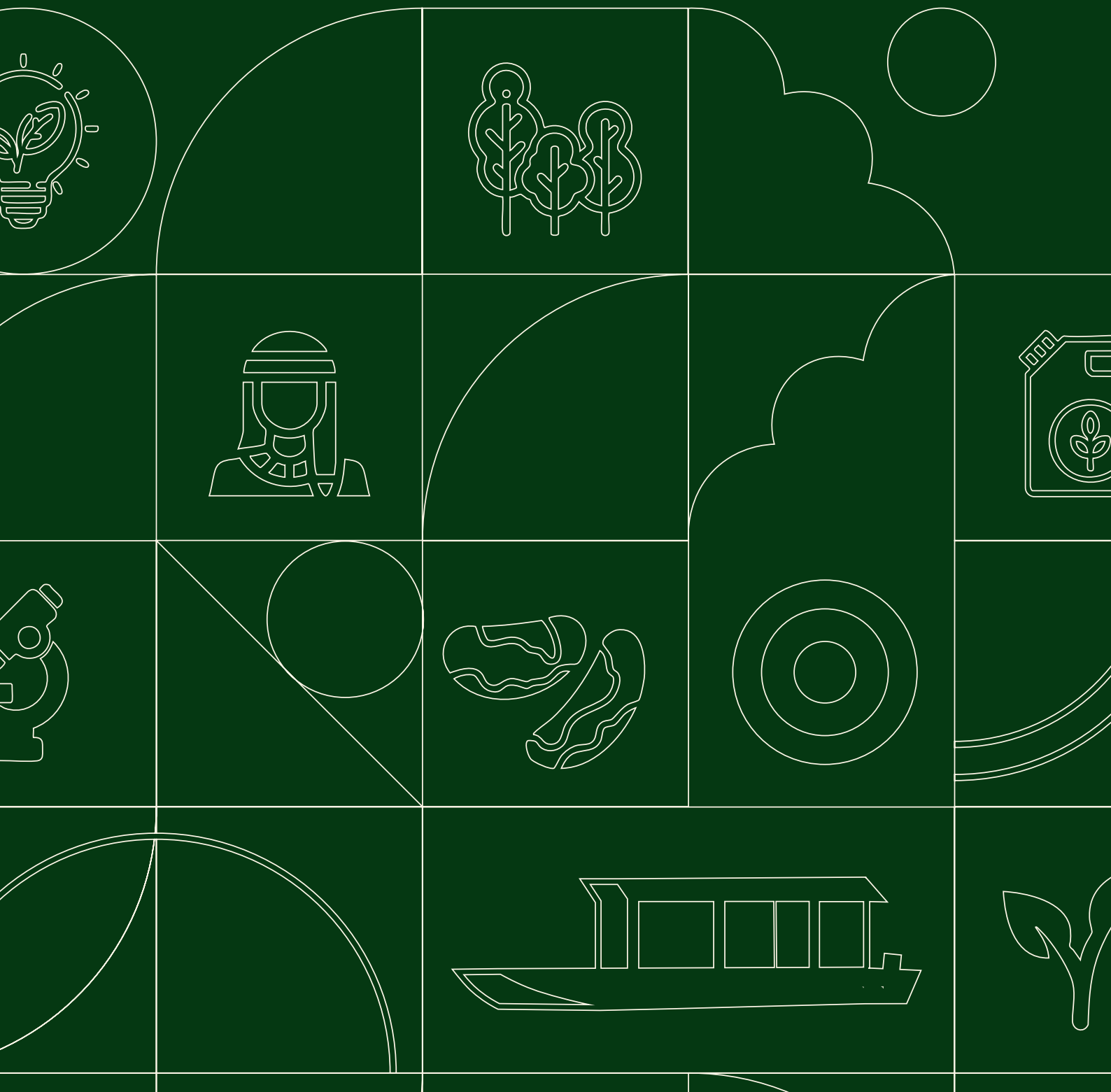
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National Bioeconomy Development Plan

2026-2035

Executive Summary





National Bioeconomy Development Plan

2026-2035

Executive Summary



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Brasília, DF
MMA
2026

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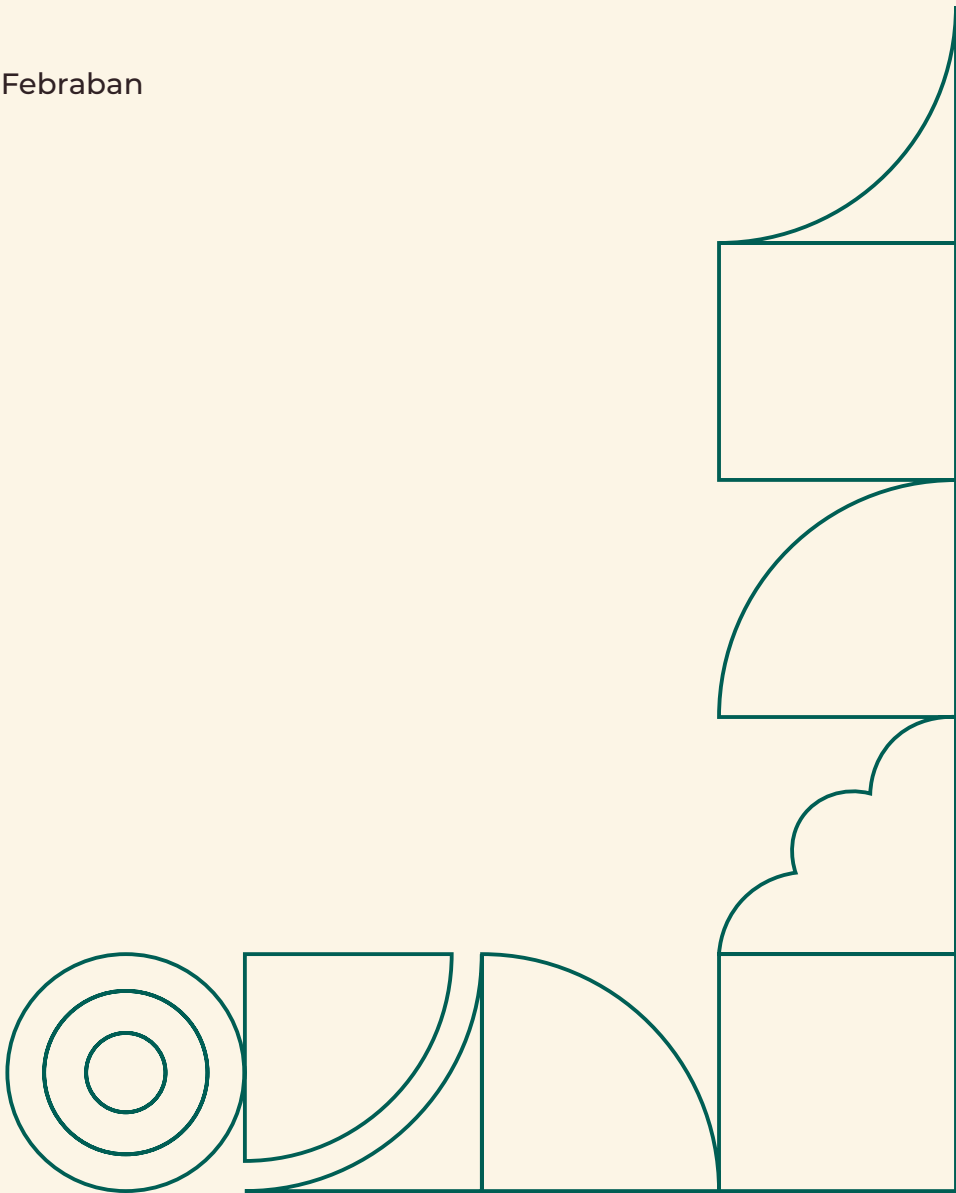
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LIST OF FIGURES

Figure 1 – The PNDBio participatory process.....33

Figure 2 – Methodological model of the PNDBio.....34

Figure 3 – The National Bioeconomy Development Plan.....39

Figure 4 – PNDBio Strategic Actions.....40

Figure 5 – First implementation phase.....44

Figure 6 – Distribution of capital mobilised in 2024 by origin.....73

Figure 7 – Main actors of the National System of Science, Technology and Innovation (SNCTI).....76

Figure 8 – Core impact dimensions of PNDBio.....81

LIST OF CHARTS

Chart 1 – Forecast of Community Businesses supported by 2035 41

Chart 2 – Projection of the number of PRONAF B credit operations by 2035 42

Chart 3 – Forecast of the annual gross value of sociobiodiversity production in 2035 43

Chart 4 – Forecast of the number of PES beneficiaries in 2035..... 47

Chart 5 – Projection of the number of organisations benefiting from access and benefit-sharing in 2035 54

Chart 6 – Projection of the percentage share of phytotherapeutics in the pharmaceutical market in 2035 54

Chart 7 – Projection of the number of phytotherapeutics incorporated in SUS..... 54

Chart 8 – Projection of the number of notifications of cosmetic and supplements in SISGEN in 2035 54

Chart 9 – Projection of the share of renewable raw materials in the production processes of fossil-based chemical inputs in 2035..... 62

Chart 10 – Forecast of the national production of biofuels by 2035..... 62

Chart 11 – Forecast of CO_2 emissions reductions by 2035..... 65

LIST OF BOXES

Box 1 – The National Bioeconomy Strategy....31

Box 2 – Sociobioconomy dialogues....35

Box 3 – The National Sociobioconomy Programme....44

Box 4 – Training Programme in Sociobioeconomy and Agroecology for Rural Credit Agents....45

Box 5 – The Food Acquisition Programme....45

Box 6 – The National School Feeding Programme (PNAE)....46

Box 7 – Payment for Environmental Services (PES) for managed pirarucu in Amazonas....49

Box 8 – *Bolsa Verde* programme....50

Box 9 – ARPA Comunidades programme....50

Box 10 – *Natureza com as Pessoas* programme....53

Box 11 – Traceability of biological inputs....56

Box 12 – PDFITO....56

Box 13 – Pilot Project for the identification of chemical markers....57

Box 14 – Phytotherapeutic derived from Phyllanthus niruri (Stonebreaker)....57

Box 15 – Sustainable public procurement....60

Box 16 – Brazil Showcase for Rural and Forest Bioindustry....60

Box 17 – Amazon Biorefinery Network....61

Box 18 – Coopera+ Amazônia Project....61

Box 19 – National Biofuel Policy....64

Box 20 – Social Biofuel Seal....64

Box 21 – Agro Brasil + Sustentável Programme....67

Box 22 – Rgen+ Sustentável....69

Box 23 – Targets to address bioeconomy financing bottlenecks....74

Box 24 – Eco Invest Brasil Programme....75

Box 25 – Brazilian Sustainable Taxonomy (TSB)....80

LIST OF ACRONYMS

AB + S: Agro Brasil + Sustentável Programme

ABC: Brazilian Academy of Sciences

ABBI: Brazilian Bioinnovation Association

ARPA: Protected Areas of the Amazon

BIP: Brazilian Climate and Ecological Transformation Investment Platform

BNDES: Brazilian Development Bank

CBA: Centrer for Amazon Bio-based Businesses

CEBDS: Brazilian Business Council for Sustainable Development

CG-PNGATI: Steering Committee for the National Policy for the Territorial and Environmental Management of Indigenous Lands

CICS: Interministerial Commission of Public Procurement for Sustainable Development

CLPI: Free, Prior and Informed Consultation

CMN: National Monetary Council

CNA: Brazilian Confederation of Agriculture and Livestock

CNAE: National Classification of Economic Activities

CNBio: National Bioeconomy Commission

CNI: Brazilian National Confederation of Industry

CNPC: National Council of Traditional Peoples and Communities

CNPq: National Council of Scientific and Technological Development

CO_2e: Carbon Dioxide Equivalent

CONAB: National Supply Company

Conama: National Council for the Environment

Conape: National Council of Aquaculture and Fisheries

Condraf: National Council of Sustainable Rural Development

Consea: National Council of Food and Nutrition Security

COP30: 30th Conference of the Parties to the UN Framework Convention on Climate Change

ST&I: Science, Technology and Innovation

CTIFIB: Technical Chamber for Financial Innovation and Investment in Bioeconomy

CTMIB: Technical Chamber in Bioeconomy Monitoring and Intelligence

DIEESE: Inter-union Department of Statistics and Socioeconomic Studies

Embrapa: Brazilian Agricultural Research Corporation

Embrapii: Brazilian Company for Industrial Research and Innovation

ENB/ENBio: National Bioeconomy Strategy

EPANB: National Biodiversity Strategy and Action Plan

ESG: Environmental, Social, and Governance FAPs: Research Support Foundations

FAS: Sustainable Amazon Foundation

FBB: Banco do Brasil Foundation

Febraban: Brazilian Federation of Banks

FGV: Getúlio Vargas Foundation

Finep: Brazilian Funding Authority for Studies and Projects

FNDCT: National Fund for Scientific and Technological Development

FNDE: National Fund for the Development of Education

Funbio: Brazilian Biodiversity Fund

G20: Group of 20 (international forum)

GIB: G20 Global Bioeconomy Initiative

GIZ: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

IBAMA: Brazilian Institute of Environment and Renewable Natural Resources

ICMBio: Chico Mendes Institute for Biodiversity Conservation

ICTs: Research Institutes / Scientific, Technological and Innovation Institutions

IFAV/IFAVs: Ingrediente Farmacêutico Ativo Veterinário (do inglês, Active Pharmaceutical Ingredient – API)

ICLFs: Integrated Crop-Livestock-Forestry Systems

Inmetro: National Institute of Metrology, Quality and Technology

IoT: Internet of Things

KfW: German Development Bank

MAPA: Ministry of Agriculture and Livestock

MCTI: Ministry of Science, Technology and Innovation

MDIC: Ministry of Development, Industry, Trade and Services

MF: Ministry of Finance

MGI: Ministry of Management and Innovation in Public Services

MMA: Ministry of the Environment and Climate Change

MRV: Monitoring, Reporting and Verification

NCMs: Mercosur Common Nomenclature

NDC: Nationally Determined Contribution

NIB: New Industry Brazil

OCB: Organisation of Brazilian Cooperatives

GMO: Genetically modified organisms

RD&I: Research, development and innovation

PAA: Food Acquisition Programme

PDFITO: Project for the Development of Value Chains of Medicinal Plants, Phytotherapeutics and Herbal Products in Health

PFSA: Training Programme for Sociobioeconomy and Agroecology for Rural Credit Agents

GDP: Gross Domestic Product

PIPCTAFs: Indigenous Peoples, Traditional Peoples and Communities, and Family farmers

PLANAVEG: National Plan for the Recovery of Native Vegetation

PNAE: National School Feeding Programme

PNDBio/PNDBIO: National Bioeconomy Development Plan

PNRB: National Benefit-Sharing Programme

UNDP: United Nations Development Programme

PPBIO: Priority Bioeconomy Programme

PRONAF: National Programme for the Strengthening of Family Farming

PRONARA: National Pesticide Reduction Programme

Prospera Sociobio: National Sociobioeconomy Programme

PES: Payment for Environmental Services

PTE: Ecological Transformation Plan

RGen+/Rgen+ Sustentável: National Policy for the Conservation and Sustainable Use of Genetic Resources for Food, Agriculture, and Livestock

SBPC: Brazilian Society for the Advancement of Science

SEBRAE: Brazilian Support Service for Micro and Small Enterprises

SENAI: National Industrial Training Service

SISGEN: National System for the Management of Genetic Heritage and Associated Traditional Knowledge

SNCTI: National System for Science, Technology and Innovation

SNICBio: National System for Information and Knowledge on Bioeconomy

SNUC: National System of Conservation Units (of Nature)

SUS: Unified Health System

TNC: The Nature Conservancy Brazil

TSB: Brazilian Sustainable Taxonomy

WWF Brasil: World Wide Fund for Nature Brazil



LETTER FROM MINISTER MARINA SILVA

A roadmap to a new cycle of prosperity

The historical moment we face calls for the courage to rethink, in a bold and forward-looking manner, the mechanisms that drive global economic systems. In the complex context of the triple planetary crisis—climate change, biodiversity loss and pollution—it is increasingly evident that traditional development pathways no longer provide adequate or sufficient responses.

It is necessary to rethink the foundations of the relationship between economy, society and nature, seeking solutions that are able to reconcile prosperity, social justice and environmental integrity. As the concept of entropy, from the Second Law of Thermodynamics, reminds us, it is not possible to grow forever on a planet with finite resources. This theoretical foundation gave rise to the concept of bioeconomy, whose basic premise is that productive processes must be aligned with ecological limitations.

This scientific premise, which today serves as both a compass and an interpretative lens for climate urgency, underpins our view that the economy does not exist above nature; rather, it operates within it and is subject to its most fundamental laws. It is from this clear recognition that this National Bioeconomy Development Plan is grounded—not as a constraint on progress, but as a definitive understanding that maintaining ecological integrity is our most essential infrastructure and the primary source of our true wealth.

To translate this vision into a robust, enduring and transformative State policy, the Government of Brazil has advanced an unprecedented institutional milestone through the creation of the National Secretariat for the Bioeconomy. This initiative represents far more than an administrative restructuring; it is the clearest signal that the ecological transition has assumed the highest priority at the centre of government. By establishing the National Bioeconomy Strategy, we have laid the foundations for building a broad national coalition around the ecological transition. This agenda is structured through a major partnership among the public sector, the private sector, local communities, academia and civil society. In doing so, we have consolidated the genuine mainstreaming of environmental policy across the economy. The environmental agenda is no longer viewed as a constraint or as a portfolio limited to regulatory oversight. Instead, through the bioeconomy, it operates in synergy with other national policies of the Ministry and its affiliated entities, acting as a dynamic driver of opportunities and incentives for Brazilian society.

In a coordinated manner, Congress and representatives of strategic sectors have advanced together in the development of a Plan that integrates the protection and sustainable use of our rich biodiversity, alongside social inclusion, into the core of the national economic strategy.

The bioeconomy we have designed and now present carries a deep, plural and non-negotiable identity: the Brazil brand. We fully recognise that the bioeconomy is not limited to a recent laboratory or technological invention. On the contrary, we acknowledge a genealogy of ideas, initiatives and organic connections among academia, governments and civil society that now culminates in the institutionalisation of a strategic national agenda.

Moreover, with great pride and a strong sense of historical responsibility, we recognise the leadership of Indigenous Peoples and Traditional Communities in Brazil. For millennia, these populations have managed their territories based on genuinely bioeconomic principles, producing with knowledge and care within the regenerative capacity of the abundant resources of our biomes. It is also important to acknowledge that, long before gaining prominence in public policy, Brazilian civil society and academia had already been leading the sociobiodiversity agenda. Over recent decades, concepts and practices have been developed that demonstrate that nature conservation and income generation can advance together.

Our Plan therefore places people and territories at the centre of decision-making, ensuring that inclusion, socio-environmental justice and the full recognition of ancestral knowledge are non-negotiable pillars. This is a development strategy—and, above all, a civilisational one—in which protecting forests, water, soils and biodiversity means promoting local prosperity.

It is grounded in this legitimacy that Brazil has assumed its historic role as a country that proposes, convenes and delivers on the international stage. During our presidency of the G20, we took a leading role in advancing this debate, elevating the bioeconomy to the highest level of the political agenda through the establishment of the High-Level Principles on the Bioeconomy, which now guide the world's largest economies.

We have gone even further: with the launch of the Bioeconomy Challenge during COP30, we connected the global evolution of the concept to immediate practice, creating a bridge between the ambition of climate diplomacy and the effective implementation of action by mobilising, in a spirit of collective effort, governments, businesses, financial institutions and civil society. We are leading by example, offering the world a roadmap for the global bioeconomy and demonstrating that it is possible to align decarbonisation, biodiversity conservation and poverty reduction with the development of Global South economies.

In doing so, we are advancing the bioeconomy as a multi-benefit agenda within the multilateral system, confident that it will serve as a catalyst for the achievement of major international commitments, such as Nationally Determined Contributions (NDCs) and National Biodiversity Strategies and Action Plans (NBSAPs).

However, for this transformation to take hold and endure, we must structurally break with outdated approaches that no longer deliver. The transition requires moving beyond the traditional logic of comparative advantage—based on extractive models and resource depletion—towards a model grounded in shared value, resilience and territorial prosperity.

Our global competitive advantage is no longer defined by abundance viewed merely as a stock of natural resources to be depleted; rather, it lies in the integrity of our ecosystems, in innovation for the commercialisation of high value-added products, and in improving quality of life through the fair sharing of benefits. Through the PNDBio, we will foster cooperative advantages by aligning efforts and attracting investments that value standing forests and remunerate the invaluable ecosystem services they provide to agriculture, climate stability and the well-being of humanity as a whole.

We are fully aware that the urgency imposed by climate change does not afford us the luxury of delay. This is why this Plan is a living document, focused on action. Implementation has already begun. As we further develop this regulatory framework, a range of initiatives are rapidly gaining traction and delivering tangible change.

In alignment with the PNDBio, we are making history across areas that are essential enablers of the bioeconomy. We are already operating at the forefront with innovative green finance instruments, mobilising billions in concrete commitments for nature-based solutions. We are advancing swiftly in consolidating territorial arrangements focused on land tenure regularisation, establishing vital partnerships for market development, and strengthening sociobioeconomy value chains alongside productive innovation. These are decisive steps by a country that is already beginning to reap the first results of an economy grounded in regeneration.

This document is, in essence, our pact for a Brazil that refuses to be a mere spectator of its own future. In this Plan, which sets out the path for the next ten years, we recognise our biological wealth, the immense responsibility we bear towards the planet and the urgency imposed by the climate—guided at all times by an unwavering belief in our capacity to deliver. Through enabling public policies, concrete actions and a long-term vision, our country issues a call, both domestically and internationally, for the construction of a new development paradigm. A paradigm in which economic prosperity, environmental integrity and human dignity are not competing objectives, but inseparable dimensions of a shared vision for the future. We are already moving forward with the implementation of the PNDBio, towards a new cycle of prosperity.

We invite every member of civil society, every worker and entrepreneur in the productive sector, every academic researcher, community leaders and forward-looking investors to join us on this path. We embrace the responsibility of making the bioeconomy our most comprehensive systemic response. The invitation is extended, the direction is clear, and this new reality of prosperity and justice will be built together.

Marina Silva
Minister for the Environment
and Climate Change



LETTER FROM MINISTER GERALDO ALCKMIN

Launch of the National Bioeconomy Development Plan

As part of his development agenda for the country, President Lula has prioritised strengthening national industry with social and environmental responsibility. Through the re-establishment of the Ministry of Development, Industry, Trade and Services, its structure has been modernised, including the creation of the Secretariat for the Green Economy, Decarbonisation and Bioindustry.

Brazil has the world's greatest capacity for sustainable biomass production and holds the largest biodiversity. These natural assets, combined with a diversified industrial base and a competitive agricultural sector, create an unparalleled comparative advantage. Brazil has the potential to become a global leader in the production, export and use of bioproducts and bioenergy.

We are already the world's second-largest producer of biofuels. In 2024, we produced 45.8 billion litres of biofuels. Brazil is also the world's leading exporter of agricultural commodities and feeds more than one billion people globally.

The bioindustry will take us even further. Across our 18 petrochemical complexes, these inputs can be transformed into high value-added bioproducts and biochemicals. For example, the vertical integration of cotton farms in Mato Grosso has enabled the production of cotton fibre alongside cottonseed oil, animal feed and pellets, increasing value added by around 240 per cent per hectare, while generating more jobs and better incomes. In the state of Tocantins, communities are already utilising 100 per cent of the babassu palm, from fibre to oil, creating income and employment in semi-arid regions.

The Ministry of Development, Industry, Trade and Services (MDIC) has a long-standing role in advancing the bioindustrialisation agenda. It was within this Ministry that the National Alcohol Programme (Proálcool) was launched in 1975. Consolidating a national bioindustry is now a key priority. The pharmaceuticals of the future include biopharmaceuticals; the fuels of the future are renewable; and the plastics and materials of the future are bioplastics and biomaterials. Leveraging biomass from agricultural products in which Brazil is a global leader allows the bioindustrialisation of both rural and forest-based economies to generate a strong multiplier effect on national income.

Through strategic planning and prioritisation, we will develop new technological packages to extend this transformation across multiple value chains in agribusiness and Brazil's biomes. The bioindustry transforms rural areas into bioindustrial clusters, generating decentralised development across the territory and creating higher-skilled, better-paid jobs.

For all these reasons, today we are launching the National Bioeconomy Development Plan, a mission-oriented strategy, similar to Nova Indústria Brasil. These two economic development policies are aligned to position Brazil as a global leader in bioindustry and in building a low-carbon, climate-resilient economy.

Geraldo Alckmin
Minster of Development,
Industry, Trade and Services

Vice President of the
Federative Republic of Brazil

CONTENTS

1. Brazil as a bioeconomy 26

1.1. Brazil as a bioeconomy 26

1.2 Governance and participative development 33

2. National Bioeconomy Development Plan 38

2.1 Sociobioeconomy community business ecosystem 41

2.2 Valorisation of the environmental and sociocultural services of Indigenous Peoples and Traditional Communities 46

2.3. Bioeconomy and terrestrial and aquatic ecosystems 51

2.4. Health and well-being 53

2.5 Full utilisation of biomass and its circularity 58

2.6 Biochemistry of renewables 62

2.7 Sustainable biomass production 65

2.8 Biomass diversification 67

3. Cross-cutting strategies for bioeconomy development 72

3.1. Financing 72

3.2 Bioeconomy and the National System of Science, Technology and Innovation 76

3.3 Safeguards 78

3.4 Expected impacts of PNDBio by 2035 81

4. Concluding message 84

REFERENCES 90



Chapter 1

BRAZIL AS A BIOECONOMY

1. BRAZIL AS A BIOECONOMY

1.1 Brazil as a bioeconomy

The world is at a decisive moment in the transformation of its development models. The climate emergency, the accelerated loss of biodiversity, ecosystem degradation and the urgency of achieving the Sustainable Development Goals demand profound changes in how we produce, consume and relate to nature. The linear economy, based on intensive extraction and the unsustainable use of natural resources, does not provide adequate responses to these challenges and threatens ecological and climate balance, economic stability and social justice.

In this context, the bioeconomy emerges as a concrete pathway towards a new productive and economic paradigm, integrating environmental, social and economic dimensions in an indivisible manner. It is an agenda that cuts across key sectors of the Brazilian economy—such as food, energy and health—and is expressed through new products, processes and services based on biodiversity.

The countries that will lead the global economy in the coming decades are those that are already structuring long-term strategies aligned with decarbonisation and the sustainable use of biodiversity as an economic asset, creating the regulatory, financial and technological foundations for new standards of production and competitiveness.

Brazil is exceptionally well positioned to assume a leadership role in the bioeconomy. As the holder of the world's largest biodiversity, distributed across six terrestrial biomes and an extensive coastal and marine zone, the country also possesses vast water resources, high solar potential, a predominantly renewable energy matrix and a territorial base capable of supporting large-scale production under sustainable standards.

In addition, it has accumulated scientific knowledge and experience in biomass processing and the development of sustainable products. Its biological assets, combined with science, technology and innovation—including traditional knowledge—constitute a strategic heritage with multiple pathways for value creation.

In this context, Brazil is not only keeping pace with this global shift but also making its own contribution to the bioeconomy debate by proposing an approach that integrates the sustainable use of biodiversity and the socio-cultural dimensions of production with innovation and economic development. In doing so, it expands the reach of the bioeconomy across different sectors of the economy and consolidates it as a national strategy for sustainable development.

One of the key distinguishing features of this approach is the incorporation of sociobiodiversity economies as a structural component of the bioeconomy. Within the context of national public policies, this approach is consolidated under the concept of the socio-bioeconomy, which reflects the central role of Indigenous Peoples, Traditional Peoples and Communities, and Family Farmers (PIPCTAF) in this development strategy.

These groups have developed, over generations, production systems based on the sustainable use of ecosystems, contributing directly to biodiversity conservation. At the same time, these territories continue to face constraints to their full economic development. The Brazilian bioeconomy therefore incorporates the socio-bioeconomy as a strategic axis, seeking to strengthen these economies through improved access to markets, innovation and financing, while promoting income generation, cultural recognition and strategies for well-being within territories.

This Brazilian contribution is also reflected at the international level. During its 2024 G20 Presidency, Brazil placed the bioeconomy at the centre of the multilateral debate through the G20 Global Bioeconomy Initiative (GBI), which adopted the High-Level Principles—the first internationally agreed framework on bioeconomy among countries. With COP30 in Belém, Brazil is consolidating this leadership by launching the Bioeconomy Challenge,

a multi-stakeholder initiative aimed at implementing these principles, with a focus on metrics, financial mechanisms, market development and the socio-bioeconomy.

The Federal Government has responded to this challenge with a systemic approach through the Ecological Transformation Plan (*Plano de Transformação Ecológica*—ETP), which integrates public policies aimed at a just and sustainable economic transition, with the bioeconomy as one of its central pillars.

In this context, key enabling instruments have been developed to guide and operationalise this transformation. The Brazilian Sustainable Taxonomy establishes broad environmental, social and economic criteria for sustainable finance, within which the bioeconomy is embedded and seeks progressively to consolidate its role. At the same time, innovative mechanisms such as Eco Invest are helping to mobilise capital through risk mitigation solutions, including currency and performance-based instruments, which are essential for enabling investment in new productive models.

Financing tools such as the Climate Fund also play an important role in allocating resources to projects aligned with the transition. This framework is complemented by instruments such as carbon markets and payments for ecosystem services, which help align economic incentives with conservation and the sustainable use of biological resources. Together, these mechanisms create the enabling environment for different economic sectors to progressively and competitively integrate the principles of the bioeconomy, with environmental integrity and social inclusion.

The development of this strategy required a national coalition commensurate with the scale of the challenge. Ministries across different policy areas came together with financial institutions, civil society organisations, the private sector, academia, and representatives of Indigenous Peoples and Traditional Communities to collectively develop the National Bioeconomy Development Plan (PNDBio), the implementation instrument of the National Bioeconomy Strategy.



Collection of the Department of Bioeconomy Promotion Policies (MMA)

This coalition, formalised through the National Bioeconomy Commission (CNBio), strengthens the coordination capacity of the Brazilian State by integrating, in a structured manner, productive, environmental, scientific and territorial agendas. Its distinguishing feature lies in the articulation between bioindustry, sustainable biomass production and socio-biodiversity, reflecting the growing role of the bioeconomy as one of the most important contemporary frontiers of innovation, technological development and biotechnology. The result is a set of strategic missions that constitute a roadmap for the consolidation of the bioeconomy in Brazil.

The National Bioeconomy Development Plan, presented below, translates these missions into an implementation strategy. Built on the principle of additionality to existing public policies, the Plan does not merely articulate ongoing initiatives; it defines specific contributions that reorient instruments, establish priorities, structure governance and coordinate

inter-institutional action. In doing so, it adds strategic direction and effectiveness to public action, converting national wealth into sustainable development.

Its success will not be measured solely by its contribution to Gross Domestic Product (GDP). As a State policy, its effectiveness will depend on the capacity to deliver consistent social and environmental outcomes, reflected in increased income, the generation of decent work, the reduction of inequalities, and the conservation and regeneration of biomes.

The implementation of this transformation will not occur automatically, nor will it be the exclusive result of this Plan. The transition to a bioeconomy depends on the creation of an enabling environment for the adoption of new production patterns through economic, regulatory and institutional instruments. PNDBio organises and guides this set of incentives—including financing, support for innovation, regulatory frameworks and capacity development—creating the necessary conditions for different economic sectors to progressively and competitively integrate the principles of the bioeconomy.

The PNDBio is therefore the guide to an already ongoing process: it organises, guides and accelerates actions under way, establishing the foundations for the transformation of Brazil's biological wealth into sustainable and inclusive prosperity to reach its full scale and potential.



Collection of the Department of Bioeconomy Promotion Policies (MMA)

Box 1 – The National Bioeconomy Strategy

The National Bioeconomy Strategy

Decree No. 12.044 of 5 June 2024 established the National Bioeconomy Strategy (ENB), marking an integrated State policy to coordinate public bioeconomy actions in articulation with civil society and the private sector. The document created the National Bioeconomy Commission (CNBio) and defined the National Bioeconomy Development Plan (PNDBio) as the main implementation instrument. The ENB is guided by the following principles established in the Decree:

- Promotion of economic and productive activities that foster the sustainable use, conservation, restoration and valorisation of biodiversity and ecosystem services.
- Decarbonisation of production processes and promotion of biomass production and processing systems that do not result in the conversion of native vegetation.
- Promotion of bioindustrialisation in line with industrial policy.
- Promotion of regenerative agriculture, productive restoration, native vegetation recovery, and sustainable forest management and production, particularly in relation to healthy food systems.
- Respect for the rights of Indigenous Peoples and traditional communities to self-determination and to the traditional use and management of their territories.
- Reduction of inequalities with a view to regional development.
- Fair and equitable sharing of benefits resulting from access to genetic heritage and associated traditional knowledge, in accordance with Law No. 13.123 of 20 May 2015.
- Promotion of the inclusion of women and young people in the bioeconomy.
- Expansion and improvement of the innovation environment based on biodiversity assets, agricultural and forestry production, and existing industrial capacities for the development of high value-added products, technological upgrading, and business models adapted to different scales and production systems.
- Professional training and skills development, promotion of entrepreneurship and generation of new jobs across different segments of the bioeconomy.
- Promotion of research, technological development, innovation, and production activities to integrate scientific and traditional knowledge, in partnership with science and technology institutions and with public and private companies.
- Assessment of the risks, opportunities, and impacts of scientific and technological development and of bioeconomy production activities.
- Coordination and cooperation among federal entities and across the public, private and academic sectors, as well as civil society.

The ENB sets out eight interconnected and complementary objectives, reflecting the ambition underpinning the PNDBio



Promote national, regional, and local development through the use of biological resources, grounded in environmentally, socially, and economically sustainable practices, in order to contribute to the population's water, food, and energy security.



Promote forest-based and sociobiodiversity economies by identifying, innovating, and enhancing their socio-economic, environmental, and cultural potential, while expanding market participation and income generation for PIPCTAF.



Strengthen the competitiveness of national bio-based production, particularly that derived from Brazilian biodiversity, in the transition to a low-carbon and climate-resilient economy.



Develop innovation ecosystems, scientific and technological knowledge, and entrepreneurship.



Develop the National Bioeconomy Information and Knowledge System.



Propose the creation and targeting of financial and economic instruments to stimulate and promote the bioeconomy.



Expand the integration of bioeconomy products into national markets and global value chains.

Source: Decree No. 12.044/2024.

WHAT IS THE BIOECONOMY FOR BRAZIL?

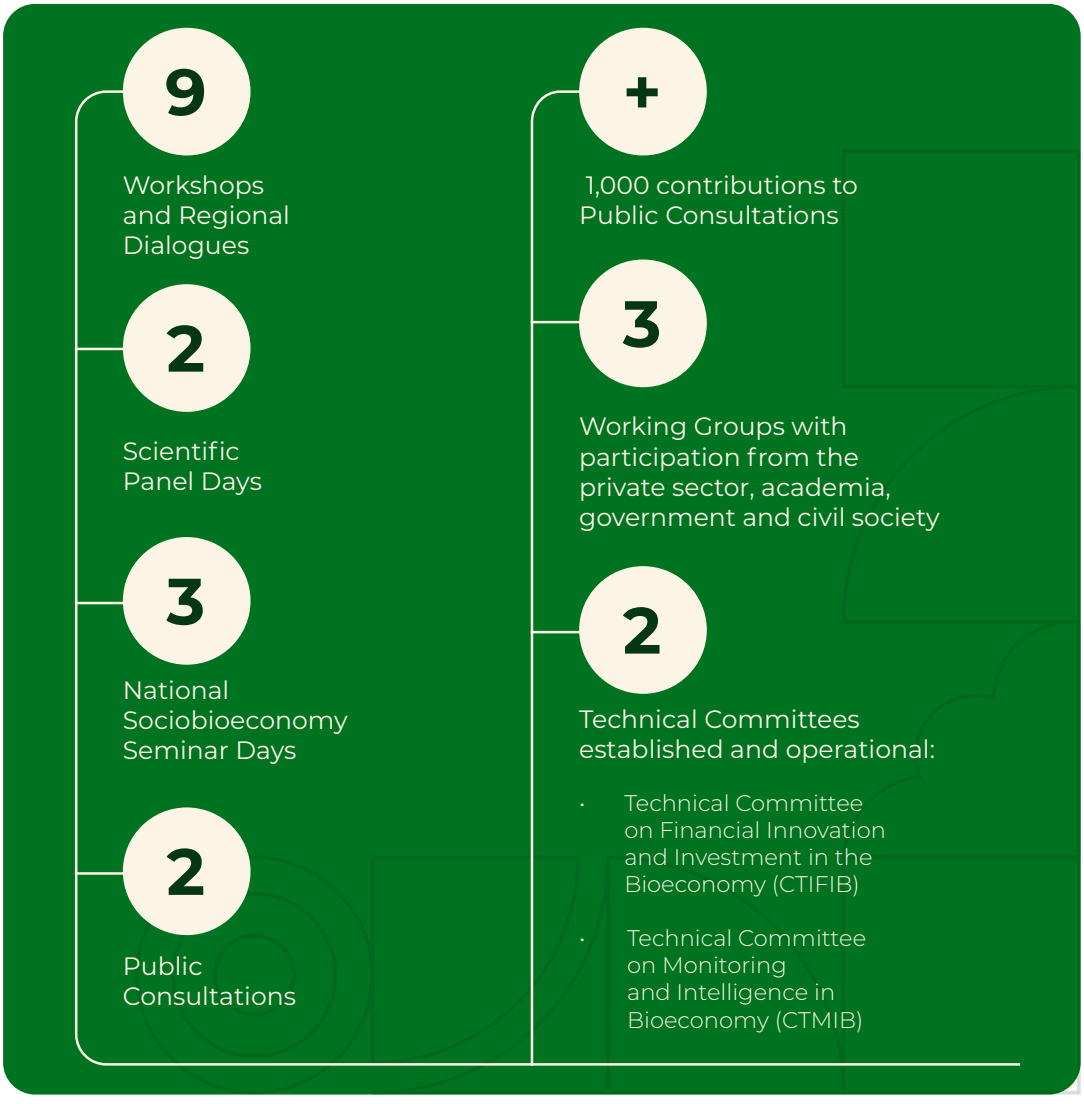
A model of productive and economic development grounded in the values of justice, ethics, and inclusion, capable of generating products, processes, and services efficiently, based on the sustainable use, regeneration, and conservation of biodiversity, guided by scientific and traditional knowledge as well as by innovation and technology, with a view to value creation, job and income generation, sustainability, and climate balance

Source: ENBio.

1.2 Governance and participative development

The National Bioeconomy Commission (CNBio) is the main governance body for the bioeconomy in Brazil, responsible for developing and monitoring the implementation of the Plan. It is a permanent collegial body of a consultative and deliberative nature, with a rotating chair shared among the Ministries of the Environment and Climate Change; Development, Industry, Trade and Services; and Finance. It comprises 34 members, with a parity structure between the Federal Government and society, including the private sector, academia, civil society organisations, financial institutions, environmental organisations, and representatives of social groups.

Figure 1 – The PNDBio participatory process



Source: Authors' elaboration.

For the development of the Plan, dedicated forums for formulation and deliberation were established to propose missions, targets and strategic actions, drawing on broad participation from other government entities and society. These included:

- Three Working Groups established through CNBio Resolution No. 2 of 13 February 2025:
  - Group 1 – Biomass, coordinated by the Ministry of Agriculture and Livestock (MAPA);
  - Group 2 – Bioindustry and Biomanufacturing, coordinated by the Ministry of Development, Industry, Trade and Services (MDIC);
  - Group 3 – Terrestrial and Aquatic Ecosystems and Sociobioeconomy, coordinated by the Ministry of the Environment and Climate Change (MMA;
- Technical Chamber for Monitoring and Intelligence in Bioeconomy (CTMIB), established through CNBio Resolution No. 3 of 28 March 2025 and led by the Ministry of Science, Technology and Innovation (MCTI);
- Technical Chamber on Financial Innovation and Investment in Bioeconomy (CTIFIB), established through CNBio Resolution No. 4 of 28 March 2025 and led by the Ministry of Finance.

The Plan was developed based on a Mission-Oriented Policies approach. This methodology suggests that public policies should be guided by missions—that is, by broad, cross-sectoral and aspirational objectives capable of mobilising and coordinating efforts to generate public value. According to this approach, missions should be both ambitious and realistic, and should be translated into feasible targets and actions that combine different public policy tools and instruments and strengthen State capacities to achieve the desired outcome.

Figure 2 – Methodological model of the PNDBio



Source: CGEE.

In 2024, a technical-scientific panel was held, constituting one of the initial stages in the development of the PNDBio. It provided a forum for technical debate to develop content, proposals and recommendations for the National Plan. The event took place in Brasília from 7 to 8 October 2024 and created an opportunity to engage key governmental and non-governmental stakeholders in the Plan's development, reflecting the diverse perspectives and interests surrounding the development of the bioeconomy in Brazil.

Between 2024 and 2025, seminars, national and regional dialogues, technical meetings, workshops and panels were held with managers and sectoral experts, as well as with the working groups and technical chambers established under the CNBio. In addition, two rounds of public consultation were conducted through the *Brasil Participativo* Platform, enabling around 900 contributions from society and consolidating social participation in the Plan.

The implementation of the Plan will be monitored through annual public indicators, structured based on the Theory of Change across three pillars: environmental, social and economic. The National System for Information and Knowledge on the Bioeconomy (SNICBio) will serve as the data and information infrastructure underpinning this monitoring, ensuring it is continuous, transparent and aligned with the international commitments undertaken by Brazil.

Box 2 – Sociobioeconomy Dialogues

SOCIOBIOECONOMY DIALOGUES

The Sociobioeconomy Dialogues were structured as a listening space established through territorial strategies to ensure popular participation in actions related to sociobiodiversity. Six workshops were held with leaders from all geographic regions and biomes of Brazil, involving different segments of Indigenous Peoples and traditional communities, such as Indigenous peoples, Quilombola communities, extractivists, artisanal fishers and others, as well as family farmers, with particular emphasis on the participation of women and youth The Dialogues also engaged other actors within the ecosystem, including the private sector, the financial sector, academia and innovation actors, the government sector and civil society. The set of demands identified through the Dialogues informed the first phase of the PNDBio public consultation, and the discussions culminated in the National Sociobioeconomy Seminar, held in August 2025. In total, around 500 people participated in the in-person stages of this process, with the majority (60 per cent) comprising representatives of PIPCTAF.

Source: Authors' elaboration.



Chapter 2

NATIONAL BIOECONOMY DEVELOPMENT PLAN



Palê Zupanni (MMA)

2. NATIONAL BIOECONOMY DEVELOPMENT PLAN

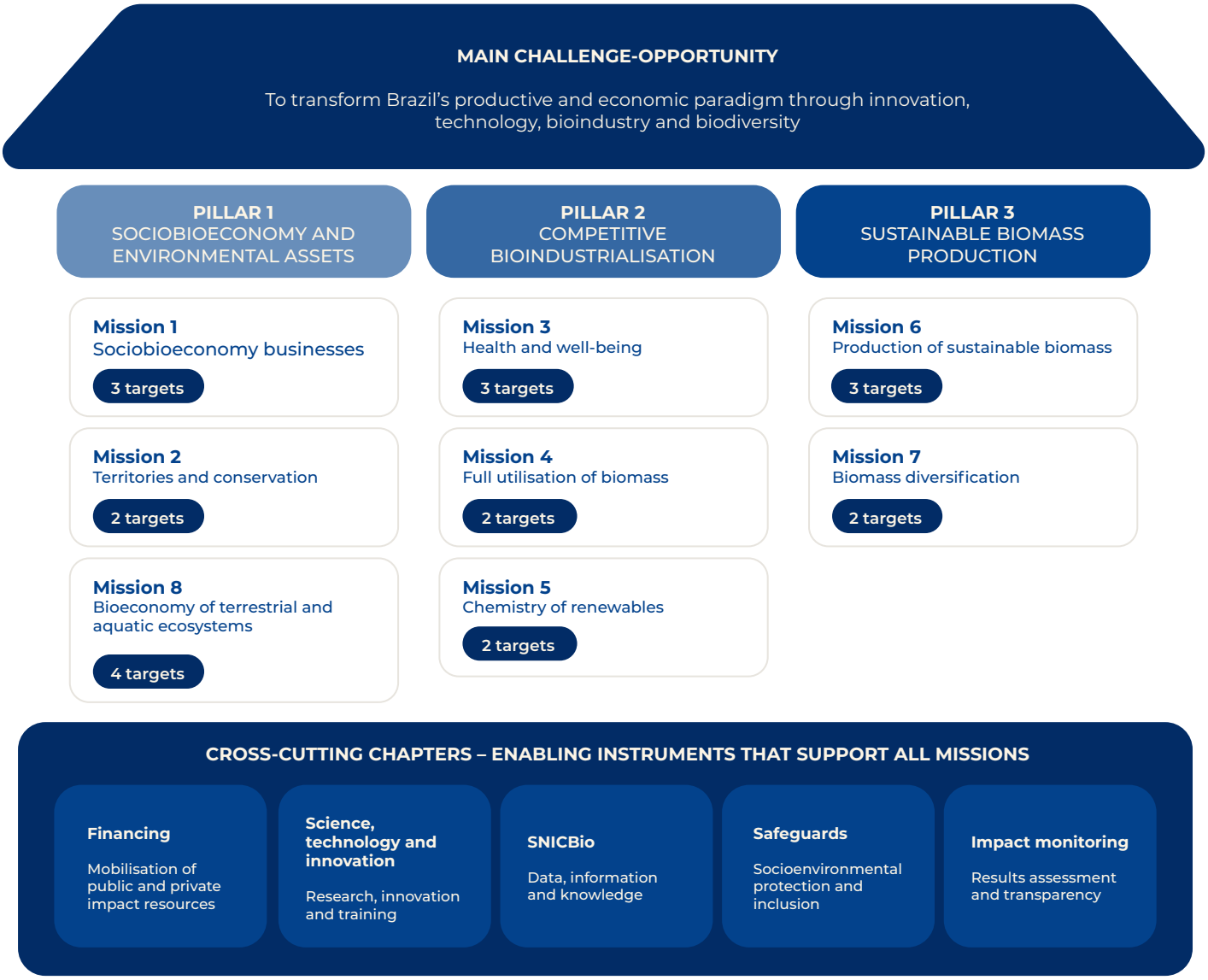
The missions and actions of this Plan converge to address the central challenge–opportunity for the development of the bioeconomy:

> To transform Brazil's productive and economic paradigm through innovation, technology, bioindustry and biodiversity, while conserving and regenerating nature, addressing climate challenges, and fostering global leadership and prosperity for all Brazilians.

Based on this challenge, eight missions were developed, broken down into 21 targets and 185 strategic actions, organized around across three complementary analytical pillars and supported by cross-cutting instruments that are necessary conditions for the success of all of them. The Plan has a 10-year implementation Horizon, although numerous actions are already underway.

Figure 3 illustrates the organisation of the Plan:

Figure 3 – The National Bioeconomy Development Plan

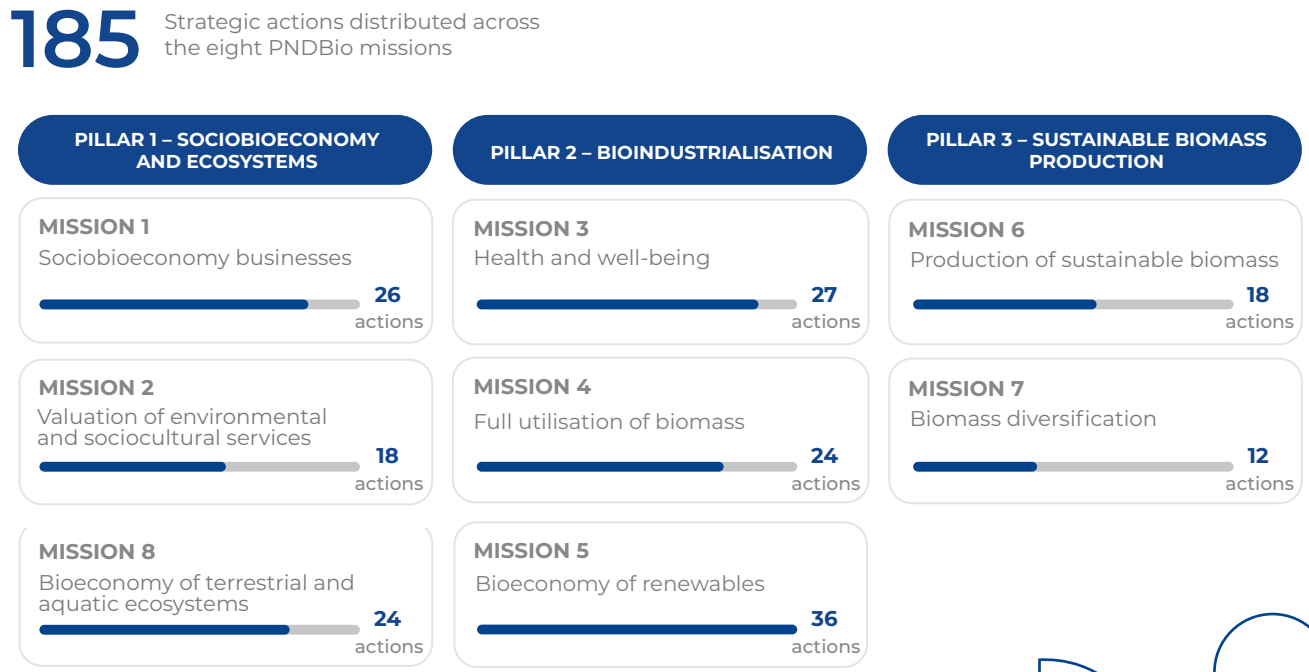


Source: CNBIO Resolution No. 7, CNBIO Resolution No. 8 – adapted.

The aspirational nature of the missions is complemented by the establishment of clear targets and a set of strategic actions that guide the implementation of the Plan. To define measurable delivery milestones, 21 targets were established, each associated with specific indicators for each mission, in the context of longstanding challenges related to data gaps and the integration of databases and indicators. Recognising these challenges, the PNDBio technical chambers and working groups conducted a robust mapping of information and technical inputs, demonstrating both the ambition and the feasibility of achieving the targets. The evidence gathered to support the definition of quantitative targets will enable the monitoring of progress through dedicated dashboards.

The targets are associated with a set of 185 strategic actions, which constitute the portfolio of concrete interventions that translate the missions into public policy. Distributed across the three organisational pillars, they cover a broad spectrum ranging from regulatory and financial instruments to productive infrastructure, science and technology, markets and capacity development. The figure below summarises their distribution by mission.

Figure 4 – PNDBio strategic actions



Source: MMA (2026).

*The bars are proportional to the maximum number of actions across all missions.

The missions and targets of the Plan are presented below, along with selected strategic actions and government actions already underway.

2.1 Sociobioeconomy community business ecosystem

Coordination: Ministry of the Environment and Climate Change

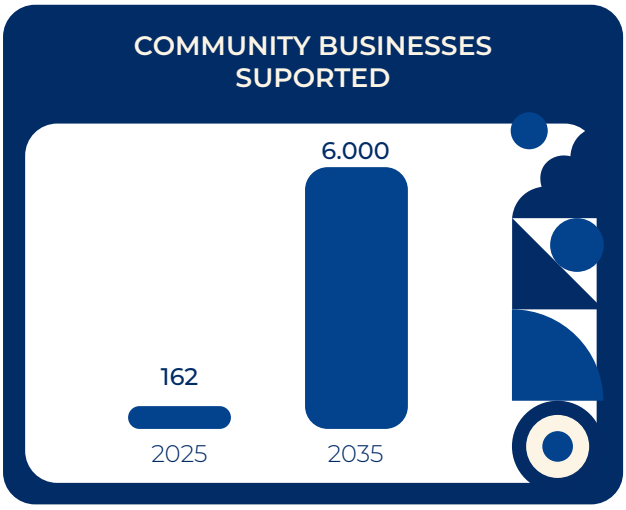
Mission 1

To strengthen sustainable businesses and community organisations of PIPCTAF, in continuous dialogue with science, technology and innovation, with a view to ensuring food security and increasing the participation of sociobiodiversity products and services in food systems and in the national and international economy, while taking into account racial, gender, youth and decent work perspectives.

TARGET 1:

Support 6,000 sociobioeconomy community businesses by 2035

Chart 1 – Projection of community businesses supported by 2035

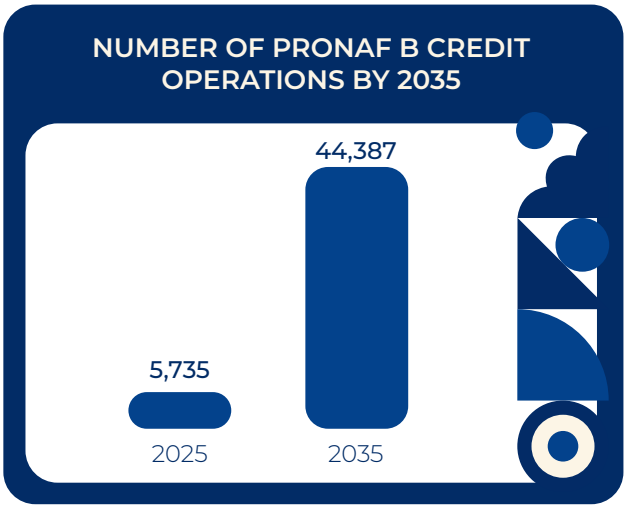


Source: Authors' elaboration based on PPA 2024-2027 – Programme 1189 – Bioeconomy for a new cycle of prosperity.

TARGET 2:

To increase by 20 per cent annually the number of PRONAF B credit contracts to support the sociobioeconomy by 2035

Chart 2 – Projection of the number of PRONAF B credit operations by 2035

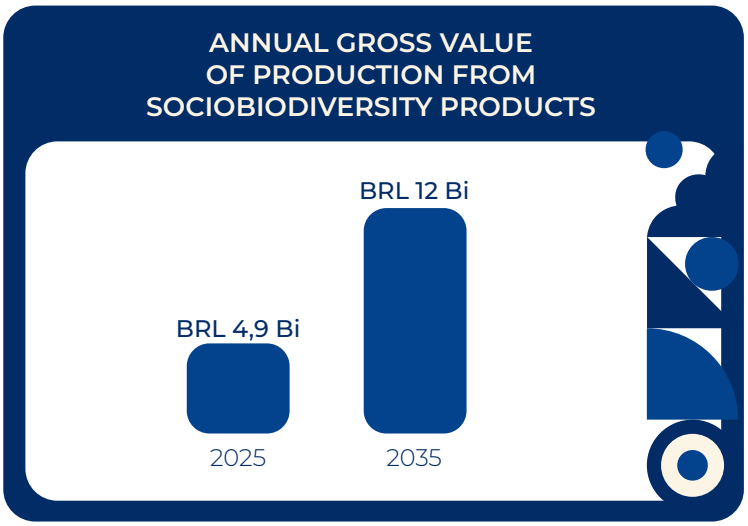


Source: Authors' elaboration based on Plano Safra Indicators Portal (MDA).

TARGET 3:

To increase by 100 per cent the annual gross value of production derived from sociobiodiversity products by 2035

Chart 3 – Projection of the annual gross value of sociobiodiversity production in 2035



Source: Authors' elaboration based on the IBGE – 2017 Agricultural Census –CensoAgro Portal.

Of the 26 Strategic Actions under this Mission, the following stand out:

- To establish Sociobioeconomy Development Hubs at the territorial level, with a view to providing support services for the development of sociobioeconomy businesses.

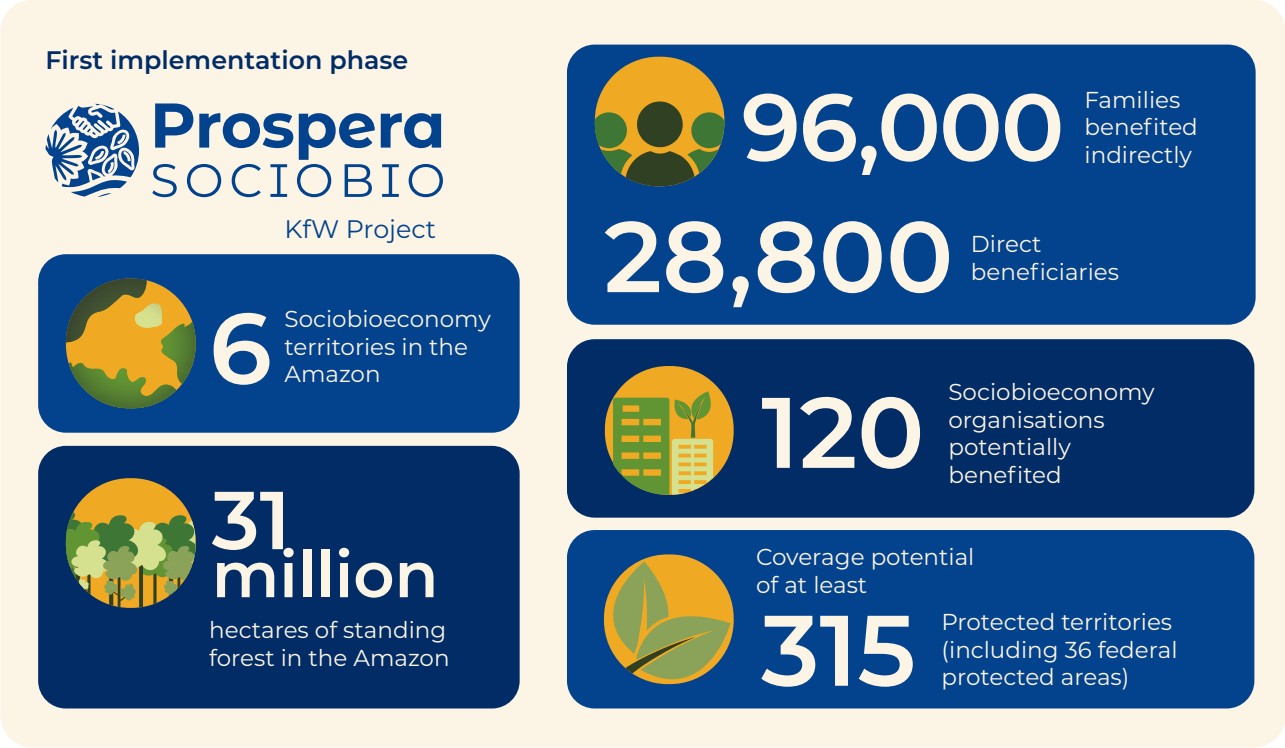
- To expand the inclusion of sociobioeconomy products and services in official economic activity classifications (e.g. the National Classification of Economic Activities—CNAE and the Brazilian Sustainable Taxonomy) and product categories (e.g. NCM and PRODLIST), enabling the generation of more granular data on these activities.

- To facilitate and expand access of PIPCTAF to government public procurement programmes, such as the Food Acquisition Programme (PAA) and the National School Feeding Programme (PNAE), among others, as well as to promote the insertion of sociobiodiversity products and services in these programmes, including fisheries and aquaculture, while also taking into account seasonality and diversified product supply.

- Increase and ensure investment in science, technology and innovation focused on products, services and knowledge derived from sociobiodiversity, while taking into account the interests of sociobioeconomy, sociobioeconomy businesses and leadership of PIPCTAF through biocultural protocols and Free, Prior and Informed Consultation (CLPI).

- Expand and streamline PRONAF credit operations for productive sociobioeconomy projects.

Figure 5 – First implementation phase



Source: Authors' elaboration.

Actions under implementation

Box 3 – National Sociobioeconomy Programme

Prospera Sociobio

Established by MMA Ordinance No. 1.508 of 12 November 2025, the National Sociobioeconomy Programme—Prospera Sociobio—aims to accelerate the maturity of community-based businesses, such as associations and cooperatives, through the creation of Sociobioeconomy Development Hubs in territories with the presence of Indigenous Peoples and traditional communities across all Brazilian biomes.

As a first delivery, the Sociobioeconomy Development Hubs call for proposals, with resources of approximately BRL 120 million, will support six territories in the Legal Amazon. The result is the outcome of a partnership between the MMA and the Sustainable Amazon Foundation (FAS), under cooperation with Germany and with financing from the German KfW Development Bank.

Further calls for proposals are under development to achieve the target of establishing 30 hubs and supporting 2,000 sociobioeconomy businesses.

Source: Authors' elaboration.

Box 4 – Training Programme in Sociobioeconomy and Agroecology for Rural Credit Agents.

Training of Rural Credit Agents for Sociobioeconomy and Agroecology

The Training Programme in Sociobioeconomy and Agroecology for Rural Credit Agents (PFSA), under the responsibility of the MMA and MDA, promotes the professional qualification of Rural Credit Agents with a view to strengthening their engagement with Indigenous Peoples, traditional peoples and communities, and family farmers (PIPCTAFs), as well as their articulation with banks. It supports the planning and management of their activities and productive organisations, with an emphasis on structuring rural credit projects for sociobioeconomy and agroecology. In 2026, the programme is expected to train 250 Rural Credit Agents, in partnership with UNDP, the Amazon Bank (Banco da Amazônia) and Banco do Brasil. It will also support and recognise other training initiatives underway in the country and engage with banks and credit cooperatives to promote simplified procedures for PIPCTAFs' access to PRONAF.

Source: Authors' elaboration.

Box 5 – The Food Acquisition Programme

Food Acquisition Programme

The Food Acquisition Programme (PAA) is a key public policy for strengthening family farming, linking institutional food procurement, income generation in rural areas and the promotion of food and nutrition security. It connects to the bioeconomy by valuing sustainable production chains and the responsible use of sociobiodiversity. Beyond being a strategy capable of promoting resilient and sustainable food systems in the face of climate change—by encouraging diversified production and the circulation of fresh food from family farming—the PAA contributes to expanding food supply and stabilising domestic market prices. Since its relaunch and expansion in 2023, the programme has purchased and distributed more than 288,000 tonnes of food, totalling over BRL 1.89 billion in investments by the Government of Brazil. Between 2023 and 2025, 65 targeted calls were carried out for Indigenous Peoples, Quilombola communities, and traditional peoples and communities across 21 states of the Federation. The total allocated resources amounted to BRL 140.4 million, distributed as follows:

- **Calls for Indigenous Peoples:** 33 calls – BRL 82.7 million
- **Calls for Quilombola communities:** 23 calls – BRL 42 million
- **Calls for traditional peoples and communities:** 9 calls – BRL 15.7 million

Source: MDS; SGPR (adapted).

Box 6 – The National School Feeding Programme

National School Feeding Programme

The National School Feeding Programme (PNAE) is a Brazilian public school feeding policy that, by legal requirement, allocates at least 30 per cent of its resources to the purchase of food from family farming, benefiting Indigenous Peoples, Quilombola communities and local producers. This creates direct links between sustainable production and healthy school meals. The initiative "*Amazônia na Escola*: Healthy and Sustainable Food", structured through the Amazon Fund and implemented in partnership with the Brazilian Development Bank (BNDES), the National Fund for the Development of Education (FNDE), the Ministry of the Environment and Climate Change (MMA) and the Ministry of Agrarian Development and Family Farming (MDA), promotes the strengthening of sustainable production by family farming and sociobiodiversity through the procurement of food under the PNAE for public school networks in the Legal Amazon. This articulation contributes to the bioeconomy by integrating the sustainable use of sociobiodiverse resources—valuing innovative and sustainable production chains—with food security and income generation in traditional territories. By connecting school supply chains to sustainable local markets, "Amazônia na Escola" fosters a production and consumption cycle that reinforces conservation practices and regional development, aligned with bioeconomy principles in Brazil.

Source: Authors' elaboration.

2.2 Valorisation of the environmental and sociocultural services of Indigenous Peoples and Traditional Communities

Coordination: Ministry of the Environment and Climate Change

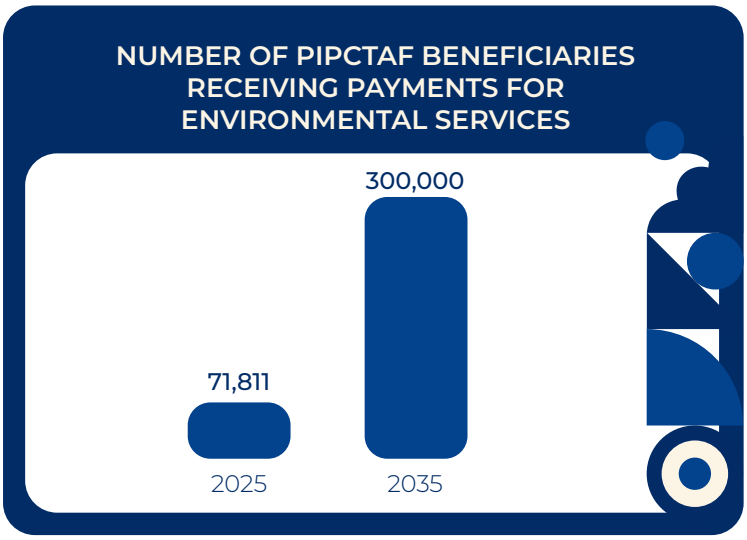
Mission 2

Recognise the central role of indigenous peoples, traditional communities, fishers and family farmers in the conservation and sustainable management of biodiversity and ecosystem restoration, ensuring rights and well-being , while valuing traditional knowledge, culture, ways of life and environmental services they provide in their territories.

TARGET 1:

To reach 300,000 beneficiaries among PIPCTAF receiving payments for environmental services provided by 2035

Chart 4 – Projection of PES beneficiaries in 2035

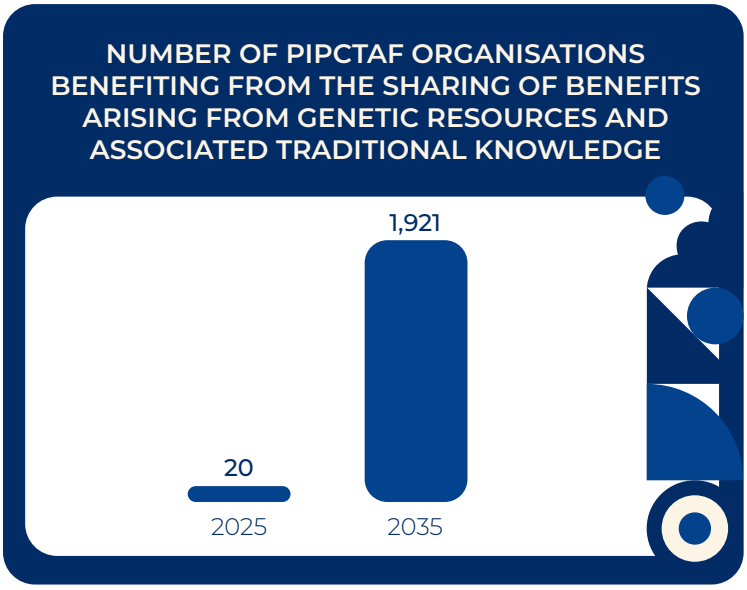


Source: Authors' elaboration based on data from Bolsa Verde Programme; Floresta+ Amazônia Project – Conservation modality.

TARGET 2:

To increase annually by 50 per cent the number of organisations of Indigenous Peoples, Traditional Peoples and Communities, and Family Farmers (PIPCTAF) benefiting from the sharing of benefits arising from genetic resources and associated traditional knowledge by 2035.

Chart 5 – Projection of the number of organisations benefiting from Access and Benefit-Sharing in 2035



Source: Authors' elaboration.

Of the 18 Strategic Actions under this Mission, the following stand out:

- To promote and enable public and private Payment for Environmental Services (PES) programmes with economic and operational sustainability, in order to ensure income for Indigenous Peoples, traditional peoples and communities, and family farmers, as well as conservation in their territories, through participatory processes.

- To promote the implementation of the instruments established under the Access and Benefit-Sharing Law (Law No. 13,123/2015) to ensure the rights of Indigenous Peoples, traditional peoples and communities, and family farmers, and to protect and value traditional knowledge associated with genetic resources, while strengthening oversight, transparency and social accountability measures.

- To promote access to basic infrastructure for Indigenous Peoples, traditional peoples and communities, and family farmer households in Sociobioeconomy Territories.

- To coordinate with public sector bodies and entities on systematic strategies and actions aimed at promoting citizen-centred public security and reducing rural violence, with particular focus on areas recognised or claimed as Conservation Units, Indigenous Lands, Quilombola Territories, other categories of territories and coastal–marine territories.

- To develop and promote Community-Based Tourism routes in territories of Indigenous Peoples, traditional peoples and communities, and family farmers through qualified technical support and advisory services, as well as public and private financial incentives.

Actions under implementation

Box 7 – Payment for Environmental Services (PES) for managed pirarucu in Amazonas

PES for Managed Pirarucu in Amazonas

The MMA, in partnership with the Brazilian Institute of Environment and Renewable Natural Resources (IBAMA), the National Supply Company (CONAB) and the UNDP Floresta + Amazônia project, has created the first Payment for Environmental Services (PES) programme focused on community-based management of pirarucu fish in the state of Amazonas. The initiative recognises and remunerates the work of communities that conserve and manage Amazonian territories and waters, covering both community monitoring activities and the volume of pirarucu (*Arapaima spp.*) commercialised. These include:

5,500 beneficiaries

+20 million hectares covered

60 community organisations in **41** protected areas

Community managers monitor more than **2,500** aquatic environments and more than **1.2 million** pirarucu annually

With an investment of approximately BRL 15 million by 2028, the initiative is expected to reach at least 80 per cent of community managers and increase average individual income by around 40 per cent. Programmes for other sociobiodiversity value chains are already being developed, expanding the model beyond pirarucu.

Source: Authors' elaboration.

Box 8 – *Bolsa Verde* Programme

Bolsa Verde Programme

Bolsa Verde is an MMA programme that links income transfers with environmental conservation, targeting families in situations of vulnerability who live in conservation units and in territories of Indigenous Peoples and traditional communities. The programme provides financial incentives to families that adopt practices for the protection and sustainable use of natural resources, recognising the leadership of local communities in biodiversity conservation and promoting economic growth through the valorisation of biodiversity and innovation in sustainable value chains. It currently reaches around 70,000 beneficiaries through quarterly payments. The expectation is to double the number of beneficiary families by 2026, increasing the programme's socio-environmental reach and strengthening sociobioeconomy territories, with a direct contribution to the PNDBio target of increasing the number of beneficiaries of Payments for Environmental Services.

Source: Authors' elaboration based on MMA (2026).

Box 9 – ARPA Comunidades Programme

ARPA Comunidades

ARPA Comunidades is a new phase of the Amazon Protected Areas Programme (ARPA), launched by the federal government during COP30 to strengthen conservation and sustainable development in the Amazon biome. The initiative has a 15-year timeframe (2025–2039) and will benefit approximately 130,000 people living in 60 Sustainable Use Conservation Units, covering around 23.7 million hectares of forest. The programme will mobilise more than USD 120 million in donations to invest in sociobioeconomy value chains, local job and income generation, and to ensure access to electricity and connectivity for thousands of people. It is managed by the Ministry of the Environment and Climate Change, in partnership with organisations such as WWF-Brazil, the German development bank KfW and the Brazilian Biodiversity Fund (FUNBIO). By combining environmental protection with local development—giving particular attention to women and young people—ARPA Comunidades improves access to public services and serves as a key instrument for the implementation of the PNDBIO.

Source: Authors' elaboration.

2.3 Bioeconomy of terrestrial and aquatic ecosystems

Coordination: Ministry of the Environment and Climate Change

Mission 8

To develop the economy of terrestrial and aquatic ecosystems through the integration of value chains related to native vegetation recovery, productive restoration, forest concessions and management, as well as sustainable ecotourism in Conservation Units.

TARGET 1:

To achieve 2.3 million hectares of native vegetation under restoration, integrated into bioeconomy value chains, by 2035

TARGET 2:

To consolidate 30 Restoration Territories as bioeconomy hubs by 2035

TARGET 3:

To implement the delegation of visitor support services in 60 Conservation Units by 2035, integrating visitation and tourism in these areas with local and regional sustainable development

TARGET 4:

To increase the area of forests under sustainable forest management concessions to 5.28 million hectares of federal public forests by 2035.

Of the 24 Strategic Actions under this Mission, the following stand out:

- To integrate Restoration Territories through Sociobioeconomy Development Hubs, recognising them as living laboratories for innovation and territorial investment.

- Structure the value chain for inputs and products derived from agroforestry systems, promoting the establishment of family agro-industries, fair and solidarity-based marketing channels, and sustainable public procurement mechanisms.

- To establish partnerships with public and private institutions to promote sustainable tourism in areas surrounding Conservation Units, supporting infrastructure initiatives, professional training, itinerary development and the joint promotion of regional tourism destinations.

- To develop the delegation of visitor support systems in Conservation Units within the National System of Conservation Units (SNUC), accelerating the implementation of priority projects with forest and aquatic routes, visitor guidance services, low-impact visitor support infrastructure, and gastronomy associated with sociobiodiversity.

- To establish RedeTrilhas as the backbone of tourism routes in natural and rural environments, expanding long-distance trails and connectivity between Conservation Units, traditional territories and local communities, as a strategy for sustainable tourism development and landscape connectivity.

Box 10 – *Natureza com as Pessoas* Programme

Natureza com as Pessoas Programme

The Natureza com as Pessoas (Nature with People) Programme, implemented by the Chico Mendes Institute for Biodiversity Conservation (ICMBio), is an initiative aimed at integrating environmental conservation with the recognition and valorisation of communities that live in or are connected to protected areas. The programme seeks to strengthen the participatory management of the National System of Nature Conservation Units (SNUC), promoting the engagement of Indigenous Peoples, traditional communities and local populations in biodiversity protection. Its objectives include promoting sustainable activities, supporting sociobiodiversity value chains and expanding income-generating opportunities linked to conservation. The initiative also advances environmental education, community-based tourism and the valorisation of traditional knowledge. By recognising communities as strategic partners in conservation, the programme seeks to reconcile environmental protection with sustainable territorial development. In this regard, it contributes to the implementation of public policies that integrate biodiversity conservation, social inclusion and the bioeconomy. The programme also strengthens participatory governance mechanisms in federal conservation units. In doing so, ICMBio aims to consolidate a management model that integrates nature, culture and local development.

Source: ICMBIO (2026), adapted.

2.4 Health and well-being

Coordination: Ministry of Development, Industry, Trade and Services

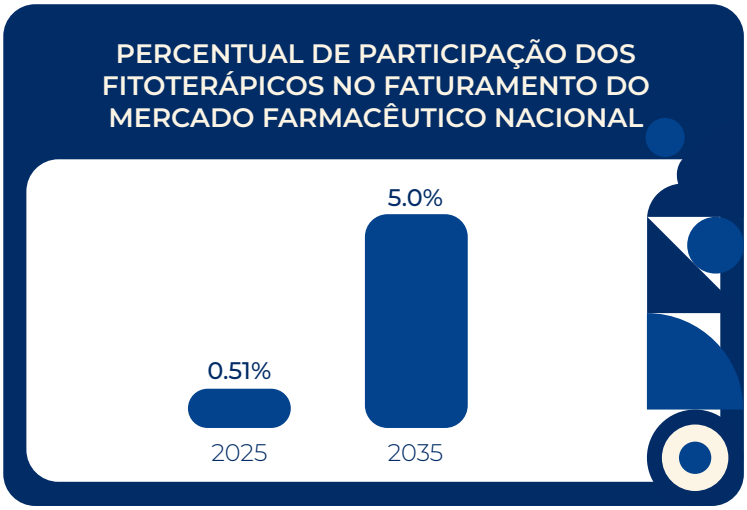
Mission 3

To promote health and well-being through innovation and by increasing national production capacity for bio-based inputs and products, prioritising Brazil's genetic heritage, ensuring supply security and supporting its sustainable use.

TARGET 1:

To increase the share of phytotherapeutics manufactured in Brazil to 5 per cent of total national pharmaceutical market revenue by 2035

Chart 6 – Projection of the percentage share of phytotherapeutics in the pharmaceutical market in 2035

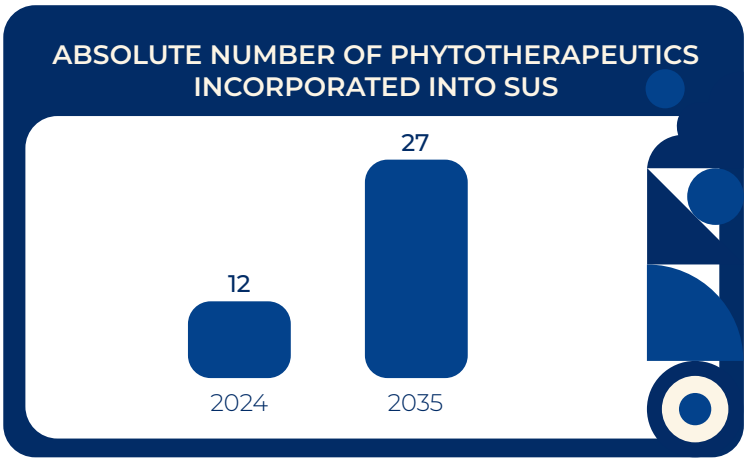


Source: CMED/ANVISA – Trade Report (Adapted).

TARGET 2:

To incorporate 15 new phytotherapeutics into the Unified Health System (SUS) at the federal level, manufactured in Brazil with plant-based Active Pharmaceutical Ingredients (IFAVs) and raw materials produced in the country, with 10 of these phytotherapeutics containing at least one IFAV derived from a native species, by 2035

Chart 7 – Projection of the number of phytotherapeutics incorporated into SUS

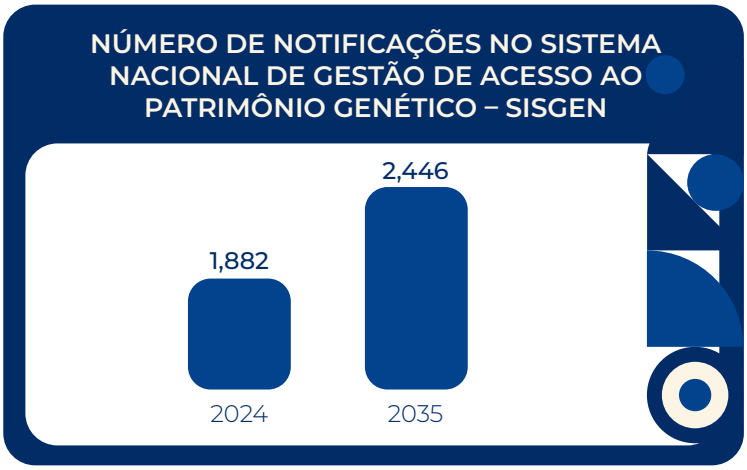


Source: National List of Essential Medicines (Rename).

TARGET 3:

To increase annually by 30 per cent the number of unique notifications per year of cosmetics, supplements, and medicines produced with IFAVs based on national sociobiodiversity, in the Genetic Heritage Management System (SISGEN) by 2035.

Chart 8 – Projection of the number of notifications of cosmetics and supplements in SISGEN by 2035



Source: MMA, SISGEN (2026) — adapted.

Of the 24 Strategic Actions under this mission, the following stand out:

- To promote the implementation of Living Pharmacies (Farmácias Vivas) and establish them as reference centres capable of providing technical training, capacity-building for health professionals, technical assistance, rural and agroindustrial extension, quality control, and the supply of propagative materials with traceability and botanical identification.

- To propose and implement solutions to reduce research gaps in IFAVs strategic to the health and well-being sector, spanning from agronomic techniques to safety, efficacy and quality stages, as well as economic and translational assessments, thereby informing actions, guiding the allocation of financial resources and supporting investments aimed at the development of value chains.

- To promote scientific exchange and cooperation between scientific, technological, innovation and educational institutions related to value chains of products, inputs, ingredients and raw materials for herbal health products, prioritising, at the international level, partnerships with countries that advance the sustainable use of traditional medicines associated with biodiversity.

- To promote actions that foster innovation in herbal products for health and well-being within universities and research institutes, prioritising those of interest to the SUS, with a view to advancing the technological and clinical maturity of these products.

- To support and propose certification mechanisms for producers, products and processes involving medicinal plants and raw materials for the herbal products industry, with a view to meeting sanitary and market requirements related to sustainability, good production practices, traceability of origin and decent work.

Box 11 – Traceability of biological inputs

Reference Laboratory at Inmetro for the Quality and Traceability of Biological Inputs of Interest to the Bioindustry

The project contributes to strengthening quality infrastructure applied to the biological sciences by developing national capacities in biological metrology and supporting the validation of analytical methods and industrial processes, with a view to enhancing the competitiveness of the Brazilian bioindustry in international markets. The establishment of the Reference Laboratory at Inmetro is an initiative led by the MDIC, in coordination with the National Congress, to secure the necessary budget.

The project is part of the National Programme for a Bioindustry Based on Renewable Inputs and Advanced Materials, enabling the development of new products and processes for the bioindustry while ensuring traceability, commercial credibility and the recognition of national and international certifications.

Source: Authors' elaboration.

Box 12 – PDFITO

Development Project for Value Chains of Medicinal Plants, Phytotherapeutics and Other Herbal Health Products (PDFITO)

Published as Cooperation Agreement No. 7 of 2024, signed between MDIC, MDA and the Banco do Brasil Foundation (BB), with a budget of BRL 12 million, the initiative foresees the purchase of machinery and equipment, training of teams from *Farmácias Vivas* and surrounding family farmers, agro-industrial technical assistance, provision of certified seedlings, and support for access to national and international markets. Based on the Farmácia Viva model from Jardinópolis—recognised as an innovation reference by the Pan American Health Organization—the project will transfer technology and knowledge to Farmácia Viva teams in other Brazilian municipalities. The objective is to transform the approximately 100 *Farmácias Vivas* in the country into hubs that strengthen productive capacity and quality standards, enabling the industrial scaling of raw material production for the health sector.

Source: Authors' elaboration.

Box 13 – Pilot Project for the identification of chemical markers

Medicinal Plants from Biodiversity

The MDIC, in partnership with Inmetro, is implementing a pilot project to develop and validate methodologies for the analysis and standardisation of quality for medicinal plants of Brazilian biodiversity, based on the identification of chemical markers for new health products. The initiative contributes to the mission of promoting health and well-being through innovation and the strengthening of national capacity for the production of bio-based inputs and products, valuing Brazil's genetic heritage, under the PNDBio. Scheduled for completion in December 2026, the project includes a bibliographic review and the development of a chemical database.

Source: Authors' elaboration.

Box 14 – Phytotherapeutic derived from *Phyllanthus niruri* (Stonebreaker)

Brazil to develop innovative stonebreaker phytotherapeutic

In May 2026, the pilot batch of the first medicine produced by Fiocruz from Phyllanthus niruri (stonebreaker), traditionally used to support the treatment of urinary disorders, will be delivered.

The partnership between the Ministry of the Environment and Climate Change (MMA), UNDP and Fiocruz enables the production of a medicine for the Unified Health System (SUS), based on Brazilian biodiversity and associated traditional knowledge. The set of activities mobilises BRL 2.4 million for machinery adaptation, equipment and inputs procurement, service contracting, technical visits and laboratory studies—resources from the Phytotherapeutics project, implemented by UNDP with funding from the Global Environment Facility (GEF) and technical coordination by MMA.

The development of the new drug included the process of obtaining prior informed consent from the Articulation of Indigenous Peoples and Organisations of the Northeast, Minas Gerais and Espírito Santo (APOINME), holders of the associated traditional knowledge (ATK).

Through this initiative, the SUS is expected to act as a strategic driver of Brazil's bioeconomy by leveraging its significant purchasing power and infrastructure to demand biodiversity-based inputs, thereby expanding the share of Brazilian bioactive compounds in the biotechnology and health markets, while respecting the rights of Indigenous Peoples and Traditional Communities.

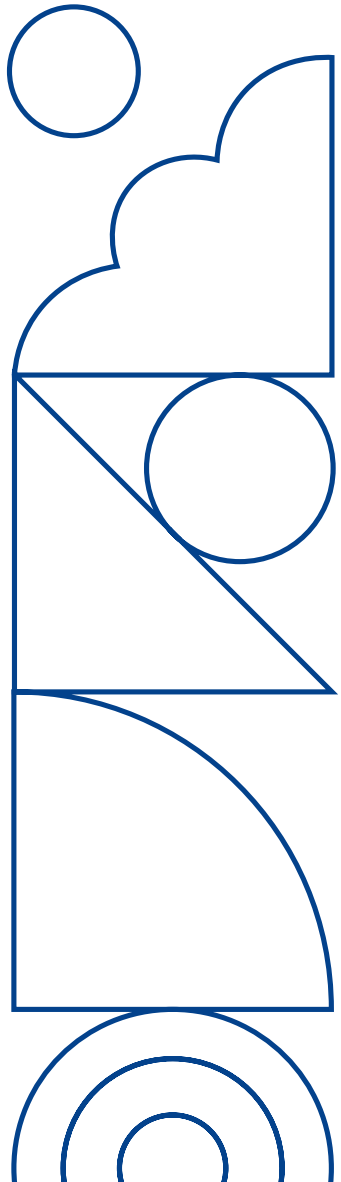
Source: Authors' elaboration.

2.5 Full utilisation of biomass and its circularity

Coordination: Ministry of Development, Industry, Trade and Services

Mission 4

To promote biotechnology and the processing value chains of biomass from Brazil's agricultural and extractive sectors, for the generation of sustainable bioproducts through biorefining in rural establishments, producer associations and cooperatives, thereby increasing value addition and enabling the full use of biomass.



TARGET 1:

To implement 10 new technological packages for biorefining processes or products at commercial-scale technological readiness, increasing value addition in biomass use, by 2035.

TARGET 2:

To establish biorefining units for the production of sustainable non-energy bioproducts in at least 20 per cent of agricultural or extractive cooperatives producing plant and animal-based goods, by 2035.

Of the 24 Strategic Actions under this mission, the following stand out:

- To develop diagnostics to map the availability of different biomass sources and potential technological pathways for producing bioproducts and bioprocesses for small- and medium-scale biorefining in rural properties, to inform public policy design.
- To establish a structuring programme and dedicated sectoral funds within the National Fund for Scientific and Technological Development (FNDCT) to support the development of bioproduct production derived from biorefining across biome-based value chains.
- To support incubation and acceleration processes for enterprises, small businesses and cooperatives focused on the development of biofactories and biorefineries.
- To promote the establishment of biorefineries integrated into sustainable value chains, focusing on regions with greater economic potential and feedstock availability, through tax incentives, guarantee funds and credit lines tailored to the regional characteristics of enterprises and cooperatives.
- To strengthen the innovation ecosystem in biotechnology and biomass processing through an integrated plan and financial, technical and regulatory support across different stakeholders, including cooperatives, enterprises, research institutions, governments, investors, infrastructure, consumer markets and collaborative networks.

Box 15 – Sustainable public procurement

Sustainable Public Procurement

With the aim of expanding the use of renewable biochemicals in Brazil's industrial sector, a resolution by the Interministerial Commission on Sustainable Public Procurement will establish preference margins in public procurement for manufactured products that use basic chemical bioinputs derived from domestically produced renewable raw materials. The initiative promotes the use of renewable biochemicals and their progressive integration into production processes in petrochemical, chemical and refining industrial complexes, contributing to reducing dependence on fossil-based inputs. Currently under implementation, the MDIC is developing, in partnership with the MGI and the MF, the regulatory framework for a pilot project that will allow the application of preference margins in public procurement for plastic and rubber products manufactured with sustainable chemical inputs. This will provide a competitive advantage in public procurement for companies that meet innovation and sustainability criteria. In the medium term, the measure is expected to foster sustainable solutions across multiple sectors, expanding the integration of the bioeconomy into Brazil's industrial base.

Source: Authors' elaboration.

Box 16 – Brazil Showcase for Rural and Forest Bioindustry

Brazil Showcase for Rural and Forest Bioindustry

This is a digital platform (*Vitrine Brasil*) with interactive dashboards integrating national data, georeferenced maps and management reports on residual biomass, socio-economic actors and technological pathways. The platform will provide information focused on the implementation of biorefineries and technological packages for biorefining processes or products, aimed at transforming waste into high value-added inputs. The proposal is to make available, by 2027, a strategic tool to be used by different public and private sector actors. This initiative, led by the MDIC in partnership with SENAI, MDA, SEBRAE and OCB, enables intelligent management of waste from agricultural and extractive value chains, and strengthens Brazil's bioindustry while enhancing the value of natural resources.

Source: Authors' elaboration.

Box 17 – Amazon Biorefinery Network

The MDIC and FINEP-led Amazon Biorefinery Network is a project aimed at consolidating a network of research institutes in Brazil to promote sustainable bioeconomy development in the Amazon through innovative biorefinery solutions. The initiative fosters the creation of R&D&I centres of excellence and supports actions that reduce technical bottlenecks in bioproduct manufacturing, with a focus on valorising Amazonian biodiversity. With an investment of BRL 15 million, the project will develop laboratory proof-of-concept solutions by 2028 for the valorisation of residues from cassava, curauá, babassu and açaí, involving research institutions and local communities. The initiative seeks to strengthen the bioeconomy in the Amazon by promoting local development and biodiversity conservation, while also identifying pathways for the future technological development of pilot-scale model micro-biorefinery systems.

Source: Authors' elaboration.

Box 18 – Coopera+ Amazônia Project

Coopera+ Amazônia Project

The main objective of the Coopera+ Amazônia Project is to modernise the production and management processes of 50 cooperatives in the Legal Amazon. The initiative includes production modernisation consultancy services, the purchase of machinery and equipment, training and technical assistance, and management innovation. It aims to integrate rural producers and cooperatives into sustainable supply chains, promoting value addition and the full use of biomass from established value chains such as *açaí, cupuaçu*, Brazil nuts and babassu. The project was announced by the MDIC, BNDES and SEBRAE during COP30. It has an investment of BRL 112 million from the Amazon Fund and is expected to reach approximately 9,300 families across five states. Its activities are aligned with other government initiatives, including business matchmaking rounds for Amazon products led by ApexBrasil and the Amazon Bioeconomy Centre (CBA), the Coopera+ Brasil Programme of the MDA, and the development of the Brazil Showcase for Rural and Forest Bioindustry.

Source: Authors' elaboration.

2.6 Biochemistry of renewables

Coordination: Ministry of Development, Industry, Trade and Services

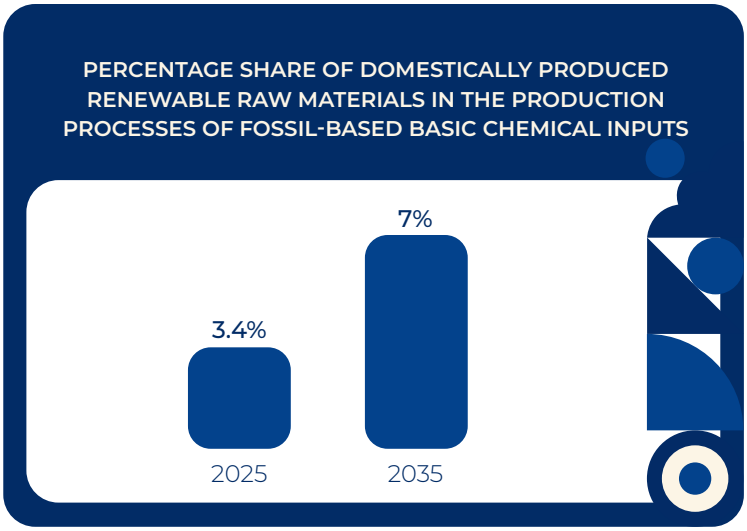
Mission 5

To promote **biochemistry of renewables** and its progressive integration into the production processes of petrochemical, chemical, refining, and pulp and paper industrial complexes, expanding the sustainable production of bioproducts and biofuels and contributing to the reduction of fossil-based feedstock use.

TARGET 1:

To increase to 7 per cent the share of installed capacity for the production of non-energy and non-food basic chemical inputs derived from domestically produced renewable raw materials in petrochemical, chemical and refining industrial complexes by 2035.

Chart 9 – Projection of the share of renewable raw materials in the production processes of fossil-based chemical inputs in 2035

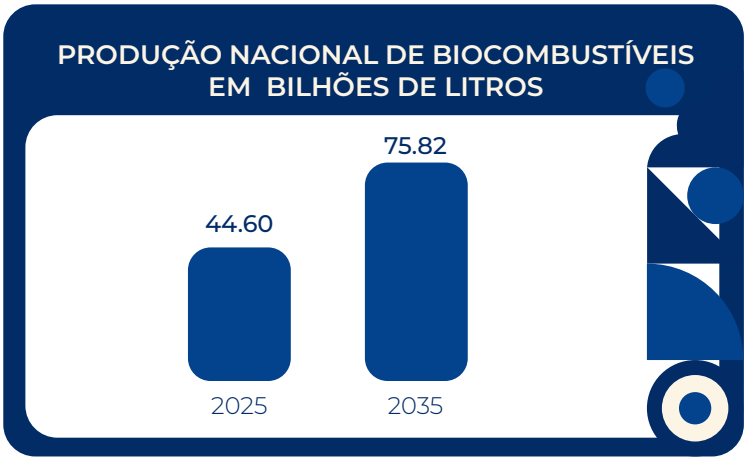


Source: ABIQUIM (2025); Authors' elaboration.

TARGET 2:

Increase the national production of biofuels by 70 per cent by 2035.

Chart 10 – Projection of the national production of biofuels by 2035



Source: Authors' elaboration based on the National Energy Balance (BEN).

Of the 36 Strategic Actions under this mission, the following stand out:

- To develop diagnostics to map the availability of different biomass sources and potential technological pathways for the production of bioproducts and bioprocesses for small- and medium-scale biorefining in rural properties, to inform public policy design.
- To establish a structuring programme and dedicated sectoral fund within the National Fund for Scientific and Technological Development (FNDCT) to support the development of bioproduct production derived from biorefining across biome-based value chains.
- To support incubation and acceleration processes for companies, small businesses and cooperatives, with a focus on developing biofactories and biorefineries.
- To promote the establishment of biorefineries integrated into sustainable value chains, focusing on regions with greater economic potential and feedstock availability, through tax incentives, guarantee funds and credit lines tailored to the regional characteristics of enterprises and cooperatives.
- To strengthen the innovation ecosystem in biotechnology and biomass processing through an integrated plan and financial, technical and regulatory support across different stakeholders, including cooperatives, enterprises, research institutions, governments, investors, infrastructure, consumer markets and collaborative networks.

Box 19 – National biofuel policy

Renovabio – National Biofuel Policy

Brazil's biofuels policy is one of the main instruments of the national bioeconomy, using agricultural biomass and organic waste for energy production, and linking technological innovation, environmental sustainability and income generation in rural areas. Brazil leads the global energy transition with one of the cleanest transport matrices in the world, supported by mandatory blends of 30 per cent ethanol (E30) and 15 per cent biodiesel (B15), as well as an 85 per cent flex-fuel vehicle fleet. The National Biofuels Policy (RenovaBio) establishes decarbonisation targets and certifies producers based on life-cycle analysis and verification that production does not occur on land deforested after the programme's establishment, strengthening the environmental credibility of Brazilian biofuels. The Fuel of the Future regulatory framework has expanded this strategy by integrating different policies for sustainable mobility and energy innovation, while promoting new technological pathways such as biomethane, renewable diesel and sustainable aviation fuel.

Source: Authors' elaboration.

Box 20 – Socio Biofuel Seal

Socio Biofuel Seal

The Social Biofuel Seal is a public policy instrument aimed at promoting the productive inclusion of family farming in the biodiesel supply chain and supporting regional development. It is granted to biodiesel producers that purchase feedstocks from family farming and socio-biodiversity systems, and that provide technical assistance and support to production chains. In return, it grants tax benefits and preferential access to markets, with up to 80 per cent of biodiesel destined for the mandatory blend supplied by certified units.

Following CNPE Resolution No. 3/2023, the Seal was restructured to expand productive inclusion and strengthen Brazil's North, Northeast and Semi-arid regions, through the definition of minimum regional participation targets, increasing progressively from 10 per cent in 2024 to 20 per cent from 2026 onwards. Between 2022 and 2024, the volume of raw materials purchased from family farming increased from 1.93 to 2.89 billion kg, with expenditures exceeding BRL 6.5 billion. Over the same period, participation from the North and Northeast regions expanded significantly, with growth of around 22 per cent in the Northeast and over 850 per cent in the North, alongside greater diversification of production chains, including Brazilian sociobiodiversity products.

The gradual increase in targets for these structurally vulnerable regions, combined with the expanded mandatory use of biodiesel under the Fuel of the Future Law, indicates strong potential for further growth in productive inclusion, increased investment in family farming, and the consolidation of new production arrangements, particularly in the North, Northeast and Semi-arid regions.

Source: MDA and MME (adapted).

2.7 Production of sustainable biomass

Coordination: Ministry of Agriculture and Livestock

Mission 6

To promote the sustainable intensification of biomass production to meet demand for bioenergy, bioproducts and food, significantly reducing net greenhouse gas emissions per unit of output in line with the targets of the Climate Plan, while contributing to job and income generation, the recovery of degraded areas and productive restoration, and avoiding the conversion of native vegetation.

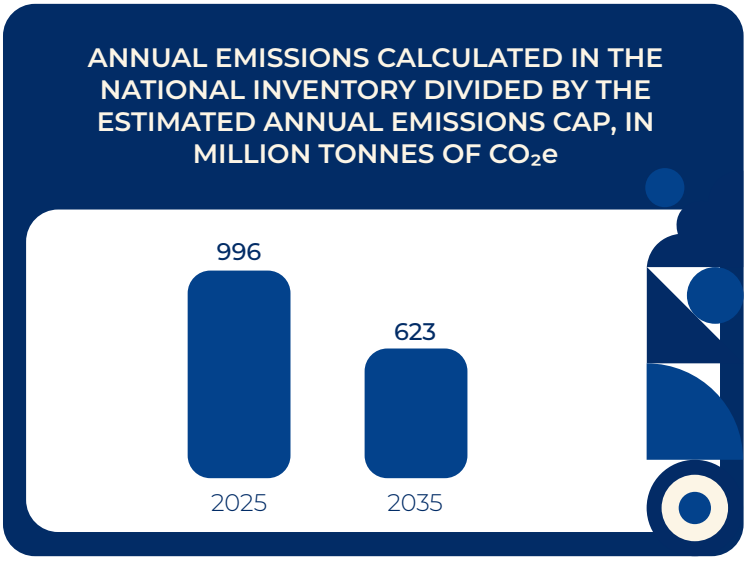
TARGET 1:

To increase biomass production and use by raising productivity by 20 per cent above projections by the Ministry of Agriculture and Livestock (MAPA) by 2035, considering the dimensions of sustainable production intensification and the specific demands of the biofuels, bioproducts and food sectors.

TARGET 2:

To reduce net CO2-equivalent emissions between 43.3 per cent and 37.5 per cent relative to the projected annual emissions estimated in the Climate Plan for biomass production processes and land-use change in private areas, by 2035, through sustainable practices.

Chart 11 – Projection of CO_2 emission reductions by 2035



Source: Authors' elaboration.

TARGET 3:

To restore 12.5 million hectares of degraded areas through sustainable biomass production for bioindustry, by 2035.

Of the 18 Strategic Actions under this mission, the following stand out:

- To implement mechanisms for the traceability and certification of biomass, including data integration and interoperability as components of qualification and accreditation services within the Agro Brasil + Sustainable Platform.

- To invest in and promote the development and interaction of innovation environments in agriculture, livestock, aquaculture and forestry, as well as other sustainable terrestrial and aquatic ecosystems, to support sustainable production intensification, generate new technologies, products, equipment, processes and services, reduce costs, increase efficiency and sustainability, and develop technologies for climate change adaptation and emissions reduction.

- To support, promote and expand agroforestry systems, Integrated Crop–Livestock–Forestry (ICLF) systems, silviculture of native and exotic species, productive regeneration, and forest management—including community-based management and concessions—among other timber and non-timber forest systems, as well as other terrestrial and aquatic ecosystems, while promoting the use of sustainable practices.

- To develop and implement incentive policies for the conversion of degraded areas into sustainable production systems, through the provision of financing lines, capacity-building and other support measures.

- To coordinate federal public policies related to the bioeconomy, expanding their reach and socio-economic impact in biomass production.

Box 21 – Agro Brasil + Sustentável Programme

Agro Brasil + Sustentável Programme

The Agro Brasil + Sustentável Programme promotes compliance of agricultural production with national legislation and verifies the application of good agricultural practices, enabling the traceability and certification of the entire value chain. The PNDBio complements these efforts with strategic actions focused on traceability and certification in biomass production—one of the pillars for ensuring the socio-environmental integrity of bioeconomy value chains. To this end, it will use the AB+S digital platform to integrate data from official databases of public and private institutions, generating traceable and reliable information on sustainable agricultural production in Brazil. As a concrete incentive, certified producers may request from financial institutions a 0.5 per cent reduction in interest rates on working capital credit under the Plano Safra, in accordance with CMN Resolution No. 5,152/2024—linking environmental sustainability to direct economic benefits for producers.

Source: MAPA (2026) – adapted.

2.8 Biomass diversification

Coordination: Ministry of Agriculture and Livestock

Mission 7

To promote the sustainable intensification of biomass production to meet demand for bioenergy, bioproducts and food, significantly reducing net greenhouse gas emissions per unit of output, in line with the targets of the Climate Plan, while contributing to job and income generation, the recovery of degraded areas and productive restoration, and ensuring that no conversion of native vegetation occurs.

TARGET 1:

To expand the area cultivated with new species that are not part of major commodity crops—preferably native to Brazilian biodiversity—to diversify species used in biomass production for bioenergy and bioproducts in Brazil by 20 per cent by 2035.

TARGET 2:

To expand the area cultivated with new species that are not part of major commodity crops, including those from Brazilian biodiversity, in order to diversify species used in biomass production for food in Brazil by 20 per cent by 2035.

Of the 12 Strategic Actions under this mission, the following stand out:

- To promote genetic improvement programmes to diversify species for biomass production and expand the availability of cultivars, taking into account adaptation to Brazil's different biomes, resilience to climate change, and contributions to food, nutrition and energy security, while also valuing the traditional knowledge of Indigenous Peoples, traditional peoples and communities, and family farmers.

- To strengthen germplasm networks, with an emphasis on native, creole and local species, through support for active germplasm banks, the establishment and strengthening of community seed and seedling banks, participatory breeding programmes, and conservation and propagation initiatives, while valuing the traditional knowledge of Indigenous Peoples, traditional peoples and communities, and family farmers.

- To structure initiatives and biomass networks for bioenergy and bioproducts within national programmes for the conservation and sustainable use of genetic resources for food and agriculture, under the RGen+ Sustainable Policy (Decree No. 12,097/2024).

- To develop and implement strategies to expand resources for research, development and innovation in new biomass sources, focusing on bottlenecks and benefits across production, processing, and the expansion of technological pathways and applications in the bioindustry.

- To improve financial instruments and incentives for producers of biomass that are not yet widely used or are emerging.

Box 22 – Rgen+Sustentável

Rgen+Sustentável

The PNDBio is aligned with the National Policy for the Conservation and Sustainable Use of Genetic Resources for Food, Agriculture and Livestock—RGen+ Sustainable, established by Decree No. 12,097/2024—to ensure the diversification of biomass sources and strengthen national genetic improvement programmes with a focus on food and energy security. To this end, it mobilises implementation instruments such as the National Information System on Genetic Resources, the National Network of Genetic Resources, and National Genetic Resources Conservation Programmes. The policy on genetic resources conservation and biomass diversification under RGen+ Sustainable is integrated with instruments of the Biodiversity Law, such as the National System for the Management of Genetic Heritage and Associated Traditional Knowledge (SisGen) and the National Benefit-Sharing Programme (PNRB).

Source: MAPA (2026), adapted.



Chapter 3

CROSS-CUTTING STRATEGIES FOR BIOECONOMY DEVELOPMENT

3. CROSS-CUTTING STRATEGIES FOR BIOECONOMY DEVELOPMENT

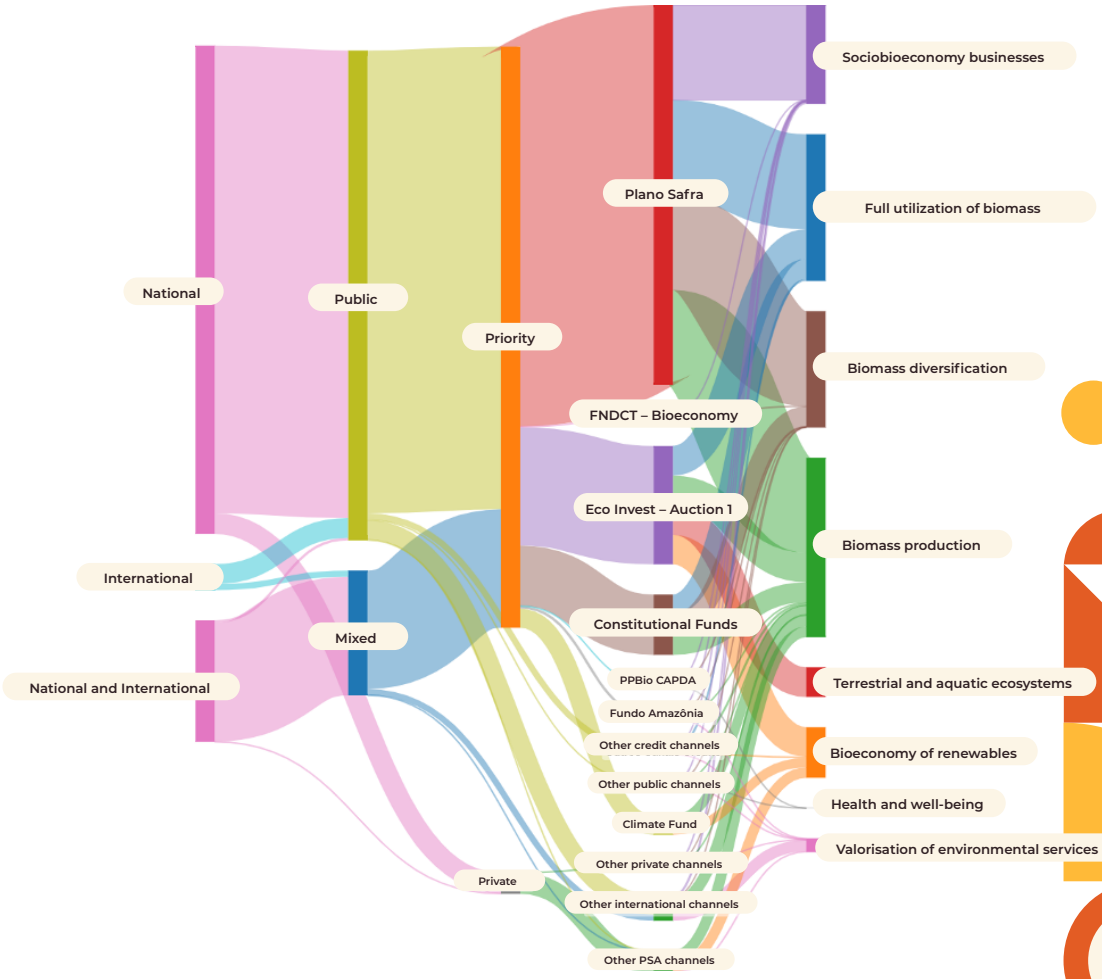
3.1 Financing

The PNDBio financing strategy aims to mobilise, direct and scale resources to ensure the Plan's financial sustainability through to 2035. The convergence of climate, industrial and sustainable development agendas, reflected in key policy frameworks such as the Climate Plan and Ecological Transformation Plan (PTE), Nova Indústria Brasil (NIB), the National Biodiversity Strategy and Action Plan (NBSAP), and the National Bioeconomy Strategy (ENBio), expands the political and institutional space to channel resources towards key sectors of the low-carbon economy.



However, the absence of a unified taxonomy in the financial market still limits the ability to track resources and accurately assess capital gaps. In response to this challenge, efforts were made to map the current landscape as a baseline to guide the PNDBio. A total of 70 channels with the potential to finance the bioeconomy were identified, mobilising approximately BRL 238 billion in 2024. Of this total, 62.4 per cent is allocated to channels only "related" to the bioeconomy, with capital that is predominantly public (99 per cent) and domestic (94 per cent). The "exclusive/specific" channels, which account for 37.6 per cent of the total, have a more mixed profile and attract greater international participation. The analysis also reveals a strong dependence on traditional credit mechanisms, with the Plano Safra alone accounting for 65.4 per cent of resources among priority channels.

Figure 6 – Distribution of capital mobilised in 2024 by origin



Source: Ministry of Finance (2026).

The integrated analysis of PNDBio financing flows, summarised in the Sankey Diagram (figure above), allows for a structured visualisation of how capital potentially associated with the bioeconomy is organised—from its origin (domestic, international or combined), through the nature of the source (public, mixed or private), and across financial channels—both priority and non-priority—until it reaches the Plan's missions. Figure 6 shows that some missions are more strongly funded—namely the full use of biomass, biomass production and biomass diversification—while others receive comparatively less funding, including the valorisation of environmental services, health and well-being, and the bioeconomy of terrestrial and aquatic ecosystems. This highlights where institutional efforts to allocate capital across the Plan's missions should be strengthened.



Ronaldo Rosa (EMBRAPA)

In other words, the capital exists, but it is diffuse. Brazil already mobilises hundreds of billions of reais that could contribute to the bioeconomy; however, most of these resources still lack clear thematic classification, integration across instruments and robust traceability mechanisms. This diagnosis highlights the need to diversify funding sources, attract private capital for scaling phases, and develop catalytic instruments for risk mitigation.

Box 23 – Targets to address bioeconomy financing bottlenecks

Financing bottlenecks will initially be addressed through three aspirational targets:

1. To leverage the instruments of the Ecological Transformation Plan (PTE)—such as the regulated carbon market, Payments for Environmental Services (PES), the Brazilian Sustainable Taxonomy (TSB) and the Brazil Climate Investment Platform (BIP)—so that they operate in alignment with bioeconomy priorities.

2. To expand the capacity to mobilise and align capital across existing priority channels (such as EcoInvest, the Bioeconomy Priority Programme (PPBIO), the Amazon Fund, the Climate Fund, the FNDCT, Constitutional Funds and the Plano Safra), strengthening the ecosystem to direct resources towards initiatives with additionality and scale.

3. To explore the creation of new channels and institutional arrangements to structure hybrid financial mechanisms (blended finance), guarantee funds (first-loss capital) and thematic bonds to catalyse private investment and mitigate risks.

Source: Ministry of Finance (2026).

Despite the pathway outlined, the full consolidation of the bioeconomy will require financing analyses to go beyond the sociobioeconomy and encompass the biomass and bioindustry missions, which demand greater capital intensity and production scale. It is important to deepen dialogue with the private sector to better understand risk perceptions and remove regulatory barriers, as well as to define explicit financing targets by mission, enabling a strategic alignment between funding demand and the potential supply of capital in Brazil.

Box 24 – Eco Invest Brasil Programme

Eco Invest Brasil Programme – an innovative instrument supporting the PNDBio

Among the innovative financial instruments supporting the PNDBio, the Eco Invest Brasil Programme stands out. Established by Law No. 14,995 of 10 October 2024, it forms part of the Ecological Transformation Plan coordinated by the Ministry of Finance and aims to promote sustainable development and stimulate investment in the economy, contributing to the reduction of social inequalities.

The Eco Invest Brasil Programme aims to catalyse sustainable private investment and attract international capital for long-term projects. It offers instruments to mitigate foreign exchange volatility and provides public credit lines on attractive terms to leverage both domestic and international private investment. The initiative primarily supports projects related to the energy transition, the bioeconomy, the circular economy, green infrastructure and climate adaptation.

With four auctions already held—the first in 2024 and the others in 2025—particular attention should be given to Auction No. 4/2025, launched during COP30 and currently under way. It aims to mobilise domestic and international private capital for sustainable projects in the bioeconomy (including sociobioeconomy, productive restoration, timber and non-timber forest management, and bioindustrialisation), sustainable tourism (including ecotourism in Conservation Units and parks, and community-based tourism), as well as enabling, waterway and port infrastructure. Sustainable bioeconomy and tourism projects may be implemented across the national territory, with a minimum allocation of 25 per cent to the Legal Amazon, while infrastructure projects must be carried out exclusively in the Legal Amazon.

The first three auctions of the Eco Invest Brasil Programme signal total investments of approximately BRL 127.6 billion, with a substantial volume of additional resources expected to be leveraged through the fourth auction.

Source: Ministry of Finance, National Treasury Secretariat (2026).

3.2 Bioeconomy and the National System of Science, Technology and Innovation (SNCTI)

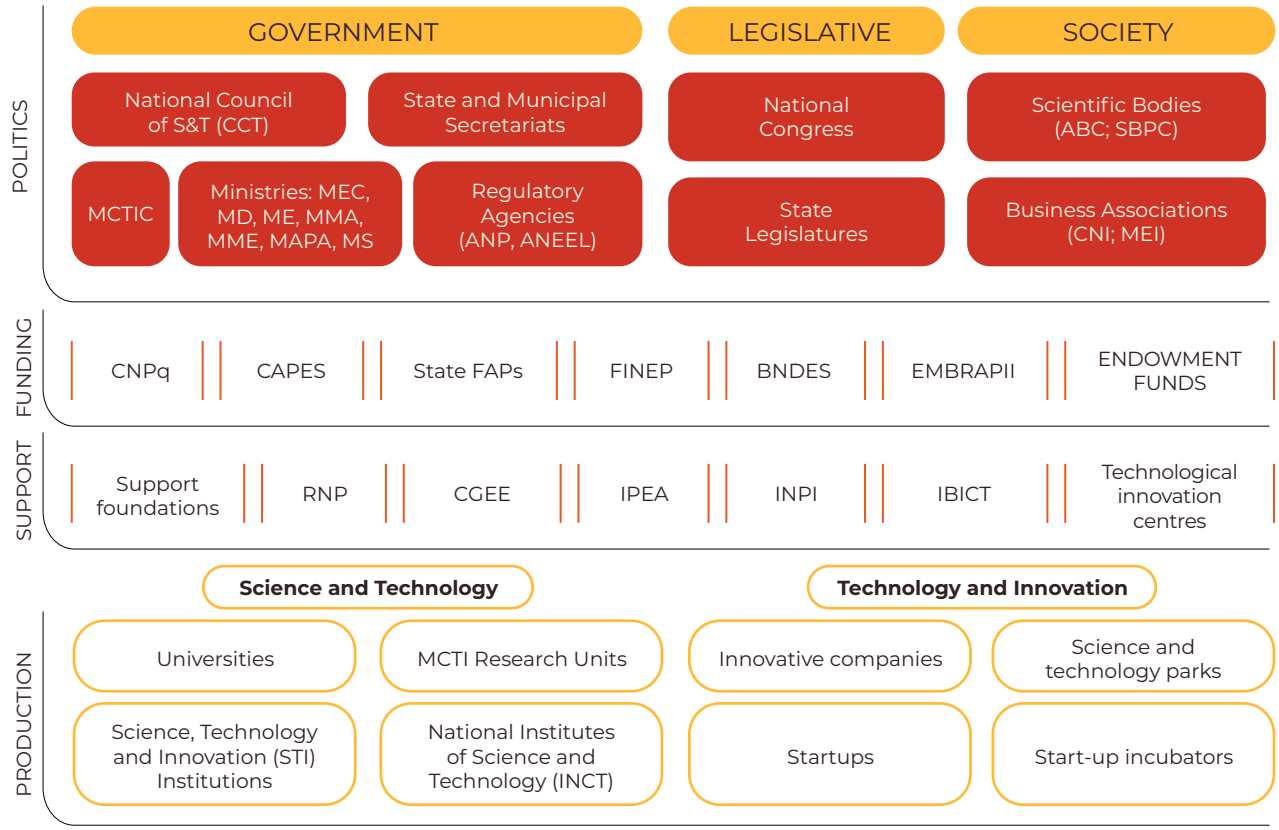
The bioeconomy is a central strategy for Brazil's sustainable development, combining the responsible use of natural resources with environmental conservation, value addition, job creation and social inclusion. In this context, Science, Technology and Innovation (ST&I) plays a catalytic role, being essential to transform Brazil's biodiversity and biomass into high value-added products, processes and services.

The National System of Science, Technology and Innovation (SNCTI) provides the framework that enables this transformation. Brazil has a well-established research, development and innovation sector and is internationally recognized for its excellence in Agricultural, Biological and Health Sciences.

In addition, Brazil has installed industrial capacity with strong potential for the bio-based industry, supported by established expertise in bioenergy and agricultural technologies. This set of assets positions the country competitively in what may be the century's leading technological race: bioeconomy as a new frontier of knowledge, where leadership is being shaped now .

To deliver on the PNDBio missions, the SNCTI operates through established agencies that span the entire innovation chain—from funding basic research (CNPq, FAPs, Finep, Embrapii) to technological development and market entry (Finep, BNDES)—structuring thematic programmes capable of ensuring sovereignty in strategic segments of the national bioeconomy. Figure 7 below illustrates the main actors that make up the SNCTI.

Figure 7 – Main actors of the National System of Science, Technology and Innovation (SNCTI)



Source: Ministry of Science, Technology and Innovation (2026).

To advance the bioeconomy, the SNCTI should prioritise key technologies grouped into four main areas:

Sociobioeconomy: Technologies for clean extraction, stabilisation of natural products, functional foods, and the integration of traditional knowledge with biotechnology (e.g. phytotherapeutics and biopharmaceuticals).

Sustainable biomass and circularity: Development of bioinputs, integrated production systems, waste recycling, and genetic improvement associated with biotechnology.

Advanced industrial processes: Use of microorganisms and enzymes to produce biofuels, bioplastics and biomaterials, including waste conversion technologies and the production of alternative proteins.

Enabling technologies: Application of data science, machine learning, digital platforms (blockchain, IoT) and financial technologies (green fintechs) to monitor biodiversity and trace value chains.


Leandro Benites (EMBRAPA)

At the level of implementation, the PNDBio's cross-cutting ST&I initiatives focus on three pillars: fostering scientific research on critical bioeconomy topics; structuring thematic research and innovation networks aligned with the Plan's missions; and providing technical support to the National System of Information and Knowledge on the Bioeconomy in developing socio-environmental and economic impact metrics, ensuring that scientific advances translate into public data and evidence-based policies.

Science, Technology and Innovation (ST&I) is an essential instrument for the implementation of the PNDBio. The SNCTI, composed of a broad set of interrelated institutions and actors, is tasked with contributing to the expansion of the bioeconomy by coordinating the provision of research and innovation solutions

across government, the private sector, academia and civil society.

The leadership that Brazil seeks to achieve in the bioeconomy agenda will only be realised through the active engagement of scientists and ST&I institutions, working in a coordinated manner and in collaboration with local communities across all national biomes, grounded in the understanding that the bioeconomy is fundamental to the future of the planet.

3.3 Safeguards

The PNDBio Safeguards System was designed to ensure that actions, investments and partnerships within Brazil's bioeconomy are fully aligned with the country's legal, social, environmental and climate commitments, preventing risks and guiding the generation of positive impacts.

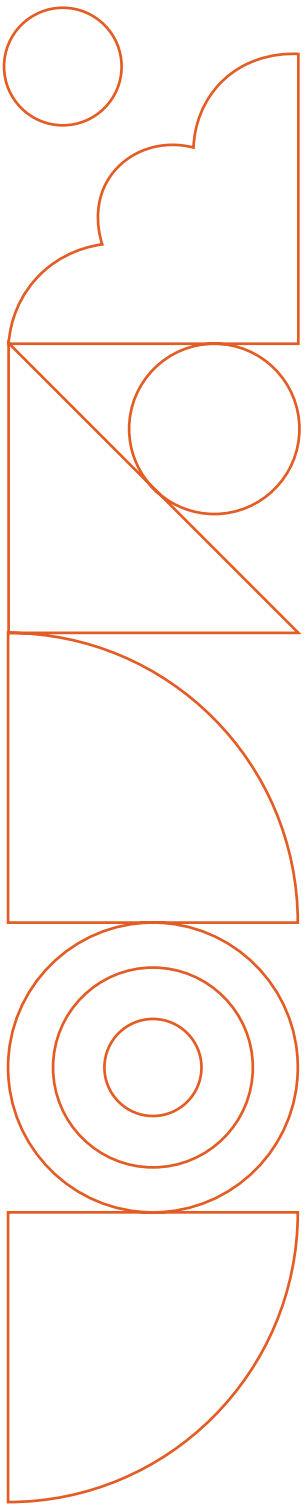
Applicable to any programme, project, policy or productive activity under the National Bioeconomy Strategy, the system combines national and international frameworks and best practices to embed, from design through to implementation, criteria that reinforce the socio-environmental integrity of the bioeconomy and its contribution to well-being. Its architecture is cross-cutting and organised around four complementary dimensions:

- **Social:** Promotes productive inclusion, decent work, gender and racial equality, youth participation and the protection of human rights.

- **Environmental:** Prevents negative impacts and promotes positive outcomes for biodiversity, guiding the sustainable use of genetic heritage and encouraging regenerative practices.

- **Climate:** Incorporates risk assessment and the contribution of the bioeconomy to greenhouse gas mitigation and climate adaptation, strengthening the implementation of Brazil's Nationally Determined Contribution (NDC).

- **Biosafety and biotechnology:** Ensures the responsible management of risks associated with modern biotechnology, including genetically modified organisms (GMOs), gene editing and advanced bioproducts, based on the precautionary principle, process traceability and compliance with the Biosafety Law (Law No. 11,105/2005) and the Cartagena Protocol on Biosafety





Collection of the Department of Bioeconomy Promotion Policies (MMA)

By integrating these dimensions, the safeguards—beyond serving as a normative instrument—operate as a driver of quality and credibility for the PNDBio, guiding public and private decision-making, reducing uncertainties and strengthening social trust in the Plan's implementation.

To ensure that implementation actions under the PNDBio are inclusive and equitable, advance climate mitigation and adaptation efforts, contribute to biodiversity conservation, and promote sustainable production based on renewable biological resources, the Plan establishes binding ethical criteria. Among these is the requirement that no stage of value chains results in the conversion of native vegetation or the degradation of habitats, as well as the promotion of the elimination of illegal deforestation and the reduction of legal deforestation through economic incentives.

The Plan also reaffirms the diversification of the use of species from Brazilian biodiversity for food, biomass and bioinputs; respect for and recognition of traditional knowledge, with its integration into science and the fair sharing of benefits; and the progressive reduction in the use of agrochemicals through the expansion of bioinputs, in alignment with

instruments such as the Brazilian Sustainable Taxonomy and the National Pesticide Reduction Programme (PRONARA). In addition, it strengthens collective bargaining and social dialogue, ensuring decent working conditions across the bioeconomy.

Developed through a participatory process, these safeguards reflect the ambitions and concerns of diverse stakeholders, including civil society, the productive sector, Indigenous Peoples and Traditional Communities, academia and the Brazilian State. They are designed to promote alignment with national and international best practices in socio-environmental safeguards, ensure compliance with Brazilian environmental legislation, and enable the proactive management of the socio-environmental impacts of bioeconomy initiatives.

Box 25 – Brazilian Sustainable Taxonomy (TSB)

Brazilian Sustainable Taxonomy as a driver of sustainable practices under the National Bioeconomy Development Plan

The Brazilian Sustainable Taxonomy (TSB), established by Decree No. 12,705 of 31 October 2025, is an instrument of the Federal Government's Ecological Transformation Plan. It is structured as a classification system for activities, assets and project categories that contribute to the achievement of climate, environmental and social objectives, based on specific criteria.

The strategic objectives of the TSB are defined as follows:

a) To mobilise and guide public and private financing and investment towards economic activities with positive climate, environmental and social impacts, with a view to sustainable, inclusive and regenerative development.

b) To promote innovation and technological upgrading focused on environmental, climate, social and economic sustainability, enhancing productivity and the competitiveness of the Brazilian economy on a sustainable basis.

c) To establish the foundations for the production of reliable information on sustainable finance flows, by promoting transparency, integrity and a long-term perspective in economic and financial activities.

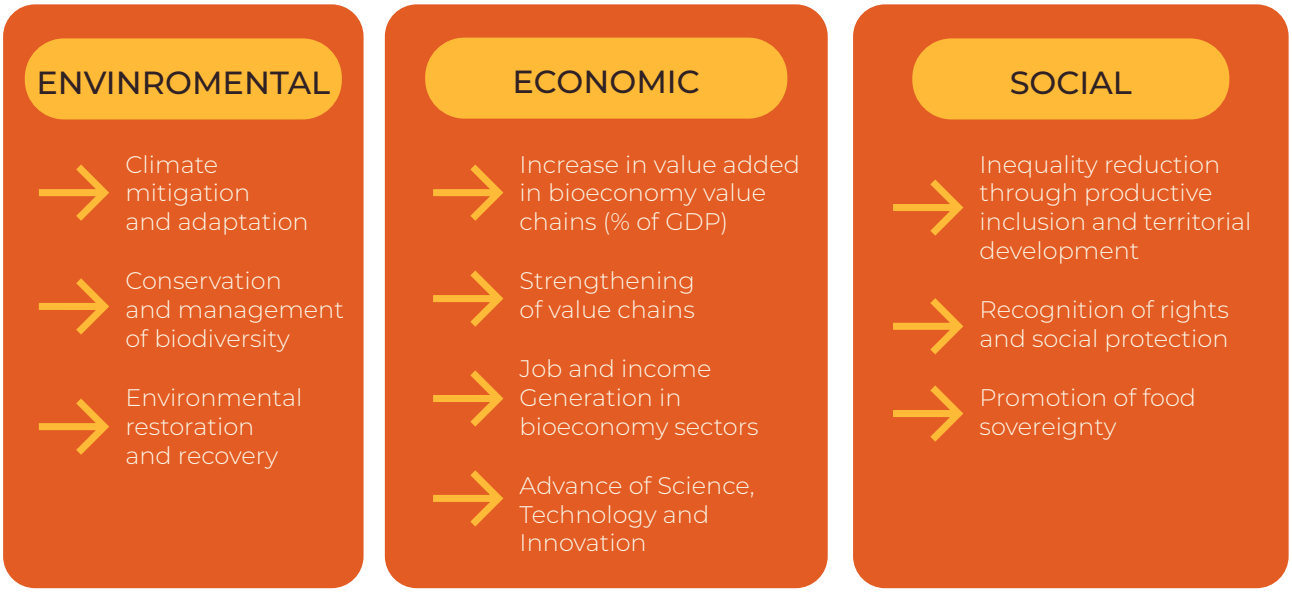
The National Bioeconomy Development Plan expressly ensures full alignment, adherence and compliance with the principles and strategic, environmental and socio-economic objectives of the Brazilian Sustainable Taxonomy, incorporating it as one of the central objectives within its safeguards system.

Source: Brazilian Sustainable Taxonomy.

3.4 Expected impacts of PNDBio by 2035

PNDBio was designed to deliver long-term structural transformations across three central and interdependent dimensions: environmental, economic and social.

Figure 8 – Core impact dimensions of PNDBio



Source: Authors' elaboration based on Ministry of Finance (2026).

Under the environmental dimension, the expected impacts are concentrated in three areas: climate mitigation and adaptation, driven by CO_2 reduction and the expansion of sustainable biomass and biofuels, in alignment with the Climate Plan; biodiversity conservation and management, promoted through Conservation Units and the expansion of sustainable forest management, in line with the National Biodiversity Strategy and Action Plan (NBSAP); and the restoration and recovery of degraded ecosystems through forest concessions and restoration territories, integrated with the NBSAP and the National Plan for Native Vegetation Recovery (PLANAVEG).

Under the economic dimension, impacts are predominantly structural and materialise in the medium and long term, both through value generation and the creation of jobs and income. The value chains with the greatest transformation potential include sociobioeconomy products, phytotherapeutics, biomass, biofuels and basic chemical inputs derived from renewable sources.

Under the social dimension, impacts are expressed in structural, territorial and distributive terms, and are central to the logic of the Plan. The bioeconomy can represent, for historically marginalized groups and vulnerable value chains, a tangible pathway to access economic opportunities, the recognition of rights and the strengthening of livelihoods.

The monitoring of these impacts will be carried out through a public dashboard of indicators, progressively integrated into the SNICBio, ensuring transparency and continuous learning in the implementation of the Plan.



Chapter 4

CONCLUDING MESSAGE

4. CONCLUDING MESSAGE

The National Bioeconomy Development Plan (PNDBio) is the result of an unprecedented process that has translated strategic ambition into concrete missions, targets and actions, anchored in governance, knowledge, innovation, financing, and safeguards. The Brazil that emerges from this Plan is a nation that recognizes nature not as an externality to be managed, but as the foundation of a new productive and economic cycle: sustainable, inclusive and competitive at the scale required by the challenges of the 21st century.

The PNDBio is the roadmap for this moment, and the work now enters its most complex phase: the effective implementation of the Plan. The role of the National Bioeconomy Commission is to provide direction and momentum to the execution of strategic actions—some already outlined in this document—under a perspective of continuous improvement.

Even more important, however, will be the concrete and effective engagement of different segments of society—the private sector, civil society, social movements and the financial sector—in a genuine partnership with the public sector for the implementation of the Plan.

Among the Commission's priorities, the first is to make the bioeconomy visible within national statistical information systems. Brazil still lacks an official methodology to measure the economic contribution of the bioeconomy, within the sustainability parameters and safeguards that define it. At present, economic activities related to biodiversity, forest management, biomass production, the sociobioeconomy and the bioindustry are dispersed across multiple national accounting categories—or remain invisible within the informal economy— making it difficult to formulate

evidence-based policies, monitor results and position the country within green finance systems. The National System of Information and Knowledge on the Bioeconomy (SNICBio) will take the first steps to address this gap by structuring existing information systems and developing an approach to calculate the bioeconomy's "GDP", including the specificities of the sociobioeconomy GDP, based on official data. This will transform natural wealth into a measurable, monitorable and investment-mobilising asset.

The second priority is to build the federative pact that the bioeconomy requires. The Plan is not implemented solely at the federal level: it takes place across biomes, in major urban and industrial centres, in remote municipalities, in Indigenous and *quilombola* territories, in restoration and sociobioeconomy territories, within river basins, across local value chains and throughout the logistics system. State and municipal governments, as well as legislative assemblies, are essential actors for scaling the PNDBio missions across diverse regional contexts. This requires cooperation protocols, state-level plans aligned with the PNDBio, and data and information mechanisms that enable coordination where actions effectively occur. Without such a pact, the Plan risks failing to generate real impact in the territories—precisely where transformation is most needed.

The third is the bioeconomy regulatory framework. One of the bottlenecks throughout the development of the PNDBio is the fragmentation and complexity of the regulatory framework that consolidates the National Bioeconomy Policy. Another line of action is to address gaps, overlaps and legal uncertainties across the different existing regulatory frameworks related to the PNDBio targets. CNBio will debate and coordinate regulatory proposals across ministries, reducing complexity and promoting alignment with international standards. This regulatory agenda is a condition for Brazil to increase its competitiveness, always aligned with sustainability, in the context of global trade.

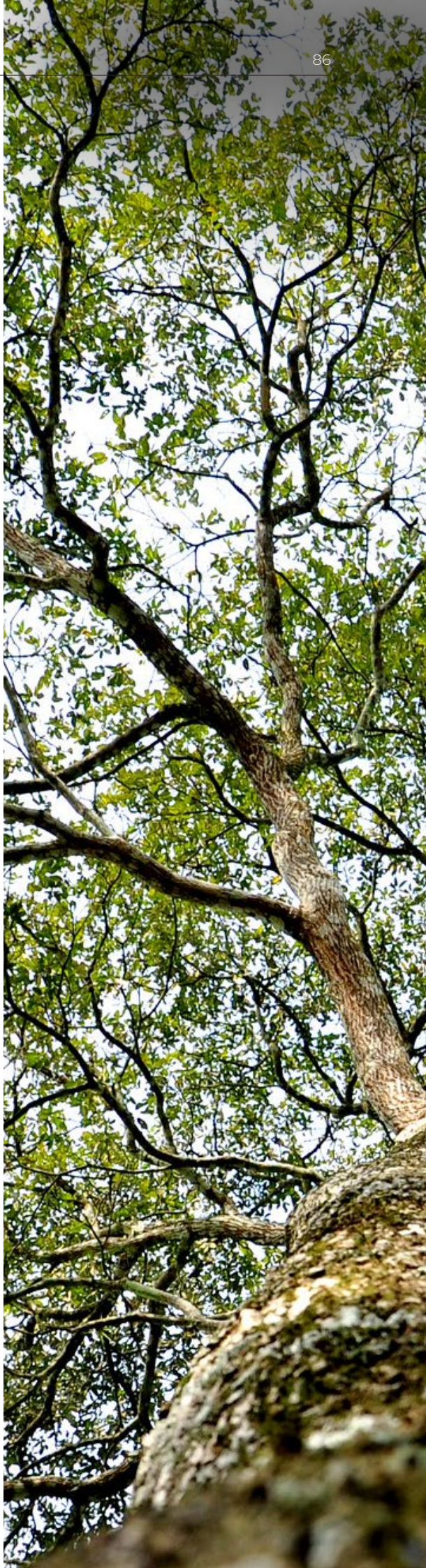
The fourth is to operationalise the TSB as a real driver of capital allocation, establishing the basis for attractive credit conditions for ambitious business practices aligned with the

bioeconomy. The TSB is one of the most transformative instruments for directing private financial flows towards the bioeconomy. By establishing clear eligibility criteria and differentiating a¬ctivities by level of environmental ambition—from conventional standards to a full bioeconomy approach—the TSB creates the common language that was previously missing between the State and the financial and private sectors. Its full operationalization, integrated with the Monitoring, Reporting and Verification (MRV) System and aligned with the PNDBio missions, will enable the bioeconomy to move beyond a diffuse category and become a sustainable, traceable, financeable and internationally comparable asset class.

The fifth priority is the construction of an international framework that positions the bioeconomy as a global driver of development. Through the Bioeconomy Challenge, working groups of governments and civil society stakeholders will translate the 10 Bioeconomy Principles into concrete solutions to overcome barriers that hinder the sector's development: improving indicators and metrics, promoting financing tools, developing market strategies and strengthening sociobioeconomy value chains. By aligning national and international efforts, this initiative enhances the bioeconomy's implementation capacity and reinforces Brazil's leadership in shaping a global agenda oriented towards sustainability, innovation and inclusion.

The Plan has a ten-year horizon, but its success starts now. Ongoing actions already underway across different ministries, public agencies, subnational governments and society demonstrate that Brazil is not starting from scratch. The PNDBio organizes, guides and accelerates a transformation that is already taking place and that must now reach the scale that only an integrated State policy can ensure.

The success of the PNDBio will be measured by results and impacts that go beyond economic growth: by standing forests; by income generated in the territories of Indigenous Peoples and Traditional Communities; by decent jobs created across different sectors; by restored





Assis Lima (MTur)

hectares that return to sustainable production; by the growing share of renewable inputs in the chemical industry; and by Brazilian phytotherapeutics within the Unified Health System (SUS). These results and impacts, once achieved, will confirm that the bioeconomy is, in fact, the development paradigm that Brazil has chosen—and that the world needs.

The invitation extended by this Plan is therefore broad and explicit. To the private sector, it calls on the recognition of the bioeconomy as a source of economic opportunity and a frontier of competitiveness to be advanced. To the National Congress, it calls for the development of the legal framework that will provide legal certainty and longevity to the policies set out herein. To state and municipal governments, it calls for the translation of national missions into concrete territorial actions. To academia and innovation centres, it calls for the continued positioning of Brazil at the frontier of bioeconomic knowledge. And to Indigenous Peoples, traditional peoples and communities, and family farmers—guardians of biodiversity and protagonists of the sociobioeconomy—it calls for their full rights and central role in this new economy.

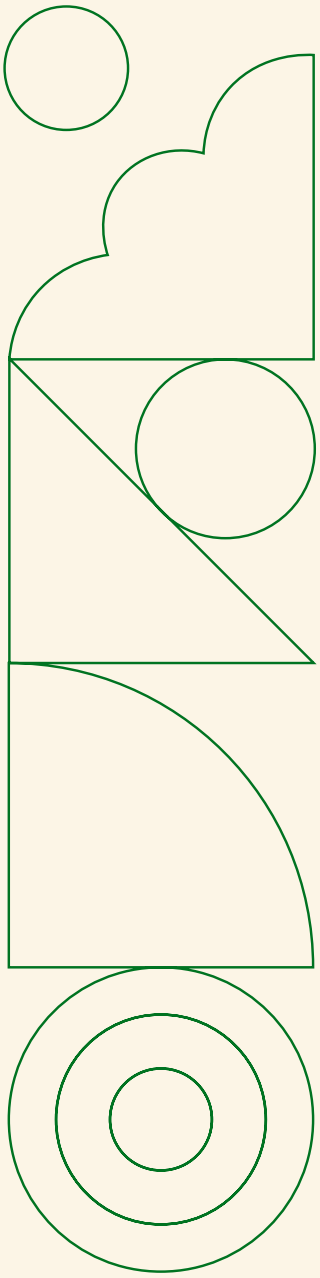
Brazil possesses the biodiversity, the knowledge, the governance frameworks and the international recognition. What was missing was coordinated, sustained action commensurate with its potential. The PNDBio is the powerful instrument for that action. And the time to begin is now.

Carina
Mendonça Pimenta

President of the
National Bioeconomy
Commission



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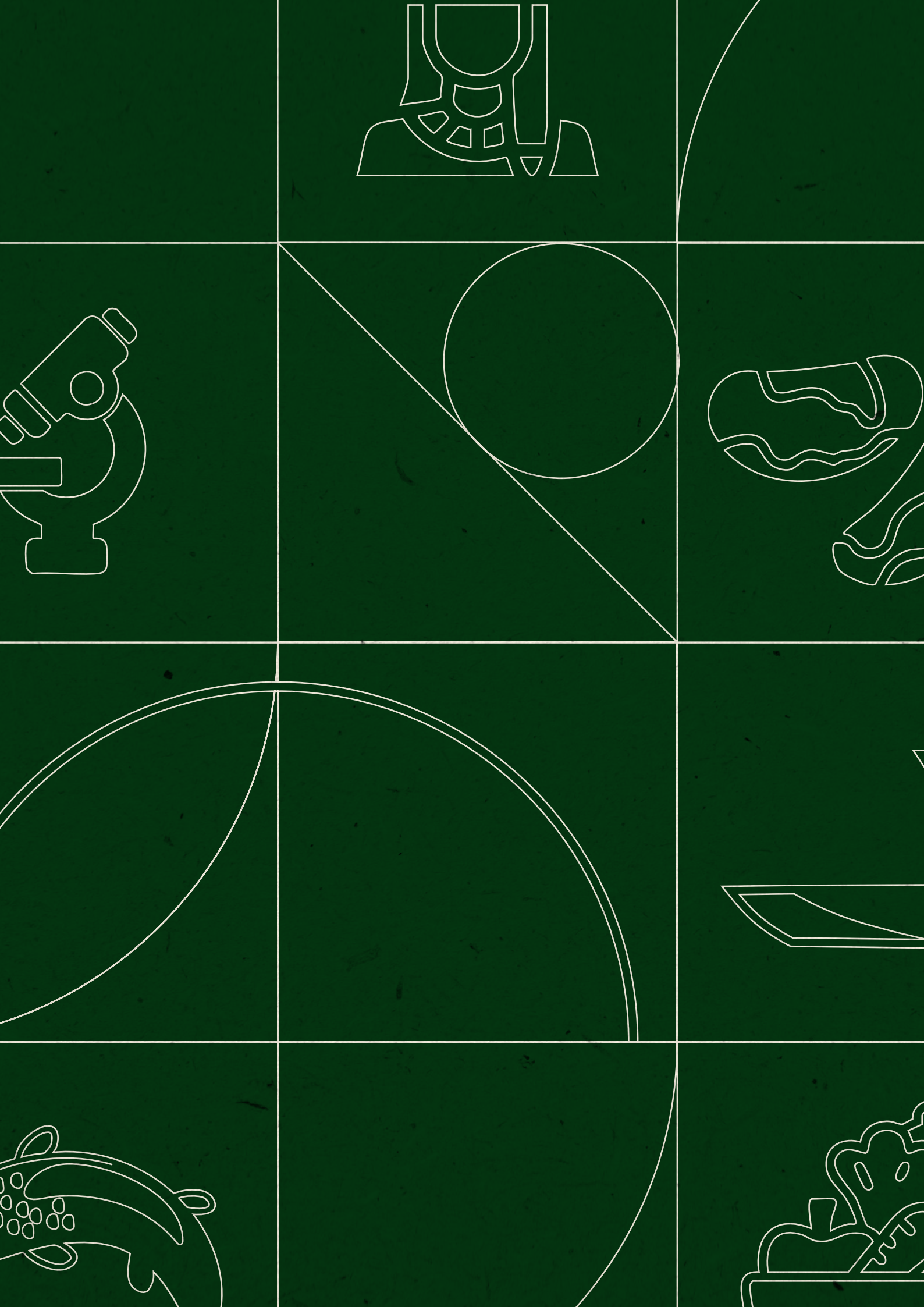
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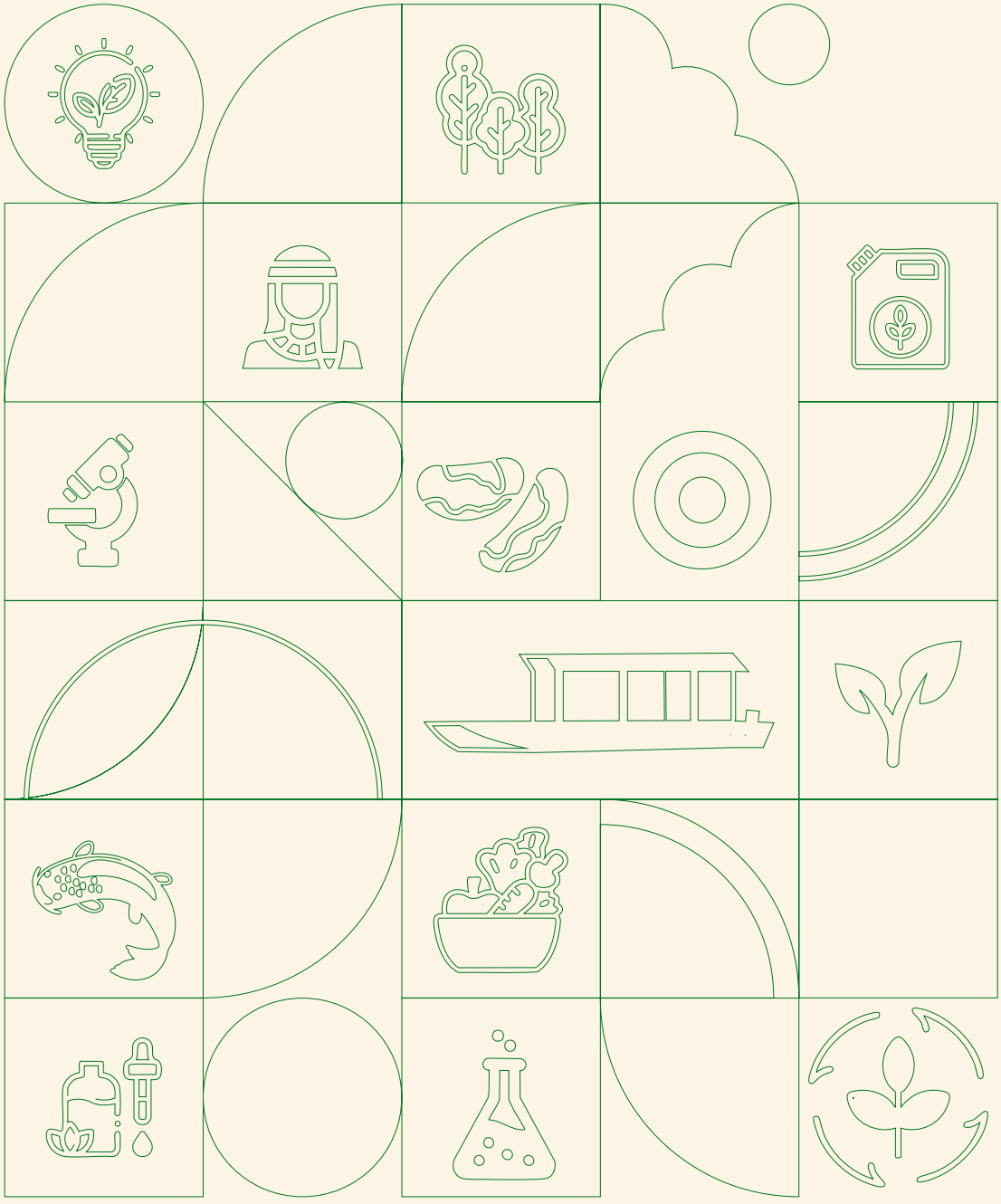
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National Bioeconomy Development Plan



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MINISTRY OF **DEVELOPMENT, INDUSTRY, TRADE AND SERVICES**

MINISTRY OF **THE ENVIRONMENT AND CLIMATE CHANGE**

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