027	MPI/Conab and Anater-MDA	
			1.1.2.4. Establish Indigenous Pronaf with easier access and subsidized interest mechanisms.	Percentage of indigenous farmers/producers with access to Indigenous Pronaf.	2027	SAF- MDA/ MPI	Banking institutions.
			1.1.2.5. Set up a program to promote training processes and technical assistance in management for 1,200 family farming cooperatives and associations to enable adequate access to government procurement policies.	a) Training program implemented b) Number of cooperatives with access to government procurement policies	2027	SEAB and Conab - MDA	SBC and SNPCT - MMA/MPI
			1.1.2.6. Recreate the management committee and strengthen and expand the Minimum Price Guarantee Policy for Sociobiodiversity Products.	a) Number of phases reached to recreate the management committee b) Management committee recreated	2027	Conab, SFDT and SEAB - MDA	SBC and SNPCT -MMA
		1.1.3. Promote sustainable business and create green jobs by strengthening the bioeconomy, agroecological transition, and ethnodevelopment.	1.1.3.1. Launch an open call to accelerate social impact businesses focused on environmental conservation and the green economy in Brazilian biomes (Enimpacto).	a) Number of phases reached to publish the open call b) Open call published	2024	MDIC	
			1.1.3.2. Develop and implement programs to support micro and small business and community-based enterprises and enable access to technological development applied to sustainable business.	No. of support programs developed and launched No. of enterprises assisted	2027	MMA/ MDIC/ MCTI/ MDIC/ Censipam - MD/MEC	SEBRAE

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
			1.1.3.3. Encourage and expand the creation of green jobs resulting from agroecological, organic, and agroforestry production, sustainable extractivism, and productive forest restoration actions in possessions and properties, collective territories, settlements, and sustainable-use conservation units.	No. of jobs created	2027	MDIC/ MTE/ Funai - MPIZ SFB, SBio and ICMBio - MMA	
			1.1.3.4. Implement the Program to Support and Strengthen Ethnodevelopment in 60 productive groups of PCTs.	a) Number of phases reached for program implementation b) Program implemented c) Number of productive groups reached	2026	Seteq - MDA	SNPCT - MMA
			1.1.3.5. Create and implement the Indigenous Seal of Origin, Quilombola Seal of Origin, and Traditional Peoples and Communities Seal of Origin as a strategy for adding value to products from production groups formed by PCTs.	a) Number of phases reached to create the seals b) Indigenous Seal of Origin created and implemented c) Quilombola Seal of Origin created and implemented d) PCTs Seal of Origin created and implemented	2027 (accreditation of all requests)	Seteq - MDA	SEAB - MDA/ MPI/MIDR
			1.1.3.6. Adapt and strengthen Extractive Pronatec.	a) Number of ATER beneficiaries from indigenous peoples, traditional peoples and communities, family, and peasant farming	2027	SNPCT - MMA	CONAB - MDA/MPI/ MEC
	1.2. Nature tourism, ethno-tourism, and regenerative tourism in the Cerrado promoted and increased	1.2.1. Expand nature, rural, and community-based tourism in conservation units.	1.2.1.1. Implement the Entrepreneur on the Trail Program to encourage sustainable economic development along long-distance trails, connecting areas inside and outside protected areas.	a) Number of phases reached to implement the program b) Program implemented	2027	SBio - MMA	MDIC
			1.2.1.2. Increase the number of Federal Conservation Units with visitation support services in the Cerrado by 30%.	No. of Conservation Units with visitation support services implemented	2027	ICMBio - MMA	Private Sector
			1.2.1.3. Implement the National Trails and Connectivity Network public policy.	a) Number of registered trails b) Number of conservation units connected by long-distance trails	2027	SBio - MMA	Mtur, ICMBio, MDA, States, Municipalities, Brazilian Trails Network Association, Organized Civil Society

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
			1.2.1.4. Strengthening and promoting sustainable and responsible tourism, with an emphasis on community-based tourism and ethno-tourism, contributing to the valorization of socio-biodiversity, safeguarding history, gastronomy, and culture, and promoting social equity and local development in indigenous territories, quilombola communities, and traditional peoples and communities.	a) Number of phases reached to implement the program b) Program implemented	2027	MTur/MDIC	MDA-Seteq, SBio, ICMBio MMA/MDIC/ MPI
	1.3. Expanded sustainable forest management	1.3.1. Promote sustainable forest management and good production practices for the economic exploitation of native timber and non-timber species, as well as fauna, including honey and pollen production from native bees, among others.	1.3.1.1. Support community and family non-timber forest management by providing technical assistance for production and management advice to community forestry and agroforestry enterprises, with the goal of encouraging and expanding good practices for managing Cerrado species.	a) Number of projects supported	2025	SFB - MMA/SFDT -MDA	ICMBio- MMA
			1.3.1.2. Implement the National Productive Forests Program (PPA 2024-2027), promoting productive restoration (agroforestry and agroforestry systems) and community and family forest management (MFCF). This includes hiring technical assistance and rural extension (ATER) teams to encourage and expand the use of good practices for managing Cerrado species.	National Productive Forests Program launched nationwide (covering all six biomes)	2024	SFDT-MDA	Incra - MDA/ SBio-MMA
			1.3.1.3. Resume the National Forestry Program and promote the re-establishment of Conaflor.	a) Number of phases reached to implement the program b) Program implemented	2024	Sbio - MMA	MDA, SNPCT, SBC, SFB, ICMBIO/ MMA, MAPA, MPI, MDIC, private sector and civil society
			1.3.1.4. Implement the National Forest Inventory project - Cerrado component, supported by the Forest Investment Program - FIP.	Completion of data collection for the 1st cycle, with the publication of the Diagnosis of the Cerrado Biome based on the IFN/ SNIF, and the opening of all IFN data for the Cerrado Biome.	2025	SFB - MMA	

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
	1.4. Ecological restoration through concessions and silviculture of native species and native vegetation restoration initiatives implemented	1.4.1. Promote the restoration of native vegetation to reduce degradation, conserve biodiversity, increase carbon stocks, and generate employment and income in the Cerrado.	1.4.1.1. Implement Planaveg to support and strengthen the national policy for the recovery of native vegetation (Proveg), based on studies of the environmental recovery production chain.	a) Number of phases reached to implement the plan b) Plan implemented	2027	Sbio - MMA	Mapa/MCTI/ MDA/MGISP/ CCPR/MF/SFB -MMA
			1.4.1.2. Define priority areas for restoring native vegetation in the Cerrado, including areas affected by fires.	Area in hectares defined as priority	2025	Sbio - MMA	SNPCT, Ibama and ICMBio - MMA
			1.4.1.3. Implement actions to foster the market for seeds, seedlings, and other inputs, with a focus on family farmers, indigenous peoples, quilombola communities, and traditional peoples and communities.	a) Number of phases reached to implement the plan b) Plan implemented	2027	SBio, SFB, Ibama - MMA	Seteq-MDA/ MAPA/ ICMBio
			1.4.1.4. Implement concession areas in public forests for forest restoration and silviculture of native species.	Area in hectares of public forest with concession		SFB - MMA	ICMBio
			1.4.1.5. Implement two structuring projects for community-based restoration of native vegetation, prioritizing protected areas and collective territories.	a) Number of phases reached for project implementation b) Projects implemented	2027	SBIO--MMAZ SFDT-MDA/ MCTI	ICMBio
			1.4.1.6. Define priority areas for the recovery of native vegetation by financing projects to convert fines in the Cerrado.	Area/year (hectare) defined for restoring native vegetation	2024	SBio, Ibama and ICMBio - MMA	Funai - MPI / SNPCT-MMA
			1.4.1.7. Implement the Sustainable Landscapes project of the Forest Investment Program (FIP).	a) Number of phases reached for project implementation b) Projects implemented	2027	SFB - MMA	
			1.4.1.8. Implement the GEF Vertentes project to support biodiversity conservation on medium and large properties.	a) Number of phases reached for project implementation b) Projects implemented	2027	SBio - MMA	Mapa
			1.4.1.9. Develop a plan with the private sector to stimulate forestry with native species.	a) Number of phases reached to implement the plan b) Plan developed and implemented	2027	SFB - MMA	Embrapa - MAPA

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
			1.4.1.10. Create a federal program to support ecological and agro-ecological restoration in protected areas that have been embargoed or affected by fires.	No. of stages completed to create the program	2024	ICMBio - MMA	
			1.4.1.11. Draw up and publish a call for proposals for the recovery of native vegetation within the scope of Floresta Viva.	a) Number of phases reached to publish the call b) Call published	2024	BNDES - MDIC	ICMBio
Objective 2. Encourage sustainable agricultural and livestock activities.	2.1. Sustainable agriculture and livestock expanded	2.1.1. Encourage sustainable livestock and grain production, reducing pressure on critical areas of deforestation, while ensuring the social, environmental, and economic promotion of agriculture and livestock.	2.1.1.1. Implement a program to accelerate the intensification of livestock farming and the management, recovery, and conversion of degraded pastures.	a) Number of hectares with the program implemented	2024	SDI - Mapa	Apex - MDIC/ Embrapa - Mapa
			2.1.1.2. Implement a program/project to integrate and intensify agricultural and livestock production on pastureland and other degraded areas, ensuring cost-effectiveness, productivity levels, and competitiveness, while reducing pressure to open up new areas of native vegetation.	a) No. program/ project developed and implemented b) No. of hectares of recovered pastures	2025	Embrapa - Mapa / MF	Private Sector
			2.1.1.3. Create the "Green Seal" relating to the analysis of the life cycle of products in terms of solid waste generation, water use, and carbon footprint to promote environmental sustainability.	a) Number of phases reached to create the "Green Seal" b) Green Label created and implemented	2024	MDIC	SECD - MMA
		2.1.2. Strengthening and expanding access to markets and public policies for family farming	2.1.2.1. Implement the Productive Reinsertion Program for irregular rural producers, resulting from embargoes and illegal deforestation, who have been excluded from production chains and government programs.	Number of rural producers regularly reinserted into production chains	2027	SAF - MDA	Ibama and SECD -MMA
			2.1.2.2. Improve the CafWeb system to expand registration in the Family Farming Register (CAF) with integration into the CAR and Incra's land systems.	CafWeb improved	2027	SAF - MDA	MMA

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
			2.1.2.3. Implement Local Reference Units for recovering degraded areas and preventing and controlling the effects of desertification, consisting of 100 Agroforestry Systems (SAFs) and 100 Greywater Reuse Systems (RACs).	Number of Local Reference Units implemented	2024	SNPCT-MMA	City of Gilbués
		2.1.3. Disseminate the integrated fire management approach, including prevention practices, alternatives to the use of fire, and substitution of fire for agricultural and livestock purposes	2.1.3.1. Implement a campaign to disseminate good practices on integrated fire management in agropastoral areas.	a) Number of phases reached for publication of the campaign b) Campaign carried out	2027	Ibama and ICMBio - MMA	MAPA/ Anater and SAF - MDA
			3.1.1.1. Implement projects/plans/actions to encourage and strengthen research and training networks for developing and applying new technologies and social technologies aimed at socio-biodiversity chains and agroecological products, with a focus on native species.	Number of projects/ plans/actions implemented	2023 (DEA -MMA) 2024 (SDI - Mapa)	DEA-MMA/ MAPA/ MCTI / SAF - MDA /MDIC/ Censipam - MD/MEC	
Objective 3. Expand research, knowledge production, training, and technical assistance for sustainable production activities.	3.1. Research, training, capacity building, and knowledge for use and conservation expanded and disseminated	3.1.1. Produce knowledge, disseminate information, raise awareness, and train and empower different social agents on the importance of conservation by adopting sustainable production and consumption practices to reduce deforestation and forest fires in the Cerrado.	3.1.1.2. Support the development of a research project to create a digital hub of bioeconomy projects in the Cerrado, contributing to the systematic and regional mapping of production chains.	a) Number of phases reached in the development of the research project b) Research project developed	2027	Censipam-MD	
.			3.1.1.3. Implement a plan to encourage ongoing research to develop and improve technological solutions for intensifying the use and productivity of degraded pasture areas, aiming to increase grain production and sustainable livestock farming.	a) Number of phases reached in the development and implementation of the plan b) Research project developed	2027	Embrapa - Mapa	Research Institutions - MCTI
			3.1.1.4. Implement a plan to produce and/or update and disseminate technical and scientific guidelines for large-scale recovery actions in the Cerrado, taking into account knowledge about the biome's reference ecosystems.	a) Number of phases reached for the development and implementation of the plan b) Research project developed	2027	MCTI	CBC/ICMBio -MMA

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
			3.1.1.5. Create and/or strengthen nine Territorial Socio-environmental Education and Cooperation Centers, committed to training educators in socio-environmental sustainability, good living, and the popular and solidarity economy. These centers will also produce teaching materials to support educational institutions in including content and practices related to the prevention and control of deforestation in the Legal Amazon.	Number of Territorial Socio-environmental Education and Cooperation Centers created or strengthened (DEA/MMA)	2027	DEA- MMA/ MEC	SENAES - MTE, Universities, Government-Owned Companies (DEA/MMA)
			3.1.1.6. Produce educational materials and processes that contribute to all levels of formal education, as well as informal and non-formal education, for the recovery of native vegetation in public and private areas. These materials should encourage the formation of critical consumers who value sustainable agricultural and livestock products.	Number of materials produced	2027	DEA, Ibama and ICMBio - MMA/ MEC	
			3.1.1.7. Encourage and support the development of educational materials that promote an identity that values the Cerrado and fosters forest citizenship, both in rural and urban settings.	Number of materials published	2023	DEA-MMA/ MEC	CBC/ICMBio -MMA
			3.1.1.8. Support the development and implementation of environmental education programs in basic and higher education institutions, aimed at preventing and controlling deforestation in the Cerrado.	Number of programs implemented	2023	DEA-MMA/ MEC	
			3.1.1.9. Support the creation of extension courses and Professional and Technological Education (EPT), offered on a regular or alternating basis and with scholarships, for young people, indigenous and traditional peoples. These courses will prepare participants to act as environmental agents, promoting environmental education and sustainable production activities across various territories in the Cerrado.	Number of extension and Professional and Technological Education courses created/offered	2027	DEA- MMA/ MEC	Universities

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
	3.2. Strengthened and expanded technical assistance with inclusive service and diversified practices.	3.2.1. Strengthen and expand the supply of technical assistance through ATER executing entities, ensuring inclusive service and incorporating models aimed at sustainable practices, conservation, and reducing deforestation.	3.2.1.1. Implement two programs through ATER executing entities, including Extractive Pronatex, aimed at the specific needs of indigenous peoples, quilombola communities, and traditional peoples and communities, valuing their knowledge and agroecology practices.	Number of programs implemented	2027	Seteq, SAF and Anater - MDA	SBio-MMA
			3.2.1.2. Offer technical assistance to 6,000 rural families to implement productive restoration models (timber and non-timber forest products, fruit growing) and agroforestry.	Number of rural families assisted per year	2027	Incra and ANATER - MDA	MAPA/MF

Summary Table Axis II – Environmental Monitoring and Control

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
Objective 4. Strengthen federal institutions and ensure accountability for environmental crimes and infractions related to deforestation, forest fires, and forest degradation in the Cerrado.	4.1 Federal institutions responsible for investigation and enforcement strengthened	4.1.1. Strengthen the work of federal institutions responsible for investigating and enforcing deforestation control through inspections and the application of precautionary measures.	4.1.1.1. Embargo 50% of the illegally deforested areas under federal jurisdiction.	Area embargoed per year (hectares)	2027	Ibama - MMA	SECD - MMA
			4.1.1.2. Increase the seizure of products produced in areas subject to environmental violations by 50%.	Number of products seized	2027	Ibama - MMA	
			4.1.1.3. Inspect 20% of priority areas affected by forest fires in fire-sensitive ecosystems.	Area inspected per year (hectares)	2027	Ibama - MMA	
			4.1.1.4. Embargo 100% of illegally deforested areas in Federal Conservation Units every year.	Area embargoed per year (hectares)	2024	ICMBio - MMA	SECD - MMA
			4.1.1.5. Structure a state environmental intelligence governance center to combat deforestation in the Cerrado.	Number of centers structured	2027	Abin - CCPR	SECD - MMA
		4.1.2. Ensure accountability for crimes and administrative infractions related to deforestation, forest fires, and forest degradation.	4.1.2.1. File 20 Public Civil Actions (ACPs) to demand reparation for environmental damage and discourage the financing, production, and acquisition of products from illegally deforested areas.	Number of ACPs filed per year	2027	AGU	SECD, Ibama and ICMBio - MMA
			4.1.2.2. Increase by 20% the number of administrative proceedings initiated in relation to crimes and infractions against flora in the Cerrado.	Number of administrative proceedings opened per year	2026	Ibama and ICMBio-MMA/PF -MJSP	

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
			4.1.2.3. Increase the annual resolution rate of investigations by 10%, especially regarding the identification of offenders.	Percentage annual increase in the resolvability of investigations	2027	PF - MJSP	
			4.1.2.4. Set up a group of experts capable of investigating fires and issue the relevant ordinance.	Group set up	2027	Ibama, ICMBio - MMA/ MJSP	MJSP
			4.1.2.5. Increase the number of forensic investigations and investigations into the causes and origins of forest fires by 10% each year, compared to the average over the last four years.	Number of forensic analysis and investigations carried out / Number of fines issued	2027	Ibama and ICMBio- MMA/PF -MJSP	
		4.1.3. Human, technological, and logistical resources available to effectively tackle forest fires and other environmental crimes and offenses.	4.1.3.1. Hire 400 environmental analysts through a civil service entrance exam to work in the regions most at risk of deforestation and forest fires in the Cerrado.	Number of environmental analysts hired per year	2027	Ibama and ICMBio- MMA/ MGISP/ MPO	MMA
			4.1.3.2. Structure two logistical bases to support actions to prevent and combat forest fires in the Cerrado.	Bases structured	2027	Ibama - MMA	
			4.1.3.3. Hire four rotary-wing aircraft to support operations to prevent and combat forest fires in the Cerrado.	Aircraft hired	2027	ICMBio - MMA	
Objective 5. Improve capacity to control and monitor deforestation, degradation, and production chains.	5.1. Capacity to monitor deforestation and degradation in the biome expanded	5.1.1. Deforestation and degradation monitoring systems improved	5.1.1.1. Improve Prodes, Deter, and TerraClass to support monitoring, enforcement, the national GHG inventory, and the National REDD+ Strategy.	Number of monitoring systems improved	2027	Inpe - MCTI, Ibama - MMA	SECD - MMA
			5.1.1.2. Develop an automatic monitoring system for compliance with embargoes.	Number of system implementation stages completed	2026	Inpe - MCTI, Ibama - MMA	SECD - MMA
	5.2. Capacity to monitor production chains improved	5.2.1. Improved systems for controlling the traceability and environmental origin of timber, livestock and agricultural and livestock products	5.2.1.1. Develop a traceability and environmental origin control system for agricultural and livestock products.	a) Phases reached in developing the system b) System implemented	2024	SDI - MAPA /SECD - MMA / RFB -MF	

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
			5.2.1.2. Improve the DOF+ Traceability System for controlling forest products.	a) Phases reached in developing the system b) System implemented	2024	Ibama and SECD-MMA	Ibama - MMA
			5.2.1.3. Develop a system to support environmental enforcement of agricultural and livestock chains.	a) Phases reached in developing the system b) System implemented	2024	SECD-MMA/ Ibama / ICMBio	Ibama - MMA
	5.3. Capacity to assess the impact of deforestation on the established water regime	5.3.1 Expand data collection, establish parameters, and procedures for measuring the impact of deforestation combined with climate change on the Cerrado's water regime.	5.3.1.1. Encourage the expansion of the data collection network on surface and underground water resources.	Number of new measuring stations installed	2024	SNPCT - MMA/ANA -MDR	
			5.3.1.2. Carry out a public call to stimulate research focused on monitoring and analyzing the impact of climate change, deforestation, fires, and soil degradation on the water regime.	a) Number of steps taken to publish the public call b) Public call published c) Number of research projects approved	2027	CNPQ-MCTI/MDR	MCTI/MMA
	5.4. Community initiatives for monitoring and cooperation in environmental protection and tackling climate change in the territories disseminated and strengthened	5.4.1. Support initiatives and encourage the creation and strengthening of community networks to monitor deforestation and forest degradation for the environmental protection of their territories.	5.4.1.1. Support one community initiative in each Cerrado state.	Number of community initiatives supported	2027	ICMBio and SNPCT-MMA/ MDA/ Funai - MPI	
		5.4.2. Draw up and implement socio-environmental and territorial management plans to address the climate crisis in Indigenous and Quilombola Territories (PGTECs), with technological and economic support and technical assistance for adaptation and mitigation plans.	5.4.2.1. Draw up ten socio-environmental and territorial management plans for monitoring and addressing the climate crisis (PGTECs) in Indigenous and Quilombola Territories.	Number/proportion of Indigenous and Quilombola Territories with PGTECs prepared	2027	MPI	SNPCT - MMA/Funai - MPI/MIDR
			5.4.2.2. Set up a program to promote training processes aimed at monitoring extreme events and addressing the climate crisis in ten indigenous schools.	a) Training program implemented b) Number of indigenous students certified	2027	MPI	SNPCT - MMA/Funai -MPI
			5.4.2.3. Set up a collaborative mapping program for extreme events in ten indigenous territories.	a) Number of maps produced per indigenous territory	2027	MPI	SNPCT - MMA/Funai -MPI

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
Objective 6. Reduce forest fires by implementing integrated fire management	6.1 Fire monitoring and control capacity strengthened	6.1.1. Implement and equip the Federal Brigades Program to reduce the number of forest fires in priority federal areas.	6.1.1.1. Increase the number of firefighters hired by the Federal Brigades Program to work in the federal areas of the Cerrado by 5% annually.	Number of brigade members hired and equipped per year	2027	Ibama and ICMBio- MMA	SECD - MMA / Incra - MDA/ Funai – MP
			6.1.1.2. Carry out annual educational and awareness-raising campaigns on the effects of fire in the Cerrado.	Number of actions carried out per year	2027	ASCOM, SECD, Ibama and ICMBio - MMA/ SECOM - PR	
		6.1.2. Implement the National Integrated Fire Management Policy	6.1.2.1. Expand the area managed with prescribed burning in protected areas of the Cerrado.	Area managed (ha) ICMBio: 400,000 ha in federal CUs / Ibama: 380,000 ha in areas served by the Federal Brigades Program Prevfogo/Ibama	2027	Ibama and ICMBio- MMA	SECD – MMA
			6.1.2.2. Create a register of human resources for integrated fire management in Sisfogo.	Structured register	2027	SECD and Ibama - MMA	ICMBio - MMA
			6.1.2.3. Structure and implement the Federal Volunteer Strategy for Integrated Fire Management.	Number of actions carried out for structuring and implementation	2027	SECD, Ibama and ICMBio- MMA	Organized Civil Society, volunteers
		6.1.3 Improve systems for monitoring fire and its impacts	6.1.3.1. Implement the National Fire Information System (Sisfogo) to generate daily alerts, integrate state-controlled burning authorization bases, and compile information on forest fire monitoring and response actions.	Number of alerts issued per year; Survey on procedures for issuing burning authorizations in Cerrado states carried out; Number of burning authorizations and firefighting operations entered into Sisfogo; Number of products made available on Sisfogo.	2027	Ibama - MMA	ICMBio and SECD - MMA
			6.1.3.2 Implement and improve air pollution monitoring to help measure the impacts of fires on air quality in the Cerrado biome.	Percentage of Cerrado Biome states with air pollution monitoring	2027	SQA - MMA	
			6.1.3.3 Improve BD Queimadas, Fire Panel, and fire spread simulation systems.	Number of fire monitoring and simulation systems improved	2027	Inpe - MCTI / Censipam - MD/ Ibama and ICMBio - MMA	SECD - MMA

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		6.1.4. Support awareness campaigns and training related to the prevention and control of deforestation and fires.	6.1.4.1. Promote awareness campaigns against forest fires and burn-offs.	a) Number of campaigns carried out b) Number of producers trained	2027	SECD, Ibama and ICMBio - MMA	MCTI
			6.1.4.2 Design and carry out annual training courses or events to prevent and combat environmental crimes and offenses against indigenous peoples and traditional populations, offered to state public institutions in the Cerrado.	Number of annual courses or events held	2027	PF - MJSP/ Ibama, ICMBio and SECD - MMA/ Censipam - MD/MCTI	MEC/CCPR
	6.2 Scientific, technical, and operational improvement for integrated fire management actions	6.2.1. Encourage research and studies on the effects of fire to support decision-making.	6.2.1.1. Publish an open call to encourage the development of research into the effects of fire in the Cerrado, including estimates of greenhouse gas emissions.	a) Number of phases reached to publish the open call b) Call for proposals launched c) Number of projects/ research carried out	2027	Ibama and ICMBio - MMA	CNPQ - MCTI
Objective 7. Improve and integrate state and municipal data on deforestation permits, embargoes, and infraction notices into federal systems.	7.1. Vegetation suppression authorizations, embargoes, and infraction notices integrated into federal systems	7.1.1. Integrate the data on Vegetation Suppression Authorizations (ASV) and Alternative Land Use Authorizations (UAS) under the responsibility of federal, state and municipal agencies into the federal systems.	7.1.1.1. Integrate ASV and UAS data from all Cerrado states into Sinaflor.	Number of states with information on all ASVs and UAS integrated into Sinaflor	2024	Ibama - MMA	SECD - MMA
		7.1.2. Increase monitoring of compliance with Vegetation Suppression Authorizations (ASV) and Alternative Land Use Authorizations (UAS).	7.1.2.1. Improve Sicar by integrating and analyzing data from remote sensing, CAR, ASV, and UAS to automatically assess the legality of deforestation.	Number of states with all deforestation data qualified in terms of legality	2026	SECD-MMA	SFB and Ibama -MMA/MGI
		7.1.3. Improve and make available a platform to integrate data on environmental notices and embargoes under the responsibility of federal, state and municipal agencies into a federal system.	7.1.3.1. Provide a system for receiving and integrating environmental notices and embargoes issued by states and municipalities.	Number of states with environmental notices and embargoes integrated into the federal system	2026	Ibama - MMA	SECD - MMA
			7.1.3.2. Engage states and municipalities to integrate environmental notices into the federal system.	Number of states with environmental notices and embargoes integrated into the federal system	2026	SECD-MMA	Ibama - MMA

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
Objective 8. Strengthen coordination with the Cerrado states to promote actions for controlling deforestation, forest fires, and implementing the Native Vegetation Protection Law.	8.1 8.1 Action by the Cerrado states in line with the PPCerrado	8.1.1. Support the preparation of State Plans for Deforestation and Fire Prevention and Control (PPCDQs) in the Cerrado, along with other strategic actions.	8.1.1.1. Support the 12 states in drafting State Plans for Deforestation and Fire Prevention and Control (PPCDQs).	Number of states supported in drawing up PPCDQs	2027	SECD-MMA	
	8.2. Sicar improved to support states in implementing the Native Vegetation Protection Law	8.2.1. Provide the states with an improved CAR system as an instrument for controlling deforestation.	8.2.1.1. Develop solutions to integrate the National Rural Environmental Registry System with data on suppression authorizations, fines, embargoes, and deforestation on Gov.BR.	Number of solutions developed	2025	MGI/SFB and SECD-MMA	
		8.2.2. Improve the environmental regularization process by analyzing properties in the CAR carried out by the states.	8.2.2.1. Develop solutions to improve the automation of the CAR analysis process and the preparation of proposals for the environmental regularization of properties.	Number of properties and percentage of area in CAR analyzed with no pending issues and PRA signed	2027	MGI/SFB and SECD-MMA	

Summary Table Axis III – Territorial and Land Planning

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
Objective 9. Ensure the allocation of public lands for the protection, conservation, and sustainable use of natural resources, especially for indigenous peoples, quilombola communities, other traditional peoples and communities, and family farmers	9.1. Designated public lands and reduced land insecurity	9.1.1. Allocate federal public lands for the protection, conservation, and sustainable use of natural resources, recognition of land rights, and prevention and control of deforestation.	9.1.1.1. Set aside 1.2 million hectares of federal public land.	Area (in hectares) of undesignated federal public land	2027	Incra - MDA	MMA/MPI/ MGISP/MME
		9.1.2. Support the states in identifying, collecting, and allocating state public lands.	9.1.2.1. Support all Cerrado states in identifying, collecting, and allocating state public lands.	Number of states supported	2027	Incra - MDA	SECD - MMA
		9.1.3. Create new agrarian reform settlements, especially those of an environmentally differentiated nature, and promote the development and landholding regularization of those that already exist.	9.1.3.1. Create 20 agrarian reform settlements.	a) Number of settlements created b) Number of families settled	2027	Incra - MDA	MME
		9.1.4. Structure a multifunctional and interoperable land registry, integrating land, environmental, and registration information on rural properties.	9.1.4.1. Structured multifunctional and interoperable register.	Structured register	2027	Incra - MDA	MMA/MGI/ CNJ

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		9.1.5. Encourage and strengthen the creation of inter-institutional bodies and programs for managing land conflicts to protect local communities and combat grabbing of public areas.	9.1.5.1. Reduce the number of land conflicts registered in the Cerrado biome.	Number of land conflicts registered in the Cerrado	2027	Incra - MDA/MJSP	
	9.2. Land bases with improved controls	9.2.1. Promote, through state and federal land agencies, the verification of the regularity of rural property titles and registrations, especially those exceeding 2,500 hectares, and adopt appropriate measures when irregularities are identified.	9.2.1.1. Audit at least 10% of the proceedings for titling and registering rural properties with areas greater than 2,500 hectares.	Number of proceedings audited	2027	SFDT and Incra - MDA	CNJ
		9.2.2. Automatically analyze, notify, and reject requests for landholding regularization of parcels registered in the Land Management System that overlap public lands without a request or evidence of use before the landholding regularization deadline, and/or without an active CAR.	9.2.2.1. Monitor irregularities in rural parcels or certifications of rural properties on undesignated federal and state public land.	Number of areas monitored	2027	SFDT-MDA	GSIPR
		9.2.3. Establish a permanent task force to identify and investigate fraud in landholding regularization and titling requests, in cooperation with the National Justice Council, states, and registry offices.	9.2.3.1. Each year, audit 30% of landholding regularization applications, certifications, and registrations of rural properties on public lands with signs of irregularities.	Number/proportion of landholding regularization applications, certifications, and registrations of rural properties on public land with signs of irregularities audited	2027	Incra - MDA	MMA/MGISP/ CNJ

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		9.2.4. Create control mechanisms to detect and prevent the registration of native vegetation areas on Indigenous Lands, Quilombola Territories, and Territories of Traditional Peoples and Communities as Legal Reserve (LR) and Permanent Preservation (APP) areas on private properties.	9.2.4.1. Evaluate and cancel CAR registrations for private properties overlapping with Indigenous Lands, Quilombola Territories, and Territories of Traditional Peoples and Communities.	Number of CAR registrations of private properties overlapping with Indigenous Lands, Quilombola Territories, and Territories of Traditional Peoples and Communities canceled	2025	MGI/SFB-MMA	MPI/MDA
		9.2.5. Implement a system for automatic verification of compliance with the environmental resolutive clauses of landholding regularization titles and settlements, with the loss of benefits provided for in the legislation if illegal deforestation is detected or an embargo is applied to irregularly deforested areas.	9.2.5.1. Develop and implement functionality for automatic verification of compliance with environmental resolutive clauses in land titles.	a) Number of phases reached in developing and implementing the system b) Number of titles checked per year	2027	Incra - MDA	MMA
Objective 10. Expand and strengthen the management of protected areas.	10.1. Conservation Units created, consolidated, and with strengthened management	10.1.1. Create and consolidate Conservation Units in the Cerrado biome, focusing on critical areas of deforestation.	10.1.1.1. Create or expand 500,000 hectares of Conservation Units in the Cerrado.	Area (in hectares) of Conservation Units created/expanded	2027	ICMBio-MMA	MDA, MGI, MMA
			10.1.1.2. Carry out the 3rd update of the Cerrado's priority conservation areas (APCBs).	Update finalized and officially launched	2027	SBio - MMA	
			10.1.1.3. 70% of Conservation Units located in critical deforestation areas have management plans drawn up.	Percentage of Conservation Units with management plans drawn up in critical areas	2027	ICMBio - MMA	
			10.1.1.4. 70% of Conservation Units have advisory/deliberative councils established and active.	Number/proportion of Conservation Units with advisory/deliberative councils established and active	2027	ICMBio - MMA	
			10.1.1.5. Promote landholding regularization in strategic areas of at least 20% of federal Protected Areas (PAs) in the public domain.	Proportion of strategic areas of federal CUs in the public domain regularized	2027	ICMBio-MMA	

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		10.1.2. Strengthen, recognize, and implement integrated territorial management and governance instruments for the connectivity of protected areas, such as mosaics, ecological corridors, biosphere reserves, Ramsar sites, RPPNs, restoration plans, etc.	10.1.2.1. Implement and strengthen five integrated territorial management and governance instruments for protected areas.	Number of integrated territorial management and governance instruments for protected areas developed	2027	ICMBio-MMA	MPI/MDA
	10.2. Indigenous Lands, Quilombola Territories, and Territories of Traditional Peoples and Communities identified, delimited, demarcated, homologated, regularized, and with improved management	10.2.1. Identify, delimit, demarcate, ratify, and regularize Indigenous Lands and Quilombola Territories to guarantee the recognition of their territories.	10.2.1.1. Expand the identification, delimitation, demarcation, ratification, and/or regularization of Indigenous Lands in the Cerrado.	Area (in hectares) of Indigenous Lands identified, delimited, demarcated, ratified, or regularized	2027	MPI	MDA/MGISP/MME
			10.2.1.2. Expand the identification, delimitation, demarcation, homologation, and regularization of Quilombola Territories and those of other traditional peoples and communities.	Area (in hectares) of Quilombola Territories and those of other traditional peoples and communities identified, delimited, demarcated, homologated, or regularized	2027	MinC/ Seteq and Incra - MDA	MGISP/MIDR/ MME
			10.2.1.3. Expand actions to identify and remove invaders from Indigenous Lands.	Number of actions to remove invaders from Indigenous Lands carried out per year	2027	MPI/PF - MJSP	Ibama - MMA
		10.2.2. Regulate the identification, recognition, and regularization of territories collectively occupied and used by traditional peoples and communities.	10.2.2.1. Draw up a normative instrument to regulate the identification, recognition, and regularization of territories collectively occupied and used by traditional peoples and communities.	Normative instrument drawn up	2025	MDA/ SNPCT-MMA	MGI/GSIPR/ MME
		10.2.3. Draw up and implement territorial and environmental management plans for Indigenous Lands, Quilombola Territories, and territories of other traditional peoples and communities, with technological and economic support and technical assistance for sustainable activities.	10.2.3.1. Encourage the preparation of 100 territorial and environmental management plans for Indigenous Lands, Quilombola Territories, and other traditional peoples and communities, in line with the Indigenous and Quilombola Territorial and Environmental Management Policy.	Number/proportion of Indigenous Lands and Quilombola Territories with territorial and environmental management plans drawn up	2027	MPI/Seteq -MDA	MinC/MIDR/ Incra - MDA/ SNPCT - MMA

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
Objective 11. Coordinate and/or align the planning of major infrastructure and development projects in the region with the goal of zero deforestation by 2030	11.1 Improved planning and decision-making processes for the implementation of major infrastructure and development projects, in line with Brazil's environmental and development goals	11.1.1. Regulate, develop, and implement instruments (e.g., Technical, Economic, and Environmental Feasibility Studies - EVTEA, Strategic Environmental Assessment - SEA, etc.) to contribute preventively to environmental and territorial governance. These instruments aim to control deforestation, repair deforested areas, and mitigate GHG emissions resulting from land-use changes in the area of influence of large infrastructure and regional development projects.	11.1.1.1. Identify infrastructure projects with a significant impact on deforestation and GHG emissions in the Cerrado.	Number of projects identified	2027	SECD - MMA	MMA/MPO/ MF/MGISP/ CCPR/MME/ MT/MPor/ Mapa
			11.1.1.2. Set up an inter-institutional working group to present a proposal for regulating, developing, and implementing environmental and territorial governance instruments for major infrastructure and development projects in the Cerrado.	a) Working group set up b) Number of meetings held c) Number of technical or normative instruments prepared/ presented	2027	SECD - MMA	MMA/MPO/ MF/MGISP/ CCPR/MME/ MT/MPor/ Mapa
Objective 12. Carry out territorial planning and implement instruments provided by law to ensure the role of native vegetation in maintaining and recovering the water regime and the quality of water.	12.1. Instruments provided in the Native Vegetation Protection Law (Law No. 12651/2012) implemented	12.1.1 Support the preparation and review of the ecological-economic zoning (EEZ) of the Cerrado states, especially in the Upper Paraguay Basin and Matopiba regions, considering the possibility of increasing the Legal Reserve requirement based on art. 3.II, Law 12651/2012.	12.1.1.1 Draw up/revise the EEZ for all the states in the Cerrado biome.	Proportion of Cerrado biome territory with state and federal EEZ initiatives drawn up/ revised	2027	SECD-MMA	MIDR/MAPA/ MDA/MME
		12.1.2 Draw up a proposal for priority areas for Legal Reserve compensation, focusing on the recovery of spring areas, aquifer recharge areas, wetlands, the creation of ecological corridors, and the conservation or recovery of vegetation, soil, and threatened ecosystems and species.	12.1.2.1. Draw up a proposal for priority areas for Legal Reserve compensation in all Cerrado states.	Number of states in the Cerrado biome with proposals for priority areas for Legal Reserve compensation drawn up Total priority area proposed for Legal Reserve compensation	2025	SBio - MMA	ANA - MIDR /SNPCT - MMA/MME

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		12.1.3. Establish targets and guidelines for the recovery or conservation of native vegetation in APPs (Permanent Preservation Areas) that are higher than those defined by law for river basins considered critical, in consultation with the River Basin Committees and the State Environment Council, as provided for in art. 61-A.17, Law No. 12651/2012.	12.1.3.1 Establish additional targets and guidelines for the recovery and conservation of APPs in watersheds considered critical.	a) Number of states in the Cerrado biome with additional targets and guidelines for recovery and conservation approved and implemented b) Additional area for recovery and conservation (sqkm)	2025	SBio - MMA	ANA - MIDR /SNPCT - MMA/MME
		12.1.4. Improve the forest replacement instrument in the case of ASVs and UASs, as provided for in Law No. 12651/2012, to consider the interdependence between the ecosystem services generated by native vegetation and the regulation of surface, underground, and atmospheric water.	12.1.4.1. Establish targets and guidelines for forest replenishment in the case of ASVs and UASs.	Number of states in the Cerrado biome with forest replenishment targets and guidelines aligned with water management	2025	SFB- MMA	ANA - MIDR /SNPCT - MMA/MME
	12.2. Agricultural management tools integrated with native vegetation conservation and water management policies	12.2.1. Draw up and revise the agricultural climate risk zoning (Zarc) for the main agricultural crops (soy, corn, and sugarcane) and forestry, guiding the expansion of these activities in accordance with water availability, the quality of the biome's water, and the effects of climate change and deforestation.	12.2.1.1. Draw up/ revise the Zarc for four agricultural crops, considering water availability, water quality, the effects of climate change, and deforestation.	Number of Zarcs for agricultural crops prepared/revised	2027	Mapa	MMA/MME
	12.3. Water management instruments integrated with native vegetation conservation policy	12.3.1. Include criteria for the conservation of native vegetation at the property and micro-basin level in the evaluation process for granting irrigation licenses.	12.3.1.1. Develop a regulatory proposal to encourage the maintenance of water regulation by native vegetation.	Regulatory solution developed and implemented	2026	SNPCT - MMA/ANA -MIDR	SNPCT - MMA

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		12.3.2. Structuring information systems for the management of surface, underground, and atmospheric water resources and improving, based on an integrated and energetic approach, the application of water use grants and deforestation authorizations, with a focus on critical river basins affected by water scarcity and deforestation.	12.3.2.1. Develop a technological solution to enable and ensure the proper management of surface, underground, and atmospheric water resources.	Technological solution developed and implemented	2025	SNPCT-MMA/ANA-MIDR	SNPCT - MMA

Summary Table Axis IV - Rules and economic instruments							
Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
Objective 13. Create, improve and implement rules and economic instruments for deforestation control	13.1. Funds or mechanisms established and expanded to support deforestation control policies	13.1.1. Establish coordination and governance actions between funds and special projects (Climate Fund, FNMA, FNDF, FNRB, FCO, FDD, etc.) to enable the implementation of programs and projects arising from the PPCDAM and PPCerrado lines of action.	13.1.1.1. Draw up a proposal for an action plan for interfund coordination, governance, and special projects.	Number of cooperation instruments/Fund calls carried out, considering the lines of action of PPCerrado/PPCDAm	2027	SFB- MMA	MDIC/MF
		13.1.2. Propose the creation of funds or similar mechanisms to maintain water availability, soil conservation, and the conservation and recovery of native vegetation and biodiversity in the Cerrado, with resources from multiple sources, including contributions from the public and private sectors, international cooperation, and multilateral financing organizations.	13.1.2.1. Present a draft regulatory instrument to establish the "Cerrado Fund" or a similar mechanism.	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2027	SECD and SBio - MMA	MF/ MDIC/ MIDR/ Private Sector

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
	13.2. Incentive instruments for mitigation and adaptation activities implemented	13.2.1. Implement initiatives to build a green and sustainable taxonomy.	13.2.1.1. Construct green markers for the federal budget linked to the National Treasury's sustainable bond issuance strategy.	Number of programs identified with green markers	2024	MF/MPO	MMA/ CCPR /BCB
			13.2.1.2. Build a Brazilian sustainable taxonomy to scientifically classify activities, assets, and projects that contribute to climate, environmental, and/or social objectives.	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2024	MF	MMA/MDIC
			13.2.1.3. Design a Green Taxonomy proposal with government partners.	a) Taxonomy proposal established b) Number of guidelines, legal, and infra-legal instruments proposed	2024	MF/MPO	MMA/ CCPR /BCB
		13.2.2. Propose a normative instrument on the need to measure and publicize socio-environmental impacts.	13.2.2.1. Present a proposal for a normative instrument establishing the requirement for companies to publicize socio-environmental impacts and the mitigation, neutralization, and/or compensation measures adopted.	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2027	MDIC	CCPR
	13.3. Tax incentives, subsidies, and financing for productive activities and sustainable biodiversity businesses created and implemented	13.3.1. Propose standards and promote tax incentives for the bioeconomy and subsidies for sociobioeconomy products from sustainable and biodiverse production systems, sustainable extractivism, and agroforestry systems, especially from indigenous lands, territories of traditional peoples and communities, and family farming.	13.3.1.1. Present a draft regulatory instrument to promote tax incentives for the bioeconomy and subsidies for sociobioeconomy products.	a) Number of regulations proposed b) Number of phases reached in preparing the draft regulatory instrument	2027	SBC and SBio - MMA	MPI, MDA/ MAPA
			13.3.1.2. Transfer the benefits of tax and credit incentives to 3,000 beneficiaries from quilombola, indigenous, and traditional peoples and communities.	Number of payments, tax, and credit incentive benefits granted	2027	MPI/Seteq - MDA	SNPCT - MMA

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		13.3.2. Encourage the creation or expansion of public and/or private financing mechanisms for bioeconomy businesses and mobilize blended finance capital for bioeconomy and bioindustry social impact businesses.	13.3.2.1. Increase financing for bioeconomy and bioindustry businesses in the Cerrado compared to the previous year.	Volume of resources mobilized for bioindustry businesses	2027	MDIC	MF/SBC - MMA
	13.4. Improved rural credit	13.4.1. Strengthen, simplify, and revise rules for access to credit in the National Program for Strengthening Family Farming (PRONAF) for financing the sustainable use of natural resources, agroforestry, sustainable extractivism, and socio-biodiversity chains.	13.4.1.1. Revise rules to simplify and expand access to Pronaf credits.	a) Number of rules revised b) Number of PRONAF beneficiaries in credit lines aimed at the sustainable use of natural resources and socio-biodiversity chains c) Total volume of funds taken (R$)			
			13.4.1.2. Improve PRONAF credit lines for traditional peoples and communities, with the goal of supporting and promoting seed multiplication fields, the cultivation of medicinal plants, and the production of herbal medicines.	Number of beneficiary contracts and territories accessing the new Pronaf credit line	2027	SAF - MDA	SNPCT - MMA
			13.4.1.3. Adjust Pronaf credit lines to increase financing for projects involving products from socio-biodiversity chains and the sustainable use of natural resources.	a) Number of Pronaf beneficiary contracts b) Total volume of funds taken (R$)	2027	SAF - MDA	SECD - MMA/ BCB

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		13.4.2. Progressively align rural credit to contribute to the goal of zero deforestation by 2030, continuing the measures already implemented in the 2022/23 harvest to comply with CMN Resolution 5081/2023.	13.4.2.1. Improve guidelines related to zero deforestation in the annual guidance documents for granting rural credit.	a) Number of Pronaf beneficiary contracts b) Total volume of funds taken (R$)	2027	SAF - MDA	SECD - MMA/ BCB
		13.4.3. Expand financing for the recovery of pastures and degraded areas in critical areas of deforestation, considering the Constitutional Financing Fund for the Midwest (FCO) and other public and private sources of financing.	13.4.3.1. Expand funding for the recovery of pastures and degraded areas in municipalities critical to deforestation.	a) Number of steps taken to improve the guidelines b) Guidelines improved	2023	MAPA/MDA	MF/SECD - MMA
		13.4.4. Expand the analysis and validation of the CAR in the Cerrado to ensure that rural producers can access the benefits for environmental performance introduced in the 2023-2024 Safra Plan.	13.4.4.1. Coordinate joint efforts on an annual, semi-annual, or quarterly basis to analyze and validate the CAR in all Cerrado states.	a) Number of CARs analyzed without pending issues b) CAR area analyzed without pending issues	2027	MGI/SECD and SFB-MMA	State Departments of the Environment

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		13.4.5 Encourage the strengthening of environmentally sustainable production systems	13.4.5.1. Grant a bonus of 0.5 percentage points (p.p.) in the interest rate on costing operations, from controlled resources, for producers who use sustainable production practices, duly proven through certifications, monitoring protocols, or certificates of conformity issued by institutions operating in programs regulated by Mapa.	a) Volume of funds made available b) Number of producers benefiting from the bonus	2024	MF	Mapa
			13.4.5.2. Reduce the interest rate by 0.5 percentage points (p.p.) on costing operations with controlled resources for producers whose CAR has been analyzed by environmental agencies and has no pending issues, in accordance with CMN Resolution 5078, 29 June 2023.	a) Volume of funds made available b) Number of operations carried out	2023	MF	MMA/MDA
	13.5. Purchases and public contracts with environmental performance requirements	13.5.1. Regulate article 144 of Law No. 14133/2021, regarding the variable remuneration of contracts linked to performance, to guarantee the adoption of environmental criteria associated with reducing deforestation and recovering native vegetation.	13.5.1.1. Present a draft decree to regulate art. 144 of Law No. 14133/2021.	a) Number of stages reached in preparing the draft decree b) Draft decree presented	2027	MF/MDA	MAPA/MMA
	13.6. Green investments	13.6.1. Attract green investments to finance sustainable production and support compliance with deforestation reduction targets.	13.6.1.1. Attract green investments to finance sustainable production and support compliance with deforestation reduction targets.	Volume of new green investments attracted since 2023	2024	SDI, SRI and SE-MAPA/MF	MDIC
	13.7. Voluntary initiatives implemented	13.7.1 Encourage voluntary initiatives by the private sector aimed at progressively eliminating deforestation in their supply chains, considering compensatory actions, financing, and purchases that value production without deforestation and in areas already cleared.	13.7.1.1. Encourage voluntary initiatives by the private sector.	a) Number of private sector actors joining initiatives b) Number of private sector voluntary initiatives	2023	SDI and SRI - MAPA	MF/MDIC/ MMA/MDA/ Private Sector

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
	13.8. ENREDD+ aligned with current climate change mitigation challenges through forest policies	13.8.1. Revise and implement the National REDD+ Strategy (ENREDD+).	13.8.1.1. Establish guidelines for the harmonization and alignment of REDD+ initiatives at different scales.	Revised National REDD+ Strategy	2024	SECD - MMA	
			13.8.1.2. Establish guidelines and rules for REDD+ initiatives on federal public lands.	CONAREDD+ Resolution published	2024	SECD - MMA	
			13.8.1.3 Encourage and support the eligibility of Cerrado states for REDD+ fundraising.	Number of Cerrado states eligible for REDD+ fundraising REDD+	2024	SECD-MMA	State Departments of the Environment
	13.9. Environmental compensation instruments implemented	13.9.1. Review the decree regulating the Environmental Reserve Quota to guarantee the environmental integrity of the instrument.	13.9.1.1. Present a draft for revising Decree No. 9640/2018.	a) Number of stages reached in preparing the draft decree b) Draft decree presented	2027	SECD-MMA/ CCPR	SBio - MMA
		13.9.2. Advance in the implementation of forest compensation instruments for the Cerrado biome.	13.9.2.1. Implement the Environmental Reserve Quota (CRA) market and provide incentives for other instruments.	CRA market implemented	2027	SFB-MMA	State Departments of the Environment / Private Sector
	13.10. Technical assistance, sustainable use in federal protected areas, and community and family forest management strengthened	13.10.1. Regulate existing normative instruments to encourage the sustainable use of resources in conservation units, considering aspects related to technical assistance, community forest management, the National Climate Change Policy, and ENREDD+.	13.10.1.1. Draw up a proposal for a normative instrument to regulate articles of Law No. 9985/00, which establishes the SNUC.	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2027	SBio – MMA	CCPR
			13.10.1.2. Present a proposal for a normative instrument to consolidate the technical assistance policy for strengthening community and family forest management and other sustainable production activities.	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2027	MDA/ SNPCT-MMA	CCPR
			13.10.1.3. Draw up a proposal for a normative instrument to regulate Law No. 14590/23, in close dialogue with the instruments of the National Climate Change Policy and ENREDD+.	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2024	SECD, SFB - MMA	CCPR

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		13.10.2. Strengthen the National Technical Assistance and Rural Extension Program (PRONATER) to meet the demands of family farming and traditional peoples and communities, supporting sustainable activities and improving family income	13.10.2.1. Review and strengthen PRONATER to meet the demands of family farming and traditional peoples and communities.	a) Number of phases reached to revise the program b) Program revised and implemented c) Number of producers benefiting from ATER d) Volume of funds (R$) made available from Pronater to assist family farming and traditional peoples and communities	2027	SAF and Anater - MDA	SNPCT-MMA
	13.11. Amendment to the Constitution Proposals, bills, or other legal acts relevant to the prevention and control of deforestation and forest fires presented	13.11.1. Work towards the approval of Federal Senate Bill No. 1818/2022, which deals with the National Integrated Fire Management Policy, and improve the infra-legal regulations affecting Integrated Fire Management.	13.11.1.1. Collaborate with relevant actors and the National Congress to approve the National Integrated Fire Management Policy.	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2024	SECD-MMA/ CCPR	
			13.11.1.2. Present a proposal for a normative instrument to regulate the work of volunteers in regulated integrated fire management actions (Federal Strategy).	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2024	SECD - MMA	Ibama and ICMBio- MMA
			13.11.1.3. Present a proposal for a normative instrument to create a continuing education program for firefighters, temporary environmental agents, and other forest fire prevention and combat agents.	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2024	DEA, Ibama and ICMBio - MMA	Ibama and SECD -MMA
			13.11.1.4. Present a proposal to amend Decree No. 8914/2016, with the aim of strengthening the integrated fire management policy and engaging and articulating the participation of institutions that make up the Integrated Multi-Agency Center for National Operational Coordination (CIMAN) and other federal, state and municipal agencies.	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2024	SECD and Ibama - MMA	Institutions that make up Ciman

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		13.11.2. Revise provisions of the Environmental Crimes Law, the Native Vegetation Protection Law, and Decree No. 6514/2008 to increase penalties related to environmental crimes against flora, including forest fires	13.11.2.1. Present a Bill to adjust the penalties for environmental crimes in the Cerrado, as set out in Law No. 9605/1998	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2024	PF- MJSP/ SECD-MMA	
			13.11.2.2. Present a Bill to adjust the general rules on the protection of native vegetation in the Cerrado, as set out in Law No. 13651/2013.	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2027	SECD and SBio - MMA	CCPR
			13.11.2.3. Present a draft for revising Decree No. 6514/2008 to adjust the amounts of fines as a deterrent against deforestation and forest fires in the Cerrado.	a) Number of phases reached to present the draft normative instrument b) Draft normative instrument presented	2025	Ibama, ICMBio and SECD-MMA	
		13.11.3. Approve PEC 504/2010, which establishes the Cerrado as a national heritage, and define specific legislation for the sustainable use, conservation, and recovery of the biome	13.11.3.1. Engage in political dialogue to support the approval of PEC 504/2010, which establishes the Cerrado as a national heritage.	PEC 504/2010 approved	2027	SECD-MMA	
			13.11.3.2. Present a Bill on the Cerrado with definitions for sustainable use, conservation, and recovery.	a) Number of phases reached in presenting the draft regulatory instrument b) Draft normative instrument presented	2027	SECD, SFB and SBio - MMA	CCPR/MME
		13.11.4. Expand dialogue with the National Congress and Organized Civil Society to approve bills that contribute to conservation and restoration in the Cerrado	13.11.4.1. Map Bills and other proposals for legal changes in the National Congress that are relevant to conservation and restoration in the Cerrado and assess their relevance to the objectives of the PPCerrado.	a) Draw up an annual study on bills of interest to the PPCerrado b) Number of Technical Notes prepared to support the defense of the Bills	2027	SECD-MMA	Civil Society Organizations
	13.12. Law No. 14119/2021 regulated and new economic instruments and mechanisms for Payment for Environmental Services (PES) created or revised	13.12.1. Implement the Bolsa Verde Program (Environmental Conservation Support Program) as a mechanism to encourage sustainable use and support local socio-economic development projects, with an emphasis on the collective management of territories and their traditional systems in protected areas.	13.12.1.1. Implement the Bolsa Verde Program.	a) No. of territories benefited b) No. of families benefited/Value implemented	2023	SNPCT-MMA	

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
		13.12.2. Review Decree No. 10282/2021, which creates the Green Rural Production Bond (CPR-Green), and encourage public banks to use this financial instrument as a credit operation, so that it becomes an effective mechanism for forestry investment, especially for generating environmental assets through the recovery of degraded areas and the recovery of native vegetation.	13.12.2.1. Impact assessment and proposal to revise Decree No. 10828/2021.	a) No. of phases reached to present the proposed decree b) Proposed decree presented	2025	MAPA/ MDA	MF/MDIC/ SECD - MMA
	13.13. Brazilian emissions reduction market (MBRE) regulated	13.13.1. Regulate the carbon market in Brazil, defining operating rules and standards	13.13.1.1. Propose a normative instrument with a view to regulating the Brazilian emissions reduction market.	a) Number of phases reached to present the draft normative instrument b) Proposal for a normative instrument presented	2027	SNMC - MMA/MF	MDIC/MCTI/ CCPR/MME
	13.14. Landholding regularization of Quilombola territories and territories of traditional peoples and communities strengthened	13.14.1. Improve the process of regularizing quilombola territories and territories of traditional peoples and communities.	13.14.1.1. Revise Decree No. 9191/2017.	a) Number of phases reached to present the draft normative instrument b) Proposal for a normative instrument presented	2027	Seteq - MDA	SNPCT - MMA
			13.14.1.2. Revise Incra Ordinance No. 138/2022.	a) Number of phases reached for presenting the proposal to revise the ordinance b) Revised ordinance	2027	Seteq - MDA	SNPCT - MMA/MME
			13.14.1.3. Draw up a normative instrument to regulate the identification, recognition, and regularization of traditional peoples and communities.	a) Number of phases reached to present the draft normative instrument b) Proposal for a normative instrument presented			

Strategic Objectives	Expected results	Action Lines	Goals	Indicator	Time	Key Player	Partners
	13.15. Centers for Environmental Education and Territorial Socio-Environmental Cooperation set up and active in coordinating policies, programs, projects, and actions	13.15.1. Propose and approve legal instruments related to the creation of education centers and territorial socio-environmental cooperation.	13.15.1.1. Encourage and support studies, mapping, diagnoses, and analyses to define partners, structures, spaces, and resources for implementing education centers and territorial socio-environmental cooperation.	Number of proposals submitted	2027	MTE/MEC /DEA-MMA	MMA
			13.15.1.2. Encourage and support studies, mapping, diagnoses, and analyses of the needs and potential of the territories for the work of each socio-environmental education and cooperation center.	Number of initiatives carried out	2027	MTE/MEC / DEA - MMA	MMA
	13.16. Regulatory standardization for issuing and integrating permits for suppression and alternative land use	13.16.1. Establish a normative instrument to standardize the criteria for issuing and integrating data from Vegetation Suppression Authorizations (ASV) and Alternative Land Use Authorizations (UAS) issued by federal, state and municipal agencies into Sinaflor (MMA), and define criteria for publicizing the information.	13.16.1.1. Draw up a normative instrument to provide guidance on issuing, integrating, and publicizing ASVs and UASs.	a) Number of phases reached to present the draft normative instrument b) Proposal for a normative instrument presented	2024	SECD-MMA	SBio - MMA/ Conama

Serra da Canastra National Park. Picture: João Paulo Sotero

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