



## **Report on Social, Environmental and Climate-related Risks and Opportunities**

Volume 4 | September 2024



**BANCO CENTRAL  
DO BRASIL**





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# Report on Social, Environmental and Climate-related Risks and Opportunities

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## Preface

It is with great pleasure that the Banco Central do Brasil (BCB) publishes its fourth Report on Social, Environmental and Climate-related Risks and Opportunities. This publication reinforces the BCB's commitment to addressing these risks within the scope of its institutional mandate. The BCB's mission is to ensure the stability of the currency's purchasing power, to foster a sound, efficient, and competitive financial system, and to promote the economic well-being of society. Given the implications that climate factors may have on fulfilling its mission and the pursuit of a more inclusive and sustainable financial system, the BCB has emphasized the importance of sustainability in its strategic agenda.

Adverse climate events, such as heatwaves, frosts, droughts, and floods—such as the floods that affected the state of Rio Grande do Sul in Brazil in May 2024—can impact food and energy prices, with effects on inflation, and pose challenges to the stability of the financial system. In the long term, these shocks can have lasting effects, affecting productivity and economic growth. It is the role of the BCB to remain vigilant to the impacts that these events may have on relevant economic variables and to act so that risks that could compromise its mission are monitored and mitigated.

By ensuring a sound, efficient, inclusive, and competitive financial system, the BCB aims to advance, among other aspects, its sustainability efforts by promoting the integration of social, environmental and climate factors in the risk management of supervised entities. Additionally, it conducts research, tests, and analyses on the exposure of the National Financial System (SFN) to physical and transition climate risks, and continuously seeks to improve its regulatory and supervisory practices.

To ensure that the progress is made not only from an environmental or climatic perspective but also from a social one, the BCB supports financial citizenship among other initiatives. To this end, it invests in partnerships for financial education dissemination, continually implements new technological solutions for citizen and financial system services, and has promoted innovations in areas such as microcredit, cooperativism, currency convertibility, new business models, payments, and information sharing.

Thus, this Report is another demonstration of the BCB's commitment to the sustainability agenda, aligning with best practices in the disclosure of social, environmental and climate information within the community of central banks. The BCB's participation in the Network for Greening the Financial System (NGFS) since 2020 integrates it into a coordinated and global effort to make the financial system greener.

Finally, it is important to highlight the integrity of this Report, prepared with input from various areas of the BCB, and to emphasize that it is a tool for accountability to society and for increasing the transparency of the BCB's sustainability agenda. I hope you find the reading beneficial.

Roberto de Oliveira Campos Neto  
Governor of the Banco Central do Brasil



## Executive Summary

This 4<sup>th</sup> edition of the RIS presents, in an integrated manner, the initiatives of the BCB related to the management of social, environmental and climate risks and opportunities undertaken between July 2023 and June 2024. For the preparation of the RIS, the BCB adopted the structure proposed by the World Economic Forum (WEF), in which information is organized into four pillars, which correspond to sections of this Report. The guidance of the International Sustainability Standards Board (ISSB) and the publications of the NGFS were also considered.

In the “Governance” section, information is provided about BCB’s purpose, strategy, materiality, structure, integrity, and policies, including the integrated management policy for corporate risks. The report on the BCB’s international engagement on sustainability issues also forms part of this section.

The “Planet” section contains information related to managing risks resulting from climate change for the economy, the SFN, with emphasis on regulatory and supervisory initiatives, and the portfolio of international reserves. Finally, information about greenhouse gas emissions by the BCB itself is presented, which recognizes the importance of contributing to the global effort and minimizing the impact of its activities on the environment.

Aspects related to the management of international reserves and efforts to align them with the Task Force on Climate-Related Financial Disclosures (TCFD) recommendations, now incorporated into the ISSB, receive greater attention.

The “People” section presents the BCB’s initiatives to promote financial citizenship and its relationship with society. The section also covers initiatives related to the BCB itself on diversity, learning, and employee welfare policies, among others.

In the “Prosperity” section, initiatives related to financial inclusion, innovation, and increased competitiveness in the SFN for efficiency gains are addressed. Additionally, the section describes advances in sustainable bonds, highlighting their potential to direct investments towards projects that generate positive impacts on the environment and society.

Finally, the “Perspectives” section presents ongoing initiatives with expectations of future completion. This section aims to provide more transparency not only on what the BCB has already achieved but also on what the institution is committed to accomplishing, with a focus on the development of the Brazilian



Sustainable Taxonomy, a key element for the development of sustainable finance and combating greenwashing.

To better organize these and other challenges, the BCB has the [Agenda BC#](#), a management and communication tool with society that groups BCB's strategic projects. Among the 61 strategic initiatives executed from July 2023 to June 2024, 12 (20%) were completed. It is expected that another 30 initiatives will be completed by June 2025. The BCB keeps this information about the progress in the Agenda BC# updated on its [website](#).

The Agenda BC# is organized in six dimensions, one of which is Sustainability. The other five dimensions are: Inclusion, Competitiveness, Transparency, Education, and Excellence. There are also sustainability-related initiatives within these other dimensions, including some that were completed during the reporting period, such as the 2<sup>nd</sup> Annual BCB Conference held in May 2024, which discussed this theme; the assessment of the effects of BCB's financial education projects; and the enhancement of credit cooperative regulations. Some important initiatives are expected to be finalized in the second half of 2024 and the first half of 2025, such as proposals for education initiatives and financial solutions for low-income audiences, and the implementation of the Diversity, Equity, and Inclusion Program at the BCB. Specifically, the sustainability dimension of the Agenda BC# consists of a total of 21 initiatives, twelve of which have already been completed.

## #Sustainability

### REGULATION

Improvement of regulation on socio-environmental risks (RSA): Public Consultation No. 85/202; CMN Resolutions No 4,943, 4,944 and 4,945/2021

Creation of the Rural Credit *Bureau*

### SUPERVISION

Construction of stress tests for climate-related risks – Phase 1

Structuring and expanding the collection of information on socio-environmental risks – BCB Resolution 151/ 2021

Improvement of the Social, Environmental and Climate Risk Supervision Process (RSAC)

Structuring the capture of information on social, environmental and climate risks

### POLICIES

Conducting studies for the creation of a sustainable liquidity financial line

International reserves management – inclusion of sustainability criteria for the selection of counterparties and investments

### PARTNERSHIPS

BCB joins the Network for Greening the Financial System (NGFS)

### BCB SOCIAL, ENVIRONMENTAL AND CLIMATE RESPONSIBILITY

Reducing the environmental impacting of the processing of banknotes

Review of BCB's Socio-Environmental Responsibility Policy

Development of BCB's Report on Socio-environmental Risks

12 concluded  
initiatives



9 ongoing  
initiatives

57% charged

In addition to the twelve completed initiatives listed above, there are nine others in development, with four of these expected to be completed by June 2025. Initiatives related to promoting a sustainability culture at the BCB are planned to be completed by December 2024 and include, for example, campaigns to reduce plastic and white paper use in BCB buildings, raise awareness about recycling, and encourage bicycle use and carpooling.

The second phase of the enhancement of Climate Risk Stress Testing is expected to be concluded in November 2024. Another initiative expected to be completed by December 2024 is the implementation of new restrictions in the Rural Credit Bureau. It is worth noting that, although the initiative is still ongoing, significant deliveries have already been made regarding the topic, such as defining social, environmental and climate benefits in rural credit operations.

Finally, improvements in the disclosure of information by financial institutions are expected to be completed by June 2025. This project has already completed some notable deliveries: Public Consultation No. 86/2021; BCB Resolution No. 139/2021; BCB Normative Instruction No. 153/2021; and Public Consultation No. 100/2024.

The following initiatives are expected for after June 2025: 1) Estimation of the effects of social, environmental and climate risks on the economy and the SFN; 2) Expansion of the Memorandum of Understanding with the Climate Bonds Initiative (CBI); 3) Greenhouse gas inventory of BCB buildings; 4) Inclusion of social, environmental and climate responsibility themes in the Economy Museum; and 5) Creation of Climate Change and Sustainability Indicators.

To learn more about the sustainability initiatives in development by the BCB, consult the “Perspectives” section.

# 1

## Governance

This section includes information on BCB's purpose, strategy, materiality, structure, integrity, and policies, as well as the integrated management of the involved corporate risks. The BCB's strong engagement in international sustainability initiatives is also covered in this section.

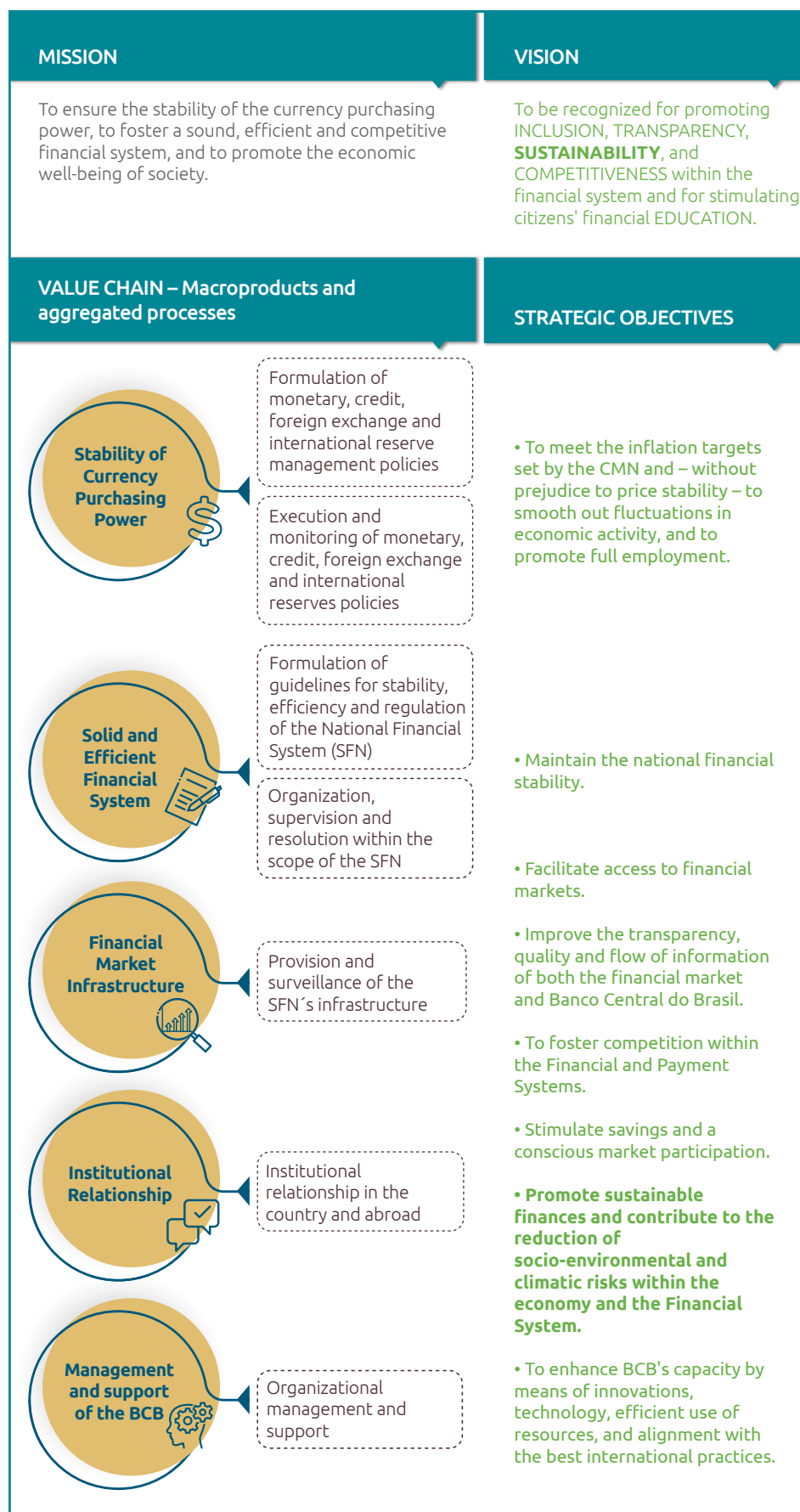
### 1.1 Purpose and strategy

The BCB's mission is to ensure the stability of the currency's purchasing power, to foster a sound, efficient, and competitive financial system, and to promote the economic well-being of society. The BCB's value chain aims to encompass all work processes carried out to fulfill its institutional mission and deliver products or services to society. The major deliverables made to society are called BCB macro-products, illustrated with their respective first-level processes, providing a broad view of what the BCB does.

By analyzing its mission and value chain, it is evident that the BCB engages in activities contributing to sustainable development in social, environmental and economic aspects. Furthermore, the BCB highlights sustainability in its vision for the future and in one of its eight strategic objectives, which is detailed in the Sustainability dimension of the Agenda BC#, its strategic agenda.

Hence, the Agenda BC# aims to promote financial democratization with reduction in the cost of credit, high-quality financial services, and greater participation of different market players. Each dimension encompasses several strategic initiatives, part of them already concluded. For the sake of transparency, the [BCB's Transparency and Accountability Portal](#) disseminates follow-ups and results of all the BCB's activities to the public on a regular basis (available only in Portuguese).





Specifically, the Sustainability dimension in the Agenda BC# deals with promoting sustainable finance, the appropriate management of social, environmental and climate risks in the economy, the SFN, and within the BCB itself by integrating sustainable variables into the institution's decision-making process.

This dimension was launched in September 2020 and is a dynamic instrument, with new initiatives being added as others are completed.

The BCB's sustainability initiatives encompass various participants in the economic-financial environment. The aim is to exchange experiences, implement national and international best practices on the subject, and become aligned with the global sustainability agenda.

It is worth noting that the BCB has a long history of supporting the environmental and social agenda, implementing measures related to the topic, and actively participating in international debates. For instance, in 2014, a decade ago, the BCB took a step forward and issued regulations to begin integrating social and environmental factors into the risk analysis of financial institutions.

Given BCB's purpose and strategy, it is possible to see contributions to at least nine of the seventeen Sustainable Development Goals (SDGs) established by the United Nations General Assembly in the document "Transforming Our World: The 2030 Agenda for Sustainable Development," which involve themes such as inclusive economic growth, sustainable development, and reduction of inequalities.

Among all the SDGs to which the BCB contributes, goals 4, 8, and 17 stand out. An example of an initiative contributing to the achievement of SDG 17, which aims to strengthen the means of implementation and revitalize the global partnership for sustainable development, is the Rural Credit Bureau, which has introduced stricter environmental compliance measures for granting this type of credit. More information about the Bureau can be found in the next section, "Planet."

The Aprender Valor Program is another example of a BCB initiative contributing to an SDG (4), which involves promoting lifelong learning opportunities for all. The BCB's program provides free financial education to students, teachers, and managers in public primary and secondary schools. In 2023, the results of the Program's impact assessment were released, showing significant improvement in the financial literacy level of students in the most engaged schools. More information about this initiative can be found in the "People" section.

SDG 8 aims to promote inclusive and sustainable economic growth; full and productive employment; and decent work for all. Pix is an example of a BCB initiative that contributes to the achievement of target 8.10, which involves encouraging the expansion of access to banking and financial services for everyone. Pix has shown positive results, especially for micro and small businesses, facilitating their sales operations and serving as the primary payment method for individual microentrepreneurs. More information about this initiative can be found in the "Prosperity" section.

Regarding the materiality of the RIS, it is worth noting that the process of defining what is reported in this Report involves several phases and sources. The topics covered are material to the main stakeholders, society, and the BCB. To identify these topics, throughout the year, the decisions of the Board of Governors and the Governance, Risks, and Controls Committee (GRC) are monitored through the analysis of votes and communications. Debates within the Sustainable Economy Committee (Ecos) and the Organizational Social, Environmental and Climate Responsibility Committee (CRSO) are also analyzed. Additionally, the BCB's strategic initiatives are monitored, and the results of public consultations conducted by the BCB are reviewed. The BCB's governance structure is presented in the following section (1.2), with emphasis on Sustainability.

Based on these inputs, the main sustainability themes relevant to BCB's activities during the period are selected and prioritized according to their potential to create value for society.

## Market Entities Regulator

**1995** Green Protocol

**2008** Rural credit Amazon – Res. CMN 3,545

**2010** Rural Credit Low Carbon Agriculture – Res. CMN 3,896

**2014** Febraban's Socio-environmental Risk Policy – SARB14  
PRSA – Res. CMN 4,327

**2015** Tracking drought impacts on the SFN  
1<sup>st</sup> Green Bonds issuance

**2016** Green Bonds Guide – Febraban & CEBDS

**2017** Integrated Risk Management (E + S) – Res. CMN 4,557

**2018** Guidelines for implementation TCFD/FSB – Febraban & Sitawi

**2019** Tracking Brumadinho's impacts on the SFN

**2020** *BC* 

**2021** 1<sup>st</sup> RIS  
Improvements in regulations on disclosure and social, environmental and climate-related risks  
Rural Credit *Bureau* – Res. BCB 140  
Enhancement of collection on social, environmental and climate-related risks – Res. BCB 151

**2022** Accounting rules for Sustainability assets – NI BCB 325  
Assessment of SFN exposure to transition risks  
Climate scenario analysis – severe drought risk  
Sustainability criteria – reserve management

**2023** Climate scenario analysis – extreme rainfall risk  
Social, environmental and climate-related impediments associated to rural credit – Res. CMN 5,081



## 1.2 Structure, policies, and integrity

The Board of Governors is the highest hierarchical body of the BCB and consists of the Governor and eight Deputy Governors, all of whom are nominated by the President of the Republic and approved by the Federal Senate. The BCB's Governor and Deputy Governors have a four-year term, not concurrent with the term of the President of the Republic. Each year, two Deputy Governors may be replaced, ensuring that the terms of the Board members begin alternately. The Governor and the Deputy Governors may be reappointed once.

The Governor and Deputy Governors of the BCB comprise the following deliberative committees:

- the **Monetary Policy Committee (COPOM)**, which defines the target of the economy's basic interest rate (the Selic interest rate) and publishes the Inflation Report;
- the **Financial Stability Committee (COMEF)**, which establishes guidelines for maintaining financial stability and preventing systemic risk;
- the Governance, Risks and Controls Committee (GRC), which defines guidelines and strategies related to corporate governance, strategy and risk management and internal controls. Among the risks addressed by the BCB's Integrated Risk Management Policy (PGR-BCB) are social, environmental and climate risks. The GRC is also responsible for BCB's Social, Environmental and Climate Responsibility Policy (PRSAC) within its scope of duties; and
- the Administration Committee (Coad), which defines guidelines and strategies for relevant administration issues, as well as adopts measures to systematize practices within the BCB. Among Coad's responsibilities is the management of material resources, which includes the topic of greenhouse gas emissions by the BCB, for example.

The BCB is headquartered in Brasília and has regional branches in nine state capitals. The organizational chart is available [here](#). The Departments are subordinated to the Governor and Deputy Governors and carry out the activities of each area of competence.

The Deputy Governor for International Affairs and Corporate Risk Management (Direx) is responsible for coordinating BCB's efforts related to green finance and climate risks, as established by the BCB's Internal Regulations, Section II, Article 15, Item XI (Resolution BCB No. 396, of June 27, 2024).

To this end, Direx relies on the Sustainability and International Portfolio Investors Unit (Gerip), which, since 2022, has been responsible for coordinating BCB's sustainability agenda. These initiatives are inherently transversal within the organizational structure and involve different BCB departments, which operate according to their established competencies and assignments.

Direx also coordinates the Ecos committee, created in 2021 to promote discussion and integration of projects and activities related to sustainability, including initiatives related to managing social, environmental and climate risks and their impacts on the economy and the SFN.

The activities of Gerip and Ecos ensure that BCB's business units, the Governor, and the Deputy Governors are well-informed about the wide range of sustainability initiatives at the BCB. This allows activities developed across various departments to be monitored with a strategic and integrated perspective by the Board of Governors.

In turn, the Deputy Governor for Administration (Dirad) coordinates the CRSO, a committee primarily responsible for preparing, reviewing, disseminating, and monitoring the Sustainable Logistics Management Plan (PGLS), as well as managing internal activities and processes of the BCB in a sustainable manner.

The CRSO was established in 2017, in the same regulatory act that created BCB's Social and Environmental Responsibility Policy, which was updated to the PRSAC in June 2024. This update was in line with the requirements set by the BCB for the SFN, aiming to maintain a prudent system in conducting its activities, strong enough to absorb potential impacts from undesirable climate events.

As a regulator, the BCB must reflect on its own policies, which tend to be an important instrument for strategic guidance and transformation both internally and within the SFN.

Policies are a set of principles and guidelines adopted by senior management or strategic governance bodies to achieve better results. Specifically, the PRSAC consists of a set of principles and guidelines of social, environmental and climate nature to be observed by the BCB in conducting its activities and processes, as well as in its relationship with stakeholders.

Governance is essential to ensure the execution of the PRSAC and is supported by a robust structure. In addition to the previously mentioned GRC, Direx, Dirad, Ecos, CRSO, and Gerip, the BCB also has sustainability experts who represent it in working groups, task forces, and study groups, as well as other organizational components and teams dedicated to initiatives related to social, environmental and climate themes.

The Ecos and CRSO committees are responsible for analyzing and debating recommendations for revising the PRSAC in its areas, while Gerip consolidates revision proposals and coordinates, with the policy governance structure, its revision.

Each area of the BCB is responsible for implementing the PRSAC, monitoring, and evaluating the results achieved. Finally, each Deputy Governor should encourage their subordinate units to discuss and plan, in their annual planning processes, initiatives that aim to meet the objectives, principles, and guidelines of the PRSAC.

Among the specific objectives of the BCB's PRSAC are contributing to the country's sustainable development in its three dimensions: social, environmental and economic; fostering a culture of sustainability within the institution; and encouraging SFN institutions to participate in the balanced development of the country by promoting sustainable finance, responsibility, and adequate management of social, environmental and climate risks within the system.

The PRSAC includes ten guidelines that provide direction and recommendations for the BCB's strategic initiatives, five of which were added in 2024 during the policy update process. Three of these added guidelines focus internally on the institution's operations: preparing its governance to systematically adopt social, environmental and climate criteria in internal decision-making processes; applying sustainability requirements to its facilities and administrative activities; and developing methodologies and other instruments to monitor the social, environmental and climate results generated by its initiatives.

The other two added guidelines focus externally, one supporting and contributing to the continuous improvement of policies developed by the BCB, incorporating social, environmental and climate criteria, and contributing to sustainable local, regional, and national development and the transition to a carbon-neutral economy. Another guideline involves developing partnerships to promote sustainable development, social, environmental and climate responsibility, strengthening dialog between stakeholders and citizen participation in public management.

The BCB has a total of sixteen policies. In addition to the PGR-BCB and PRSAC mentioned earlier, it is worth noting three other policies related to ESG (environmental, social, and governance) themes: the BCB Transparency Policy, the International Negotiations Policy, launched in October 2023 to enhance clarity in governance and effectiveness in the BCB's international negotiation processes, and the Compliance Policy, which, like the PRSAC, was also updated in June 2024.

Compliance management includes integrity, which encompasses specific compliance measures for the prevention, detection, punishment, and remediation of fraud and corruption, as well as adherence to values, principles, and conduct, ethical, and disciplinary norms aimed at supporting and prioritizing the public interest.

High standards of conduct and promotion of integrity are part of the BCB's daily routine. They are materialized in initiatives such as the Integrity Program and the adoption of a code of conduct. The BCB's Integrity Program also includes measures for the prevention, detection, punishment, and remediation of fraud.

The Integrity Plan for the 2024/2025 biennium was approved and published in June 2024. Some of the thematic areas included are: promoting active transparency and access to information, and ethics among employees; communication and training initiatives; handling of complaints; monitoring, accountability, and prevention.

The Integrity Plan for the 2022-2023 biennium concluded its cycle with a total of 36 initiatives. Notable completed initiatives include the third transparency survey and the development of an Integrity indicators dashboard.

### 1.3 Integrated Corporate Risk Management

The BCB has a well-established corporate risk management structure, with models based on international best practices. The Enterprise Risk Management approach adopted by the BCB seeks to assess the institution's exposure comprehensively,

considering not only the different types of risks incurred but also the interaction between them.

As part of the PGR-BCB (Integrated Risk Management Policy), the information generated through the corporate risk management process, using specific methodologies, supports decision-making and aims to strengthen the organization's defense processes. In other words, risk management identifies, evaluates, controls, and mitigates the possibility of losses while creating and protecting value.

At the strategic level, the use of risk information is highlighted as support for senior management decision-making, such as in resource allocation and defining strategic initiatives.

Once a decision is made, risk management operates at the operational level, ensuring that the implementation of that decision is carried out in a controlled manner, after adopting additional risk mitigation measures if necessary. At the tactical level of the organization, data generated by risk management serve as complementary elements between decision-making and defense approaches.

As previously mentioned, Social, Environmental and Climate Risks (RSAC) are part of the PGR-BCB and are components of the models used for different risk types, permeating the BCB's value chain and reaching all its processes. This allows for the management of these risks and their consideration in the decision-making process.

### 1.3.1 Strategic risks

Strategic risks correspond to the measurement of uncertainty related to potential external and internal events that may affect the fulfillment of BCB's institutional mission or the achievement of its strategic objectives. In addition to measuring these impacts through the analysis of the magnitude of possible effects on strategic objectives, another factor considered is the probability of occurrence of each risk.

The identification and measurement of strategic risks are carried out through a consensus perception model<sup>1</sup>, followed by expert judgment<sup>2</sup>, with results forming the BCB's strategic risk matrix. Finally, joint analysis of criticality helps identify the main strategic risks with suggestions for priority treatment, i.e., defining responses to reduce the BCB's exposure to identified risks.

Below is an illustration of the 2024 strategic risk matrix related to the strategic objective "Promote sustainable finance and contribute to the reduction of socio-environmental and climate risks in the economy and the Financial System" and risks related to other strategic objectives, along with their main mitigation measures.

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1 A model developed by BCB and composed of rounds for risk assessment with the participation of BCB experts until consensus is reached on the relevance of risks and their measurements.

2 Validation by the members of GRC of the risks mapped in the consensus perception model, and possible reassessment.





### C. Rise in inflation due to environmental issues



Risk of rising inflation caused by events related to social, environmental and climate issues. These events may include physical risks, such as extreme or chronic climatic events associated with gradual climate changes, such as rising food prices due to crop failures and increased energy costs. They may also involve transition risks related to societal changes from moving to a low-carbon economy.

The BCB's initiatives in this regard involve estimating the effects of RSAC on the economy and the SFN, through adapting macroeconomic models to simulate such events and assessing their economic-financial effects.

### D. Failure to coordinate initiatives



Risk of failure in coordinating institutional initiatives in response to climatic, social, and environmental risks for the Brazilian economy. Possible consequences in the materialization of these risks are uncertainties related to the compliance with standards and agreements on climate among countries that, in turn, can impact the flow of investments to Brazil. This risk is exacerbated by Brazil's exposure in the context of the G20 presidency.

To address this risk, the BCB has highlighted the "Sustainability" dimension in the Agenda BC# to promote transparency and effectiveness in its initiatives and facilitate coordination among economic agents.

### E. Legal risk



Risk of legal and extrajudicial litigation involving social, environmental and climate issues related to the BCB's role as a monetary authority or regulator and supervisor of the SFN, including the extent of its legal mandate; or related to regulated entities, when such litigation has systemic relevance.

This risk is mitigated through monitoring and preventive actions with judicial bodies and control agencies, including obtaining inputs for the continuous development of the Agenda BC#, "Sustainability" dimension.

### F. Unsustainable practices in financial institutions



In exercising its regulatory, supervisory, and sanctioning power within the SFN, the BCB is attentive to the practices of financial agents regarding adherence to best ESG (Environmental, Social, and Governance) practices.

Thus, in compliance with relevant legislation, the BCB works on supervising financial institutions and monitoring the possibility of events where best practices are not followed.

## G. Image risks



Risks of failing to achieve the BCB's vision of being recognized for promoting sustainability in the financial system. Additionally, there is a risk of international perception of Brazil's lack of effective action on climate change.

The BCB's corporate initiatives to achieve its mission, particularly regarding social, environmental and climate risks and opportunities, including transparency through the disclosure of its Agenda BC#, "Sustainability" dimension, and publication of this Report, mitigate reputational risks. Additionally, other initiatives, such as including social and environmental topics in the BCB's new Economy Museum and the CRSO's work, also help mitigate reputational risks.

## H. Understanding of concepts related to sustainability



Risks related to misunderstandings or lack of complete understanding of the concepts required by the Agenda BC#, "Sustainability" dimension. Additionally, there is a risk of failure to define a timely classification system for sustainable assets, creating a uniform taxonomy on the topic.

To mitigate this risk, there are various initiatives being developed by the Federal Government and the BCB, such as the Brazilian Sustainable Taxonomy. The review of the BCB's PRSAC, the promotion of a sustainability culture by the CRSO, and the development of this Report are other examples of initiatives to enhance the understanding of both internal and external stakeholders regarding sustainability.

## I. Impact of climate changes on the agricultural sector



Risks of climate changes that may affect Brazilian agricultural production and, consequently, have a significant impact on the national economy.

Enhancing RSAC management in the SFN and establishing the Rural Credit *Bureau* are aimed at mitigating this risk and demonstrate the BCB's attention to the issue.

## J. Adherence to international practices



Risk of being perceived as a BCB not adhering to international recommendations on environmental and climate risk. The realization of this risk may impact investor confidence in the country.

Brazil is committed to implementing recommendations from the Financial Stability Board (FSB) and the Basel Committee on Banking Supervision (BCBS) and actively participates in working groups discussing potential impacts of climate change on the financial sector. By joining the NGFS, the BCB also publicly demonstrates its commitment to international best practices in sustainability transparency.

In addition to the initiatives summarized in this section, various initiatives have been or are being developed to mitigate or prevent social, environmental and climate risks, as reported throughout this Report.

### 1.3.2 Operational risks

Among the operational risks, this Report highlights those related to potential environmental impacts on internal work processes:

- Flooding in the BCB buildings caused by extreme environmental conditions, impacting the maintenance of operations. This risk, mapped internally since 2016, materialized with the heavy rains in April and May in Rio Grande do Sul. During these months, prolonged flooding occurred in various cities, including the Porto Alegre area where the BCB's regional office building is located. The BCB's business continuity plans, which account for such extreme scenarios, were promptly activated. Continuous monitoring of the situation in the building and the region was also established during the flooding period. As a result, it was possible to prevent disruption of critical internal processes carried out at that regional office.
- Water shortage in BCB facilities, that could also affect the continuity of operations.

The BCB's business continuity plans include measures for this scenario to avoid compromising critical internal processes.

It is worth noting that since 2022, the risk related to the improper disposal of banknotes in the sanitation processing of the BRL has been completely mitigated, since all BCB branches that process cash carry out full disposal in a sustainable manner.

## 1.4 International partnerships

As part of its governance mechanism, the strategy also involves interaction between the BCB's internal and external entities and its positioning on the international stage. The BCB interacts with other central banks, supervisory



authorities, government bodies, international portfolio investors (financial and capital markets), rating agencies, cooperation or development agencies, international organizations and forums, and regional and thematic blocs of countries.

In 2023, the BCB intensified its relationship with foreign counterparties, reaching more than 1,000 international interactions. The BCB also participates in various forums and international organizations, notably including the BCBS, FSB, NGFS, and G20, which have specific groups to discuss climate issues and their potential impacts on the financial system.

The BCB's exceptional work in the international sphere is recognized and reflected in the prominent positions it took up in international organizations over the past twelve months. In January, the Governor of the BCB was appointed to a two-year term (2023-2024) as chairman of the Americas Advisory Council (AAC) of the Bank for International Settlements (BIS).

In November 2023, the BCB assumed the presidency of the International Financial Consumer Protection Organisation (FinCoNet) for a three-year term. FinCoNet is an entity within the Organization for Economic Cooperation and Development (OECD) framework, which brings together supervisory bodies responsible for protecting financial product consumers. Brazil has been an official member of FinCoNet since 2015, and this is the first time a representative from Brazil has taken on the organization's top management position.

Since October 2018, the BCB has been involved in the Brazilian Sustainable Finance (FiBraS) project, a collaborative initiative between the German government (through the German Ministry for Economic Cooperation and Development and the German Agency for International Cooperation – GIZ) and the Brazilian government (through the Ministry of Finance, as the executor, and the BCB, as co-executor). The project aims to improve the structural conditions for developing the green finance market in Brazil and is currently in its second phase, with various initiatives having been completed while others are ongoing, to be detailed in the following sections.

The BCB's international activities also include organizing relevant events with foreign participation. Among the international events organized by the BCB in 2024 is the G20 TechSprint, held in collaboration with the Bank for International Settlements Innovation Hub (BISIH). This international competition seeks solutions based on innovative technologies, with this edition focused on promoting the development of sustainable finance. More information on the 5<sup>th</sup> edition of the G20 TechSprint can be found [here](#) and in the "Prosperity" section.

The BCB also organized the XI Meeting of Governors of the Central Banks of Portuguese-Speaking Countries (BCPLP). The participants presented their sustainability agendas and debated the issue, enriching the group's exchange of experiences. Issues such as developing an economy resilient to extreme natural events and committed to reducing carbon emissions, promoting sustainable economic activities, and protecting the most vulnerable social groups were discussed.

In December 2023, the Inter-American Development Bank (IDB) established a cooperation network among Central Banks, the Network on Central Bank Adaptation to Climate Change, which the BCB joined. This network aims at assisting central banks in South America to adapt their policies to climate change by strengthening their capacities and jointly developing strategies. The member countries are: Argentina, Brazil, Ecuador, Chile, Colombia, Paraguay, Peru, and Uruguay. In May 2024, the first meeting took place, during which member countries presented the current status of their work related to sustainability and climate change in their jurisdictions and their expectations for the Network.

In the first half of 2024, under Paraguay's pro tempore presidency of the Southern Common Market (Mercosur), the Macroeconomic Monitoring Group conducted the study "Economic Resilience to Climate Change," which analyzed the impact of climate change on the bloc's economies, considering factors such as the high frequency of extreme climatic events, the extensive territorial area of Mercosur, and its agribusiness-centered economy.

Given Mercosur's vast geographical area, the challenges of managing and mitigating climate change are distinct, and the bloc's dependence on agriculture makes it more susceptible to climatic variations. Additionally, the region faces frequent droughts and floods, significantly affecting the regional economy. One recommendation from the study is to develop more precise models to quantify climate shocks and mitigate risks.

In 2024, the BCB is working with the Ministry of Finance on activities related to Brazil's G20 Presidency. The group involves the world's 19 largest economies, the European Union, and, from 2024, also includes the African Union. The Brazilian presidency officially began on December 1<sup>st</sup>, 2023. The country will organize more than one hundred technical meetings and ministerial conferences, culminating in the 19<sup>th</sup> G20 Summit, which will be held in November 2024.

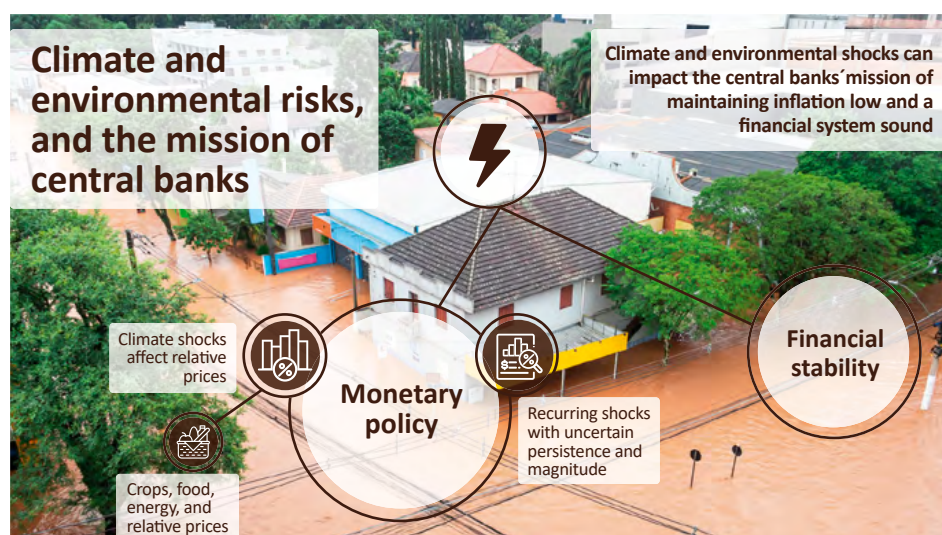
# 2

## Planet

This section is dedicated to BCB's initiatives to protect the planet from degradation, including a focus on sustainability related to the macroproducts generated for society. It presents studies and analyses on the potential impacts of Social, Environmental and Climate Risks (SECR) on monetary policy, the SFN, and the international reserves portfolio. It also outlines initiatives to mitigate these risks, with an emphasis on the BCB's regulatory and supervisory actions. Finally, it provides information on greenhouse gas emissions from the BCB itself, recognizing the importance of minimizing the impact of its own activities on the environment.

### 2.1 Economic Outlook

Climate change is one of the most significant structural forces shaping the global economy, both now and in the future. Therefore, the economic consequences of climate change constitute a global challenge, making it essential for central banks to assess the impacts of these changes so that they can factor them into safeguarding price stability and financial stability.



The analysis period of this Report – spanning from the second half of 2023 to the first half of 2024 – has been challenging from a monetary policy perspective. The inflation rate over twelve months, measured by the Broad Consumer Price Index (IPCA), decreased from 4.5% in February to 3.9% in May 2024. Inflation

remained above the target of 3.25% in 2023 and 3.00% in 2024. Amid increasing uncertainties in both the domestic and external fronts, inflation expectations for 2025 and 2026 rose from 3.5% to 3.8% and 3.6%, respectively.

Some factors were especially relevant to explain the behavior of inflation. Among these are those resulting from environmental and climate-related issues, which are the focus of this Report. For a more detailed analysis of these and other factors, please refer to [BCB's Inflation Report \(RI\)](#).

The Brazilian economy expanded robustly and above expectations in 2024Q1, leading to a revision in the projection for the GDP growth in the year. Economic activity is expected to slowdown in 2024Q2 – partly due to the negative impact of the floods in Rio Grande do Sul (RS). The [June 2024 edition of the RI](#) provides detailed analyses of the economic consequences of the climatic emergency in RS, which is addressed in the next section of this report.

Over the past year, climate change has been felt tangibly, with an abundance of extreme weather phenomena in various regions of Brazil and the world, setting new temperature records. In mid-2023, the rapid transition from La Niña to El Niño also contributed to the occurrence of these events. After three years of La Niña, El Niño, as usual, intensified rains in the South while bringing a drier climate pattern to the North and Northeast of Brazil.

Floods on one hand and droughts on the other. In the second half of 2023, the scarce rainfall regime in the northern region of the country triggered a drought in various rivers, affecting river transport of goods and people. The state of Amazonas experienced the strongest drought in its 120 years of recorded rainfall. The state's imports suffered a significant decline during the drought due to the bottleneck in Amazon basin river navigation, which prevented ships with goods from reaching Amazonian ports.

Thus, the droughts in the Amazon basin and the Panama Canal had observable impacts on Brazil's External Accounts, which were also detailed in the June edition of the RI, in the External Accounts section. The end of the drought in the Amazon basin allowed for the normalization of cargo transport in the North at the beginning of 2024, resulting in an increase in Brazilian imports for the year. On the other hand, the increased costs related to the drought in the Panama Canal are reflected in higher transportation expenses, contributing to the deficit in the services account.

The increase in the Commodity Index – Brazil (IC-Br) is also related to climate change in Brazil and worldwide. The increase reported in the [June RI](#) was influenced by energy prices, reflecting the rise in natural gas prices due to increased demand (above-average heat in the United States), as well as agricultural prices, reflecting increases in wheat (drought in Russia), orange juice (crop failure in Brazil), coffee (drought in Vietnam), and cocoa (excessive rains in Côte d'Ivoire).

The [March 2024 edition of the RI](#) contains several mentions of the impacts of climate adversities on food supply, highlighting the increases in international cocoa prices, domestic prices of raw products, and the acceleration of food inflation

measured by the IPCA. The box “Revised GDP Projection for 2024,” published in this same RI edition, lowered the projection for agricultural production in 2024, reflecting irregular rainfall and high temperatures in most of Brazil’s major production regions.

The [December 2023 RI](#) already pointed to the evolution of El Niño as a risk to the supply of agricultural commodities. The strong rise of paddy rice stood out, in a context of reduced domestic availability and international supply harmed by the shortage of rainfall in Southeast Asia. The box “Projections for External Accounts in 2023 and 2024”, published in that RI, emphasized that imports from the North region in 2023 were being affected by the drought in the Amazon basin.

The [September 2023 RI](#) showed that, prospectively, the evolution of El Niño continued to pose a risk to the supply and price of agricultural commodities. In the case of El Niño, drier weather in Southeast Asia had already been reported, with repercussions in the prices of rice and sugar. The box “Projections for External Accounts in 2023 and 2024”, published in the same RI, highlighted significant risks to the prospective export scenario for grains in 2024, especially related to climate uncertainties, amplified by the El Niño phenomenon.

Also in the [September 2023 RI](#), the box “Recent Evolution of Food Prices in Brazil” addressed the severe water scarcity and the increase in commodity prices influenced by La Niña in 2021. The phenomenon continued to pressure food prices in 2022 due to rainfall scarcity at the beginning of the year in the state of Mato Grosso do Sul and the southern region of the country, and to intense rains in the last quarter. Despite the weakening of La Niña at the beginning of 2023, there were crop failures in the South. With the transition to El Niño, the box discussed the risks for the agricultural sector and food prices in 2024, highlighting evidence of negative impacts on global productivity for corn, rice, and wheat.

Looking ahead, it is important to note that the BCB will continue to monitor temperature and precipitation fluctuations in its economic analyses. In addition to the recurring impact of climate on food production, in the coming months more attention should be given to the effects of rainfall scarcity in some regions on hydroelectric generation and, ultimately, on energy tariffs.

### **2.1.1 Impact of the climatic emergency in the state of RS on monetary policy**

In May 2024, the RS was hit by the biggest flood in its history. Heavy rainfall, mainly concentrated in the hydrographic region of the Guaíba River, caused flooding and destruction in Porto Alegre (POA), in its metropolitan region, and in the Taquari Valley towns. The floods affected areas of high population density and of great importance to the economy of the state.

The climatic emergency in RS had severe humanitarian impacts. According to the Flood Balance from the RS Civil Defense Services, by June 30, 2024, there were 179 confirmed deaths, with 33 people still missing. An additional 806 people were injured, and 478 municipalities were affected. To gauge the social impact of the disaster, over 581,000 people were displaced.

RS has an estimated population of 10.9 million people, 5.3% of the Brazilian population. The state's GDP represents 6.5% of the national GDP, with a larger share in agriculture and livestock (12.7%), and manufacturing (8.4%). The areas most affected by the rains represent 48.5% of the population and 53.3% of the state's GDP.

Effects of the climatic disaster in RS were already observed in May, especially in food prices. In the hard-hit metropolitan region of POA, with an 8.6% IPCA weighting, the index change was 0.87%, compared with an average of 0.42% in the other areas that make up the index and 0.46% for the country. The largest differences in price change occurred in bottled gas – which rose 7.39% in POA and 0.36% in other areas – and food-at-home – 3.64% in POA and 0.34% in other areas. Among food items, the price increase of some fresh products stood out. Since these products have short production cycles, this increase is expected to be reverted more quickly. RS is an important agricultural producer, accounting for 12.7% of the national grains production.

In particular, the state concentrates about 70% of the domestic rice production and 40% of the wheat production, products with longer production cycles and whose prices rose in May. In addition to the impact on the grain crops, the floods also negatively affected the production of fruits and vegetables. Impacts on their prices were already felt in the May's IPCA. Most of these impacts, however, are likely to be felt in the short-term only.

In the second half of the year, economic growth should reflect, in addition to the economy's potential growth pace and the lagged effects of the decrease in the degree of monetary policy tightening that occurred over the last year – an increase in demand and production related to the recovery of lost capital and the replenishment of goods and stocks in RS. Additionally, the disaster in RS is likely to put pressure on the primary fiscal balance of the public sector in 2024. This is because some of the measures adopted by the federal government to assist in the reconstruction of RS and support businesses and families impact the primary fiscal balance in 2024, while others affect only federal public debt. Primary expenses to face this public calamity will not be considered when measuring compliance with the primary balance target.

Neither expenses nor revenues loss caused by the impacts on the economic activity have been fully calculated. According to the Pre Copom Questionnaire, the median analysts' estimate for the potential impact of this calamity on the central government primary balance is BRL 25 billion, of which BRL 20 billion would already be incorporated into the projections. Given its direct impact on the economy of RS, floods are also expected to impact the aggregated primary balance of subnational governments.

The [June RI edition](#) provides an in-depth study of the initial impacts of the floods on the economic activity of RS. The analysis is based on a set of more timely indicators than usual, such as flows received via debit card or Pix by businesses in the state, data on invoice issuance, and surveys with consumers and entrepreneurs.

At the start of the heavy rainfall, the number of companies that received any payment flow through debit card or Pix dropped 8.6%. Throughout May and



early June, this number fluctuated around -4.3% compared with the base period (average of the weeks of April 17-30). It is noteworthy, however, that in the last week analyzed (June 5-11), the number of companies that received some payment via debit card or Pix exceeded that of the base period, suggesting a relatively quick recovery in sales across most sectors.

Data on issuance of invoices compiled by the Secretary of Finance of RS shows that, in the first fortnight of May, the state's industrial sales dropped 29.8% against the same period of 2023, in real terms. The impact receded throughout the month, so that, in the period from May 1 to June 11, the decline was 12.7%. By sector, the segments that mostly contributed to this reduction were metal-mechanical, agribusiness, and agricultural inputs.

As previously mentioned, the floods also impacted grain crops, mainly soybeans, rice, and wheat, and the production of fruits and vegetables, potentially marginally affecting the production of meat, eggs, and milk in June and July. RS concentrates 4.1%, 11.9%, and 17.1% of Brazil's cattle, chicken, and swine slaughtering, respectively. There was loss of livestock, destruction of machinery and structures, as well as difficulties in feeding the animals during the most critical period. As a result, the production of meat, eggs, and milk might still be marginally affected in the following months.

In foreign trade, the disruption of regional logistics and potential cancellations of purchases affected imports more than exports. In summary, there is evidence that indicates a sharp local activity decline in May, with high heterogeneity across sectors and segments, and signs of ongoing recovery.

For further insights on this topic, it is relevant to mention a [study published on the BC blog](#) (available only in Portuguese), aimed at understanding the economic impact of the floods in RS. Using satellite data to identify flooded areas and ZIP codes in order to locate businesses, the study estimated that 8% of formal jobs in the state were located within 500 meters of the areas flooded in May 2024.

### **2.1.2 Economic and financial effects of the Mariana disaster**

Clean water has an economic value that is difficult to estimate, especially for small communities whose agricultural activities take place along riverbanks. The rupture of a mining waste dam in the municipality of Mariana in November 2015 led to a record release of toxic waste in southeastern Brazil. A torrent of mud, approximately 50 million cubic meters of mining waste, traveled about 600 kilometers of rivers between the states of Minas Gerais and Espírito Santo before reaching the Atlantic Ocean, contaminating water in the riverside municipalities.

In addition to environmental impacts, the disaster had significant humanitarian effects, economically affecting the lives of hundreds of thousands of people living in these riverside municipalities, with around a thousand people losing their homes and nineteen losing their lives. The effects of this disaster had large and persistent social, environmental and economic repercussions, causing extreme damage to the Doce River basin. Therefore, to measure the economic and financial effects of this disaster, including economic activity, payment flows in the production chain, and local consumption, a study was conducted with the support of the IDB.

The value of clean water was assessed based on the effects of this disaster using a difference-in-differences strategy with data from the Brazilian payments system, including electronic transfers to settle business-to-business transactions. The channels through which the dam failure affected the local real economy were also analyzed, as well as quantified how and to what extent the water contamination impoverished the affected riverside municipalities.

The resulting paper was published in [Working Paper 583](#) in August 2023. The study sought to quantify the negative externalities of the contamination of the Doce River using comprehensive and identified data on electronic payments, employment, and consumer credit. Thirty-seven municipalities along the Doce River affected by the pollution brought by the disaster were identified. A control group of 153 municipalities from Minas Gerais and Espírito Santo with similar characteristics to the affected group was also selected.

The results show that agricultural producers in the affected municipalities received cumulatively 41% to 60% less transfers (revenue) from outside clients three years after the disaster. The effects are more pronounced in municipalities where the river area is larger as a proportion of agricultural land.

In the labor market, negative effects were also found, but only in municipalities with a high proportion of river water. Individuals in the affected municipalities also experienced an 8% drop in credit card and consumer credit spending, with this result being stronger for higher-risk clients.

Water contamination first led to a decrease in production and then consumption, with real effects on agricultural and service production in the affected municipalities, causing a 7% drop in local GDP compared to municipalities in the control group. In summary, there was a clear decline in consumption and destruction of wealth with considerable effects on the GDP of the coastal municipalities most dependent on agriculture.

### **2.1.3 Macroeconomic models for addressing climate issues**

Climate change and associated risks will increasingly affect key macroeconomic variables for conducting monetary policy over different time horizons. Extreme weather events, such as the floods in RS in 2024, produce severe impacts in the short and medium terms, while risks associated with the transition to a low-carbon economy appear to have a longer-term impact. In this sense, it is worth considering whether a more active monetary policy might eventually be needed to mitigate the larger side effects of the green transition on prices. Additionally, it is worth reflecting on whether the analytical tools available to the BCB adequately reflect and consider climate issues.

Mindful of this issue, the BCB is working to adapt macroeconomic models to generate domestic scenarios capable of measuring the macroeconomic impacts of climate events and transition policies for a low-carbon economy on monetary policy.

The adopted strategy was to adapt a Dynamic Stochastic General Equilibrium (DSGE) model for the Brazilian economy, the Stochastic Analytical Model with a Bayesian Approach (SAMBA) of the BCB, to include the effects on firm productivity resulting from transition policies and climate events due to pollutant emissions.

The SAMBA is an economic model which describes the interaction of several economic agents, such as households, firms, fiscal and monetary policymakers in several markets of the Brazilian economy. The model is used to support the BCB board's decision making on monetary and macroprudential policies.

Based on historical data of Brazilian economy, SAMBA selects, through statistical methods, the parameter values of a set of equations which is used to simulate scenarios. The structure of the adapted model and its results were published in [Working Paper 591](#) in April 2024.

The model includes the use of fossil and renewable energy as alternative inputs for the production of intermediate goods. It considers pollutant emissions from fossil fuel burning for energy production and other production processes, addressing the impacts of the accumulation of these emissions (through changes in the frequency and severity of climate events) on productivity, supply, demand, and prices. It also considers consumer and investor decisions, and government policies for transitioning to a low-carbon economy, such as the carbon market.

Greenhouse gas (GHG) emissions can be divided into two types: carbon dioxide emissions from burning fossil resources for energy generation, and GHG emissions not related to energy, such as waste from production processes (e.g., methane from livestock). To limit environmental damage, government policies can be implemented, for example, by imposing a cost on emissions or limiting the quantity of emissions. These are two types of policies that can be used to induce a transition to a green economy. The intensity of the policy sets the pace of the transition process, as well as determines the size of disturbances on economic cycles.

Transition scenario simulations referenced the NGFS scenarios, particularly the Net Zero 2050 scenario, whose data were used to calibrate the model parameters and condition the projections. The simulations indicate that neither of the two emission policies is sufficient to induce a transition of the energy matrix without an appropriate green energy investment policy. Increases in green energy investments have a positive impact on economic activity, more than compensating for the negative effect of emission taxation.

The results also indicate that the model is capable of reproducing the NGFS Net Zero 2050 transition scenario if a transition policy is implemented based on two main vectors: increasing the emission cost on firms and incentivizing investments in clean energy production.

Regarding the macroeconomic effects of the transition captured by the model, the net effect of the two types of shocks on economic activity is moderately positive, with the GDP level reaching +1.7% above the model's growth trend after 15 years of transition. This positive net effect on GDP results from increased investment in green energy production, leading to a +45% increase in supply.

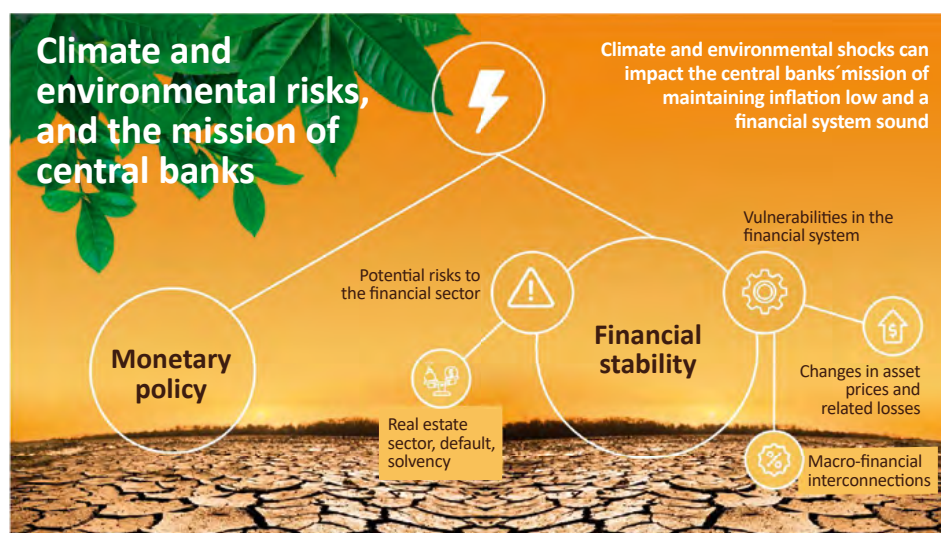
Even with the substitution effect between the two types of energy, with an -18% reduction in fossil energy supply at the end of the transition, the total energy supply grows by about +10%, becoming 18% cheaper. The effect of this increase in the supply of cheap energy is expansionary, more than compensating for the negative effect of the increased emission cost on firms, which corresponds to a fossil emission cost equivalent to 50% of the cost of the used fossil energy.

On the other hand, despite the accelerated activity, the effects on inflation are modest, not exceeding +40 basis points at the end of the transition, due to the model's monetary policy (Taylor rule), which raises the basic interest rates by +90 basis points. Thus, while the effects on inflation are positive, they are limited, as is the reaction of the model's monetary policy.

Therefore, the results suggest that active monetary policy would be necessary to contain the greater side effects of the green transition on prices. However, there is no indication that monetary policy could play a role in inducing or inhibiting the transition. On the other hand, the results indicate that this type of modeling approach is sufficiently flexible to incorporate key aspects of energy use and emissions, serving as a valuable tool for policy analysis.

## 2.2 Financial stability

Extreme weather events have the potential to affect financial stability through various transmission channels. More frequent and severe weather events can, for example, impact agricultural production and logistical infrastructure, leading to widespread price increases. Simultaneously, they can affect the profitability of businesses due to material losses and the need to rebuild damaged production structures.



The need for adaptation also increases construction costs and insurance premiums. The transition to a low-carbon economy may affect the profitability of the sectors that emit the most GHG, thereby reducing the financial capacity of these sectors.

Other aspects related to extreme weather events that strain the budgets of households, businesses, and governments are linked to labor productivity, tax revenues, and social impacts. All these factors affect the ability of borrowers to repay their debts, reduce the value of collateralized assets, and consequently increase the credit risk for financial institutions.

The increase in credit risk can also occur due to regulatory changes that impact sectors that emit the most GHG, changes in consumption patterns, or technological alterations. Regarding transition risk from regulatory changes, the BCB has developed models to estimate the effect on different economic sectors and possible impacts on financial institutions.

In addition to regulatory and supervisory measures, the BCB has conducted studies to identify economic sectors with the greatest potential exposure to transition climate risk and to analyze the sensitivity of the SFN credit portfolio to physical climate risk.

Two reports prepared by the BCB provide more details about these studies: the [Financial Stability Report \(REF\)](#), published semiannually, and the [Banking Economy Report \(REB\)](#), which is published annually.

For evaluating the sensitivity of the credit portfolio to climate risks, the BCB has conducted two exercises. The latest was published in the [REF of May 2023](#) and analyzed the exposure of the SFN's credit portfolio to borrowers located in municipalities at high risk of extreme rainfall events. The other, analyzing the risk of extreme droughts, was published in the [REF of November 2022](#).

In addition to projection-based studies, the BCB monitors the impact of extreme weather events that have already occurred in the country, such as the floods in RS in May 2024.

### **2.2.1 Financial stability survey – Climate risk**

The BCB conducts survey annually to identify the perceptions of financial institutions regarding the effects of climate risks on financial stability. In relation to the 2023 Financial Stability Survey, there has been an increased concern among financial institutions about the potential effects of climate risks on the SFN. Although the reported impact of climate events in 2023 was perceived as low by institutions, physical risks are expected to gain relevance over longer horizons.

There has also been an increase in maturity level regarding the adoption of initiatives related to climate risks. However, there is still a lot of heterogeneity among financial institutions. More mature institutions have institutional initiatives to mitigate the impact of climate risks on governance and corporate culture, align with international best practices, ensure suppliers adhere to sustainable initiatives, among other measures.

Few institutions reported any climate impact in 2023, but they believe that physical risks will increasingly impact financial institution assets in the long term. Acute risks, such as droughts, are perceived to have a high expected impact, while chronic risks, such as resource scarcity and desertification, are perceived to have a moderate

expected impact. Only 42% of institutions manage transition risk in some form, with just 19% having long-term analytical methodologies. The perception of transition risk impact is very low in the short term and moderate in the long term.

The most cited path for the materialization of physical climate risks involves damage to assets and production processes, resulting in losses and increased costs for borrowers, culminating in delinquency. Transition risks are related to climate, environmental and carbon regulations, impacting financial institutions to comply with regulations. For more details, the results are presented in greater detail in the [REF of April 2024](#).

## **2.2.2 Climate risk and the SFN: a proposal for indicators**

The BCB developed a study aimed at understanding the relationship between the SFN and GHG emissions in Brazil, using three indicators: emission coefficient by activity, SFN carbon footprint, and the proportion of loans to low-carbon sectors.

The first indicator helps identify the most emitting activities, such as livestock farming, oil refining, and transportation. The carbon footprint is a proxy for the SFN's vulnerability to climate risks and allows for international comparisons.

The loan proportion indicator shows a proportional increase in credit to low-emission sectors between 2012 and 2020. Additionally, seminars are being planned to outline climate and sustainability monitoring indicators. For more information, see the complete study in the [REB 2023](#).

## **2.2.3 Expansion of information disclosure by financial institutions**

During the second quarter of 2024, the BCB conducted public consultation nº 100 to gather contributions from society, aimed at improving the regulation that establishes the disclosure of the Social, Environmental and Climate Risk and Opportunities Report (GRSAC Report). The consultation covered selected and relevant topics to gather targeted and efficient information for including quantitative requirements in the GRSAC Report, which currently addresses only qualitative aspects.

The requirements for disclosing information on risks and opportunities related to social, environmental and climate issues are organized into four groups: governance; strategy; risk management; and metrics and targets. These requirements were inspired by the recommendations of the TCFD, incorporated into the standards published by the ISSB, linked to the IFRS Foundation, in June 2023.

The process of improving the rules for disclosing the GRSAC Report considers gradual implementation as a fundamental premise, to ensure synergies and learning experiences for both BCB and SFN institutions, given the dynamic and innovative nature of this topic in constant development in international and national contexts.

The first phase of the gradual implementation was completed in September 2021, with the publication of regulations addressing qualitative aspects of TCFD recommendations in information disclosure, focusing on governance, strategy, and risk management. The second phase was completed with the publication of public consultation nº 100, while the third phase, currently underway, aims at aligning the GRSAC Report rules to international standards.



#### 2.2.4 Social, Environmental and Climate Risk Document (DRSAC)

Starting in June 2024, the BCB began receiving the DRSAC from all supervised institutions covered by the regulatory framework, including the smaller ones, on a semi-annual basis. The first data submission occurred in February 2023 by only the larger financial institutions; subsequent submissions included additional institutions. The phased data submission enabled the development of a careful automated curation process to ensure the quality and consistency of the received data.

National and international references on sectoral risks are used, along with internal and external databases on financial system counterparts. The BCB maintains a dialogue with managers of these databases, to enhance data treatment and interpretation, and works on expanding the scope of indicators.

A survey conducted at the end of 2023 identified significant variation in understanding the concept of “positive contribution” investments, one of the relevant pieces of information collected via the DRSAC. The need for developing a Brazilian sustainable taxonomy was evident (see the “Perspectives” section).

#### 2.2.5 Management of Social, Environmental and Climate Risks (SECR)

Over the past few months, the BCB has undertaken supervisory initiatives to assess the adequacy of SECR management and the implementation of the Social, Environmental and Climate Responsibility Policy (PRSAC). In this regard, the BCB conducted horizontal analyses on a sample of entities, focusing on those with higher intrinsic risk. Additionally, entities were included in the supervision process that, despite not having high-risk levels, are situated in prudential segments with greater requirements for both PRSAC and risk management, contributing to the development of a comprehensive view.

The application of the Risk and Control Assessment System (SRC) methodology, which includes work papers to evaluate SECR and their management structure, resulted in 13 supervised entities undergoing this dedicated examination between July 2023 and June 2024. Among the 17 supervised entities identified as having the highest intrinsic exposure to SECR during the planning of supervision for 2024, 10 had their supervision cycles concluded during this period.

As a result of the BCB’s supervisory activities in previous years, internal audits of some entities were prompted to produce reports and plans to address identified deficiencies, which the BCB monitored. During this period, an assessment was also conducted of the adherence of entities specialized in gold acquisition to PRSAC requirements and SECR management, given the higher exposure associated with this activity.

Finally, the BCB developed studies based on information from the Rural Credit Bureau and Proagro Operations System (Sicor), involving cross-referencing its database with external public information. Sicor records all rural credit operations contracted in the SFN and primarily aims at providing statistical data on rural credit in the country and facilitating better monitoring, by the BCB, of rural credit operations and the Rural Credit Insurance Program (Proagro).

As a result, operations with indications of higher risk from both a compliance and a prudential perspective were mapped. These were subject to responses from the supervised credit-granting entities, following opinions from their respective internal or cooperative audit areas, as applicable.

### 2.2.6 Rural Credit Bureau

The Rural Credit Bureau is a system that stores data related to rural credit and the use of Proagro resources. Rural credit plays a central role in sustainability because of its importance for the economy and the SFN. Currently, 11.8% of the credit operations carried out by SFN institutions correspond to rural credit.

The Proagro guarantees the payment of rural financing for agricultural funding when the crop suffers losses due to climatic events or uncontrolled pests and diseases. The program was created by the federal government in 1973, is administered by the BCB according to norms approved by the CMN, and functions as rural insurance for the farmer and the financial institution that provided the rural credit.

The program mainly targets small and medium rural producers, although it is open to all within the coverage limit established by regulations. For beneficiaries of the National Program for Strengthening Family Farming (Pronaf), the inclusion occurs under a subprogram called Proagro Mais, which, in addition to Proagro's standard coverage, also ensures a minimum income to family farmers until their next production cycle.

As part of this initiative, BCB and Ibama signed a Technical Cooperation Agreement that enables the exchange of information on rural credit and Proagro operations and various databases managed by the environmental authority. In addition, information sharing will support Ibama's efforts to prevent and repress environmental crimes.

Based on the information collected in the Rural Credit and Proagro Operations System, it was possible to improve the tools used by the BCB's prudential supervision to identify potentially higher exposures to SECR. With technological advancements implemented by the BCB's supervision since 2020, rural credit operations now have their geodetic coordinates verified and analyzed alongside other information related to issues like slave labor, the location of indigenous lands, and quilombola territories. This initiative was realized by cross-referencing data reported by supervised entities in Sicor, related to rural credit, with other publicly accessible databases.

In this regard, the geodetic coordinates available in Sicor are a relevant input for locating financed plots for later comparison with similar information from other sources, such as the location of conservation units and administrative initiatives by environmental agencies. This has made it possible to identify geographically coincident points that indicate greater exposure to SECR.

During the period analyzed for this report, the BCB conducted initiatives involving 64 supervised entities, with 10 of them concentrated in the Amazon biome. These initiatives resulted in 68 alerts, the issuance of 10 summary reports, and the declassification of 342 operations.

Additionally, in the first half of 2024, the CMN approved four resolutions initiated by the BCB related to Proagro, which modernized the proof of input acquisition model, aligning the program with the best practices adopted in the rural insurance market. The proposed measures are expected to reduce costs for the country by approximately BRL 935 million in the second half of 2024 and BRL 2 billion in 2025.

Resolution CMN No. 5,081, dated June 29, 2023, stipulated that rural credit should not be granted for enterprises located on rural properties not registered or with registration canceled or suspended in the Rural Environmental Registry (CAR), created by Law No. 12,651, dated May 25, 2012. This resolution also updated social, environmental and climate impediments for granting rural credit, extending the prohibition to properties with embargoes and barring credit issuance in areas overlapping with Not Designated Public Forests.

Sicor was updated to process the checks and incentives contained in the regulations published as a result of the Safra Plan, such as the impediment of contracting with a suspended CAR, the prohibition of adhesion to Proagro for borrowers with more than seven Communications of Loss, and a 0.5% reduction in the interest rate for properties with an analyzed CAR. Another significant change was the determination that the polygon recorded in CAR be used as the property reference for rural credit purposes.

In this way, after the BCB processed and analyzed data, the supervised entities began to be challenged with evidence of operations with greater risks than the requirements of their own internal policies and limits, helping to improve the prudential supervision of SECR in the SFN.

Since the implementation of these changes in 2024, 1,235 attempts to register operations totaling BRL 726 million have been blocked. Additionally, the completion of another 30,609 attempts to register operations with CAR inconsistencies, such as areas outside CAR or CARs not related to the property area, totaling BRL 6.3 billion<sup>3</sup>, have been prevented.

Impediments		
year	number of operations	amount
2020	5	8.05
2021	42	29.51
2022	421	103.45
2023	527	173.61
2024	1,235	726.24
Total	2,230	1,040.86

Attempts to register operations with enterprises not listed in the CAR or with a CAR unrelated to the enterprise		
year	number of operations	amount
2024	30,609	6,271.87

Note: Amount in BRL Million. In 2024, data is updated up to June 30, 2024.

<sup>3</sup> An attempt to register an operation blocked due to social or environmental nonconformities, or inconsistencies related to the CAR, may be completed once the initially identified issue has been resolved.

### 2.2.7 BCB measures regarding the impact of climate events on RS

As part of the initiatives taken to address the state of public calamity declared in May 2024 in RS, the CMN and the BCB approved measures in that same month to provide the SFN with better conditions to mitigate the economic effects of the public calamity situation.

Temporary criteria were adopted for the characterization of credit restructuring for residents in that state, for credit risk management purposes. In this context, the restructuring of operations conducted from May 1, 2024, to December 31, 2024, are exempt from being classified as problematic assets, thus not altering their risk profile or requiring more stringent prudential requirements. However, this measure does not apply to the restructuring of operations already classified as problematic at the date of publication of the respective regulation or those operations with evidence of the counterparty's inability to meet the obligation under the new agreed conditions. In the context of Proagro, considering the difficulties of reaching the affected places, technical inspections required for program indemnity payments can now be carried out by using remote sensing and parametric data on municipal productivity, aiming at expediting indemnity payments to rural producers affected by floods.

Additionally, the CMN decided that credit operations under federal programs designed to address the economic consequences of climate events in RS, where the credit risk is borne by the Federal Government, directly or through a guarantee fund or controlled institution, would be subject to minimum provisioning levels only in cases of default exceeding ninety days on principal or interest payments.

The climate emergency prompted the supervision to implement more intensive monitoring procedures for supervised entities based or with significant activity in the region, with reports promptly relayed to a crisis monitoring group. Procedures included identifying supervised entities potentially more exposed to physical and financial assets in the affected region, evaluating contingency plans, and mapping key measures to address customer needs, especially in terms of physical service and financial support. This financial support could facilitate the postponement and restructuring of operations, the release of applied resources, the waiver of fees and charges, and the identification of potential changes in policies for limiting new credit operations.

Specifically for certain segments, such as credit unions (including credit union systems) and other non-banking supervised entities, a questionnaire was sent to those with significant activity in the state, covering topics such as business continuity and potential impacts on credit portfolios, deposits, and liquidity.

Finally, monitoring meetings with the management of the most exposed supervised entities were conducted, maintaining contact with those deemed most critical. Meetings with representatives from the Credit Guarantee Fund (FGC) and the Credit Cooperative Guarantee Fund (FGCOOP) are also part of the measures adopted by the BCB in response to the climate disaster in RS.

## 2.3 International reserves

Building consensus on the best way to measure the financial risks associated with climate change is an evolving process, and the disclosure of financial information in this section contributes to the effort to achieve a common understanding of measurement approaches.

Regarding the BCB’s initiatives related to managing risks associated with climate change and its economic and financial impacts, the information presented in this section is divided into four pillars, aligned with TCFD and now ISSB: Governance, Strategy, Risk Management, and Metrics. Every year, the BCB publishes the [International Reserves Management Report](#), which covers aspects ranging from the economic situation and governance to investment policy and risk management and includes a statement of reserve management’s results.

### 2.3.1 Governance

The Balance Sheet of the BCB as of December 31, 2023, is schematically presented in the figure below. The federal government securities portfolio (the largest part of the asset in local currency) consists solely of securities issued by the National Treasury of Brazil and, for this reason, will not be analyzed in this edition of the Report. The balance sheet shows that international reserves (comprising foreign currency assets) represent a significant portion of BCB’s assets. These reserves are invested in various asset classes in major international financial markets, and the climate risk metrics presented below pertain to these investments.

Balance Sheet of the BCB	
Assets	Liabilities and Equity
Assets in foreign currencies 1,811	Liabilities in foreign currencies 178
	Liabilities in local currency 3,712
Assets in local Currency 2,484	Currency in circulation 342
	Equity 63
Total Assets 4,295	Total Liabilities and Equity 4,295

Note: BRL Billion, December 31<sup>st</sup> 2023.

The GRC is responsible for establishing the strategic objectives and the risk and return profile of the country’s international reserves. Regarding investment management, the governance structure of the reserves is supported by the PGR-BCB. Investments are made according to guidelines established by the GRC, which defines a detailed and replicable benchmark portfolio, operational limits for deviations from the benchmark, and performance measurement criteria, aligned with the Institution’s conservative risk profile. Among the strategic allocation criteria, parameters related to environmental and climate risks are being gradually introduced into the decision-making process.

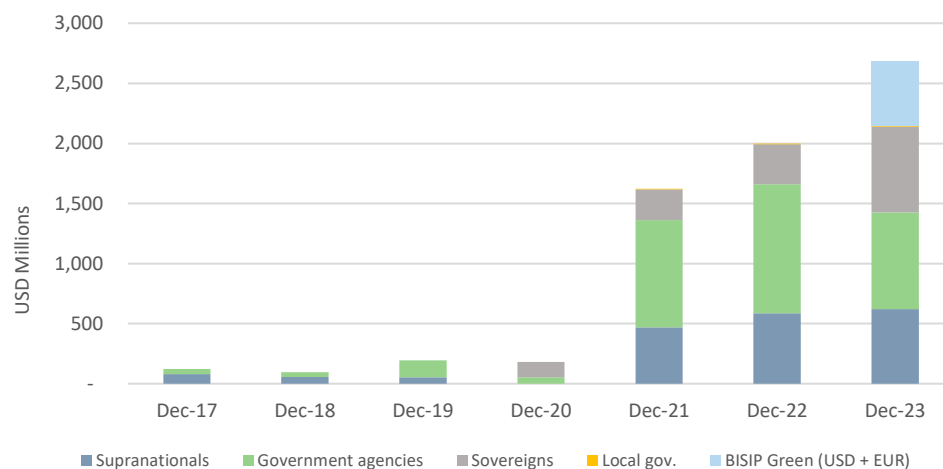
### 2.3.2 Strategy

The investments of the international reserves have a conservative profile and aim to hedge the country's gross external debt, with the objective of reducing the country's exposure to exchange rate fluctuations and have an anti-cyclical allocation profile. Allocation is carried out using risk-return optimization techniques for the portfolio, considering safety, liquidity, and profitability, prioritized in that order.

There are still no consolidated methodologies and metrics as best practices for evaluating climate risks in investment portfolio construction. However, efforts are underway for investors and institutions to disclose and monitor the climate risks of their financial positions based on existing standards, contributing to building consensus on the best measurement practices. Strategic allocation optimization exercises for international reserves take into account various asset classes, including those associated with sustainable-labeled securities, and climate risk exposure indices of the portfolio are considered, in addition, in the decision-making process. The BCB has therefore gradually increased the purchase of assets with these characteristics in the reserves' portfolio, observing liquidity, profitability, and risk constraints that also apply to other assets.

As observed below, the BCB has increased the percentage of sustainable-labeled securities in international reserves. Initially, GB (Green Bonds) were acquired in fixed-income securities issued by government agencies, supranational organizations, and central governments within the active management of international reserves investments. In 2021, a strategic allocation in GB was established in the reference portfolio of international reserves investments, considering the risk-return profile of the asset classes. More recently, the portfolio also started to include sustainability and social bonds. In 2023, investment began in funds from the BIS dedicated to green investment (BISIP Green USD and BISIP Green EUR). Graph 1 shows the allocation of international reserves in sustainable-labeled investments at the end of each year since 2017, where recent changes due to strategic allocation can be seen.

**Graph 1 – Sustainable labeled bonds in international reserves**



Source: BCB, December 2023.



### 2.3.3 Risks

Analyzing the risks associated with the investment process is crucial for understanding financial results and aligning the reference portfolio with the investment objectives of the international reserves.

The different risks taken in the investment of the international reserves are monitored daily by the BCB. In addition to financial risks (such as market, credit, and liquidity risks), records of potential operational incidents are also monitored, as well as metrics associated with GHG emissions into the atmosphere, constructed based on “CO<sub>2</sub> equivalent emissions (CO<sub>2</sub>e).”

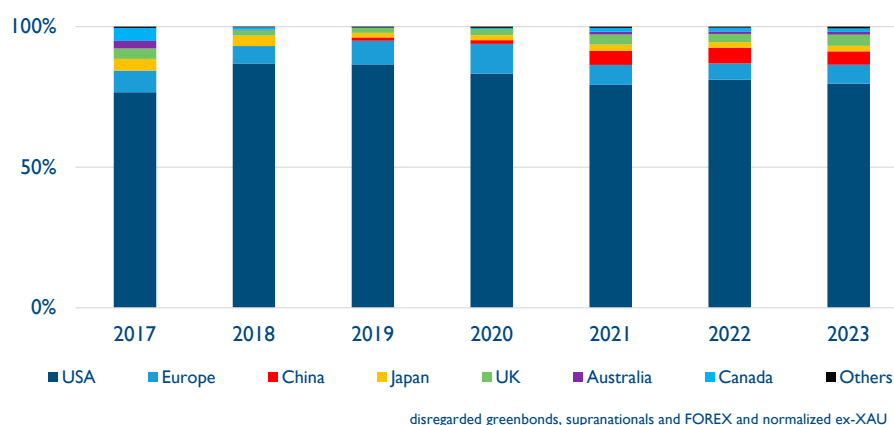
Monitoring CO<sub>2</sub>e measures aims at assessing the impact of different investment strategies on the portfolio’s carbon profile. The international reserves portfolio is predominantly invested in sovereign securities, and while there is exposure to the U.S. stock market, there is no direct acquisition of company stocks. Thus, monitoring the indices and metrics associated with the portfolio is predominantly influenced by indicators related to countries rather than companies.

### 2.3.4 Metrics

In managing international reserves, the BCB monitors some metrics related to climate risks, mainly GHG emissions, the energy profile, and the implied temperature increase. Given the lack of consensus on a single metric for evaluating international reserves investments concerning climate risks and sustainability issues and aiming to increase transparency and contribute to the discussion on the subject, this Report uses various exploratory measurements.

Graph 2 shows the evolution of country allocation for international reserves at the end of each year. Throughout the period, the USD has been the currency with the largest share in international reserves investments, mainly due to the strategy of hedging the external liability (in which the USD is also the dominant currency).

Graph 2 – Country allocation of Brazilian international reserves

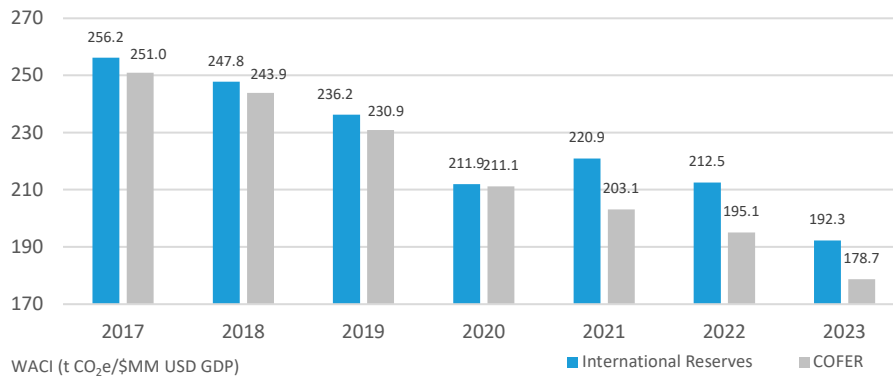


Source: BCB, December 2023.

Note: Not considered greenbonds, supranationals and Forex, and normalized ex-gold.

The BCB monitors internationally used measures, such as the Weighted Average Carbon Intensity (WACI). Combining country allocation with CO<sub>2</sub>e emission data normalized by GDP leads to the metric shown in Graph 3.

**Graph 3 – Weighted average of the carbon intensity of international reserves**



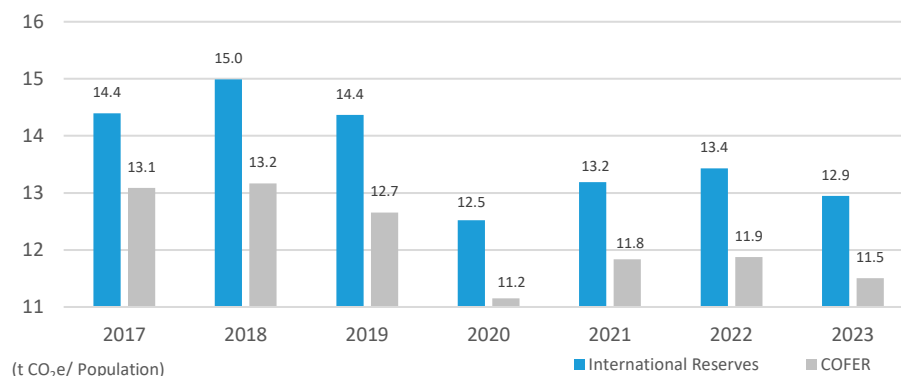
Source: BCB, with data from IEA – International Energy Agency, Moody's Data Buffet, and IMF, December, 2023.

As observed in the Graph above, in 2023, the WACI of international reserves decreased compared to 2022, mainly due to the reduction in carbon intensity, normalized by GDP, in the United States and a slight reduction in allocation to that country (which has the largest share in the portfolio).

The graph also presents, for comparison purposes, the WACI of a theoretical BCB portfolio composed of the global aggregate currency distribution of international reserves, as presented on the IMF website (COFER – Currency Composition of Official Foreign Exchange Reserves). From 2016 to 2023, the decrease in WACI value for the analyzed portfolios mainly reflects the decrease in carbon emissions of countries normalized by GDP.

Another metric refers to CO<sub>2</sub>e emissions per capita. This measure allows tracking the intensity of emissions relative to a country's population. Currently, the global average per capita emission is 6.5 t CO<sub>2</sub>e. Similar to the WACI, Graph 4 shows the weighted average of the combination of country allocation with CO<sub>2</sub>e emission data normalized by population, i.e., per capita emissions.

**Graph 4 – Weighted average CO2 emissions per capita**



Source: BCB, with data from IEA – International Energy Agency, Moody's Data Buffet, and IMF, December 2023.

One of the main sources of GHG emissions is energy generation. Using data from the International Energy Agency (IEA) on the energy mix of countries, it is possible to build the energy generation profile associated with the allocation of

international reserves across different investment currencies. This composition allows monitoring how international reserves are distributed among various energy generation sources produced by countries.

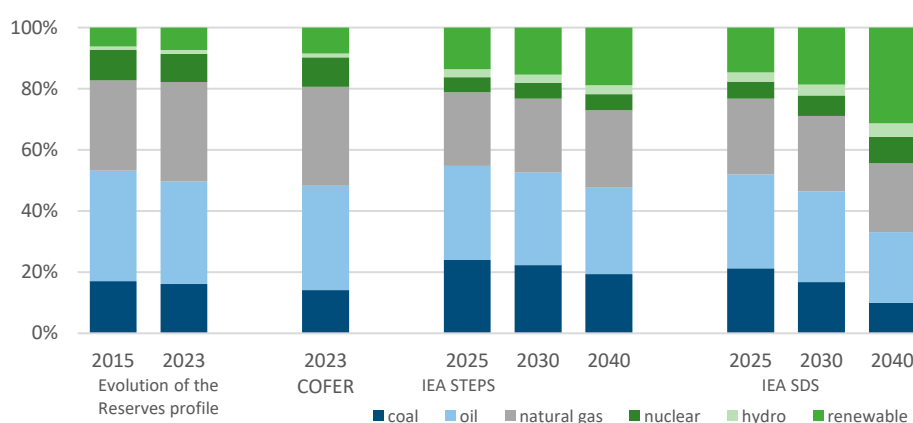
The IEA discusses two scenarios for the evolution of the energy generation profile and its adherence to the commitment established by the Paris Agreement. This commitment is to ensure that the global temperature increase this century does not exceed two degrees Celsius compared to pre-industrial levels.

The IEA does not seek to project future outcomes but aims to explore different possible scenarios: one reflecting announced political intentions and targets and another based on full compliance with sustainable energy targets. These are respectively the Stated Policies Scenario (STEPS) and the Sustainable Development Scenario (SDS). STEPS reflects not only existing policies but also announced intentions and plans and their climate impacts.

SDS proposes an evolution of policy profiles aligned with the Paris Agreement's goals of "keeping the global average temperature increase below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels." Achieving this goal requires a level of net zero emissions (balance of emissions produced with removals through carbon capture and sequestration) in the second half of this century.

Graph 5 illustrates the weighted profile of energy generation sources for the international reserves investments in the countries comprising the investments. The profile is affected by changes in asset allocation and the energy mix profile of the countries. The graph also presents the reserve investments profiles for the STEPS and SDS scenarios.

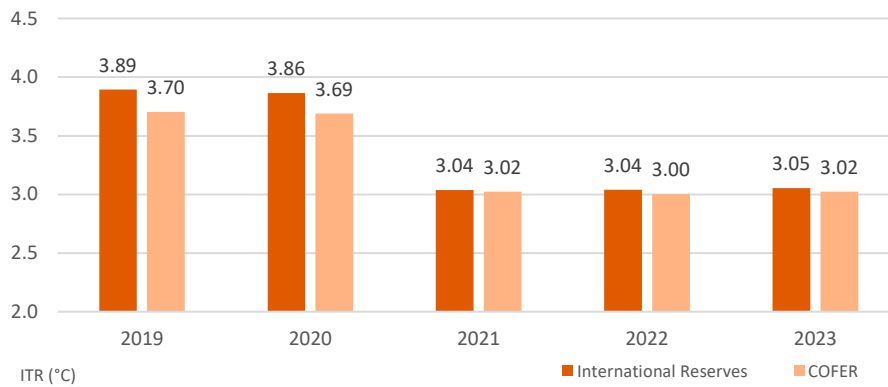
**Graph 5 – Energy generation profile**



Source: BCB, with data from IEA - International Energy Agency, December 2023.

Graph 6 shows the implied temperature increase associated with international reserves investments. The Implied Temperature Rise (ITR) provides a measure indicating the alignment of a country, institution, or investment portfolio with global climate goals. Thus, it is possible to compare, for example, the values calculated for a portfolio against the temperature increase limits of the Paris Agreement.

**Graph 6 – Implied temperature rise**



Source: BCB, with data from Climate Action Tracker, December 2023.

The credit rating agency Moody's provides an indicator that shows the impact of ESG considerations on an issuer's or a transaction's rating. The ESG Credit Impact Score (CIS) is the result of an assessment indicating the impact of ESG considerations on the credit rating of an issuer or transaction.

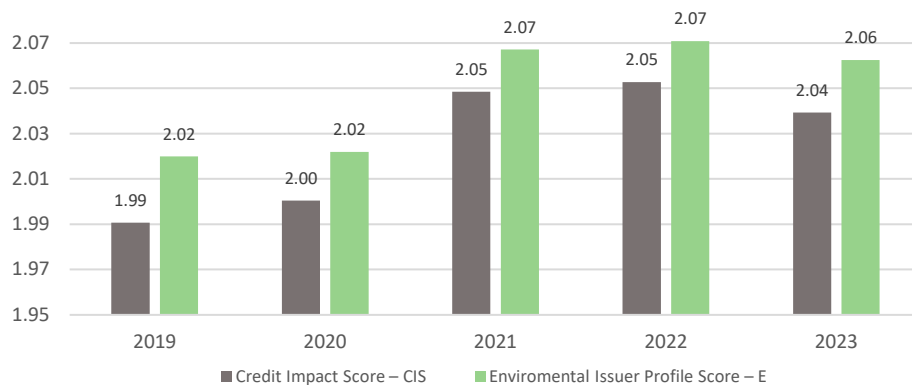
The CIS is scored on an asymmetric five-point scale:

- Positive (global ESG attributes influence on the rating is material);
- Neutral to Low (global ESG attributes influence on the rating is non-material);
- Moderately Negative (global negative ESG attributes influence on the rating is more pronounced than the previous);
- Highly Negative (global negative ESG attributes influence on the rating is more pronounced than the previous); and
- Extremely Negative (global negative ESG attributes influence on the rating is more pronounced than the previous).

It is important to clarify that since credit ratings incorporate all relevant credit factors in assessing relative credit strength (with ESG aspects being only some of these factors), there is no direct relationship between a credit rating and a CIS. A high credit rating does not necessarily imply a positive CIS, nor does a low rating imply a negative one.

Graph 7 presents the average CIS indicator for international reserves investments. It also shows the average of the environmental factor of the indicator (Environmental Issuer Profile Score). According to the indicator, international reserves are classified as CIS-2 and E-2, meaning that the global influence of ESG attributes on the rating is considered neutral to low (non-material).

Graph 7 – ESG Moody's Scores (CIS and E)



Source: BCB, with data from Moody's Investors service, December 2023.

## 2.4 Greenhouse Gas Inventory

The BCB recognizes the importance of using available natural resources responsibly and minimizing the impact of its activities on the environment. Among the initiatives conducted between July 2023 and June 2024, notable initiatives include the donation of IT equipment and furniture, the Greenhouse Gas Inventory (GHG Inventory) and the sustainable disposal of old BRL banknotes.

Donations promote the circular economy and prevent disposing of items that can still be used. During the period covered by this report, 2,578 items, including computers and other unusable electronic equipment, were donated to three Non-Governmental Organizations (NGOs) in the educational sector, focused on both youth and adults. It is estimated that hundreds of students will benefit from the donated equipment in the coming years.

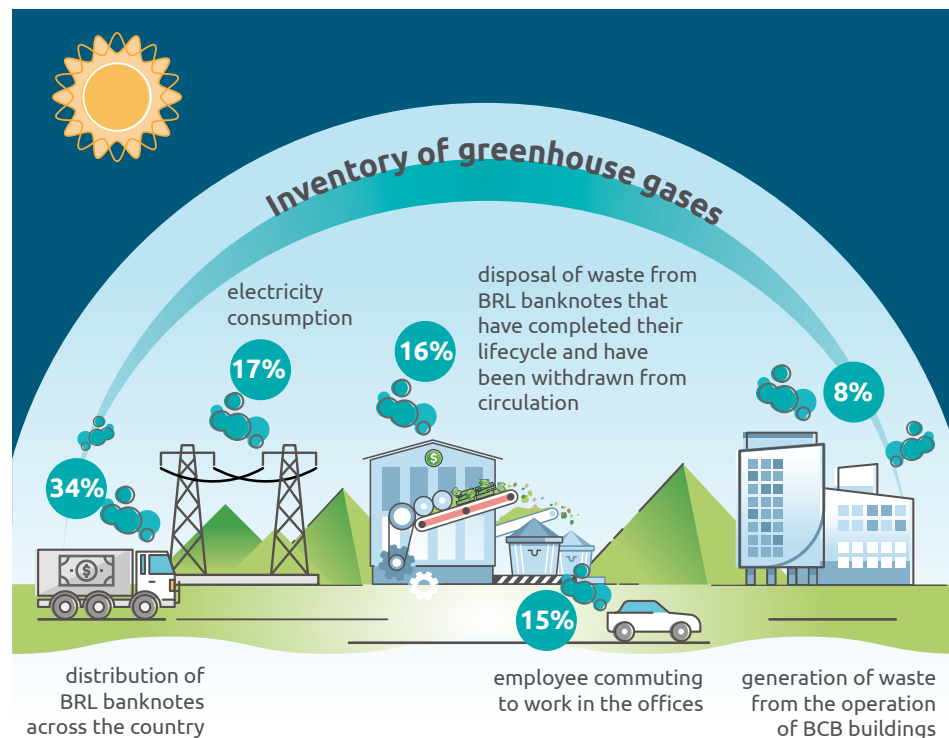
Another example of a BCB initiative to reduce the consumption of natural resources was the elimination of the transit of paper documents. Every year, around 90,000 documents are filed using the Digital Protocol. This elimination has improved the BCB, the SFN, and society in general by making the process faster, safer, and less costly.

The BCB continues to increase energy efficiency and reduce water consumption by renovating buildings and installing more sustainable solutions. The aim is to reduce natural resource consumption and rationalize public spending, which would benefit society directly.

### 2.4.1 Greenhouse Gas Inventory

The completion of BCB's first GHG Inventory in March 2024 is a notable advancement. The GHG Inventory was prepared using the GHG Protocol methodology, compatible with International Organization for Standardization (ISO) standards, Intergovernmental Panel on Climate Change (IPCC) quantification methodologies, and NBR 14064. Both the inventory and the emission reduction strategies are tailored to each of the twelve buildings owned by the BCB.

The base year for the inventory was 2019, reflecting the institution's operations with nearly all staff working onsite. There were five main sources of GHG emissions in 2019, as shown below.



Strategies for reducing these emissions are being explored. For cash distribution, one potential strategy could be the renewal of the truck fleet that transport and distribute BRL banknotes across the country, as they are from the 1980s/1990s. Newer vehicles emit significantly less GHG than a fleet that is around forty years old.

Regarding energy consumption, a strategy under consideration involves installing solar panels on the BCB's headquarters buildings across Brazil. For the building in Salvador, which already has a solar power system, an expansion of the number of solar panels is being evaluated. This BCB building was also recognized for its sustainable management practices by A3P in 2020 (8<sup>th</sup> A3P Award for Best Sustainability Practices).

Since 2022, all the disposal of banknote waste is sent for co-processing in cement production, thus avoiding high levels of emissions. Each ton of unusable paper money sent to landfills would generate 2.92 tons of CO<sub>2</sub>.

The avoided CO<sub>2</sub>e emissions are the difference between what would have been generated by each disposal method. Co-processing emits 1.61 tons of CO<sub>2</sub>e per ton of waste, so the reduction per ton of waste is 1.31 tons of CO<sub>2</sub>e. In 2023 alone, BCB avoided 1,965 tons of CO<sub>2</sub>e emissions by sending approximately 1,500 tons of banknotes for co-processing.

The use of banknote disposal for cement co-processing is currently considered the most sustainable waste treatment practice. Since 2022, BCB has individual

contracts with each regional office, and all waste, after being shredded by the institution, is sent to be used as fuel incement kilns. Thus, the numbers from the 2022 and 2023 inventories will confirm the reduction of GHG emissions from this source.

For sources 4 and 5, related to employee commuting and waste generation from building operations, the numbers for 2022 and 2023 are awaited, as most employees worked from home during these years, implying that these emissions were reduced.

The inventory has been an essential tool for informing strategic decisions focused on sustainability, and it also creates opportunities for reducing operational costs.

This underscores BCB's commitment to supporting a low-carbon economy.

#### **2.4.2 Life cycle assessment of banknotes**

In November 2023, BCB completed the Life Cycle Assessment of Brazilian banknotes. The study covered all phases of the banknote life cycle, from raw material production to cotton paper and note production, through distribution, sorting, shredding, and final disposal of unusable notes.

The study identified the two largest GHG-emitting processes throughout the banknote life cycle. The first is related to the production phases of the notes. To address this BCB is studying options for more durable materials to extend their circulation time. The second major GHG emitter, previously mentioned, involves the distribution of paper money across the country.

#### **2.4.3 Residual reduction of banknote quantity after Pix**

It was anticipated that the growing adoption of Pix—the BCB's instant payment system—by millions of people would lead to a decrease in the amount of paper money in circulation and, consequently, a reduction in GHG emissions from distributing this currency across the country. However, as of mid-2024, there is about 20% more paper money in circulation compared to 2019, before the COVID-19 pandemic.

One possible explanation for this phenomenon is the “hoarding” that occurred during the pandemic. In a period of deep uncertainty, many Brazilians may have chosen to keep cash on hand for security. Even after the pandemic, cash levels have not yet returned to pre-pandemic norms.

The BCB notes that Brazilians' relationship with cash remains strong, with behavior varying widely. Recently, the institution conducted a survey on how Brazilians receive their salaries. The survey, with a 95% confidence level, found that 65% receive payments in bank accounts, while 34% still receive cash—a surprisingly high number.

The BCB also inquired about preferred payment methods. The top four, accounting for 97% of responses, were Pix, paper money, debit cards, and credit cards, in that order. Pix is preferred by 41% of Brazilians, while 38% still choose paper money.



In summary, Brazil appears to be in a transitional period where cash remains a cornerstone of the economy, but the use of digital payment methods is steadily increasing.

However, there are challenges to further expanding digital payment usage. The first is financial inclusion, which is closely linked to information and education. The second is the informal economy, which should not be underestimated, as many people still receive cash and spend it almost immediately on daily purchases. Finally, access to technology, the internet, and smartphones is still not universal.

#### **2.4.4 Selective collection**

In 2023, approximately 53 tons of recyclable waste were sent to recycling cooperatives in Brasília. Considering that each ton of such waste sent to a landfill generates about three tons of CO<sub>2</sub>e, approximately 160 tons of CO<sub>2</sub>e emissions were avoided in Brasília in 2023. Since 2021, when BCB buildings were physically adapted for proper waste separation, recurring awareness campaigns and training for cleaning teams have been conducted to ensure correct waste separation from its origin to its final destination.

Throughout 2023, this process was intensified and incorporated into the cleaning contract, with periodic training on waste separation. Additionally, materials and videos were produced, and discussions were held with employees to emphasize the importance of correct waste separation at the source, i.e., when generated. The consolidation of the selective collection process within the institution aims to ensure proper waste disposal and generate income for many families, aligning with the concept of a circular economy. What is considered waste by the BCB is viewed as a resource for other work processes.

#### **2.4.5 Sharing of building spaces**

Another efficient space and resource management practice used by the BCB is sharing its buildings with other public agencies. In 2023, this practice resulted in savings of approximately BRL 18.6 million. Tenants occupy between 10% and 40% of the buildings, depending on the region, except in Brasília. There are 32 lease agreements with 21 public administration bodies and entities.

Sharing facilities has led to better use of space, optimized contracting services and procurement processes, and apportionment of expenses (such as water and sewage services, electricity, surveillance, maintenance and upkeep of real estate). It has also reduced property rental costs for the assignees.

Besides reducing costs for the Federal Government as a whole (since no rent is charged for these tenants, only shared operating expenses), another benefit is the reduction of GHG emissions by the BCB. By decreasing the air-conditioned and illuminated areas used by its employees, energy consumption and emissions from this major source are also reduced.

# 3

## People

This section is dedicated to presenting the BCB's initiatives focused on people. It describes the BCB's relationship with society and presents initiatives for increasing transparency and financial citizenship. It also outlines initiatives related to the BCB itself regarding diversity, learning, and employee well-being policies.

### 3.1 Relationship with society

The BCB's relationship with society involves direct citizen service, provision of services to users, and financial education initiatives. There is also the BCB's work with supervised entities, focusing on citizens' demands. The BCB actively seeks to exchange knowledge with academia and the market. Additionally, it provides a wealth of information through its website and the BCB Open Data Portal.

The BCB's Service Charter includes information on all the services offered to citizens, the ways of accessing these services, and the commitments to quality of service to the public. The communication channels maintained by the BCB, and its governance strengthen the transparency and credibility of its initiatives. They also make it possible to identify the needs of its target audience and establish a corresponding plan.

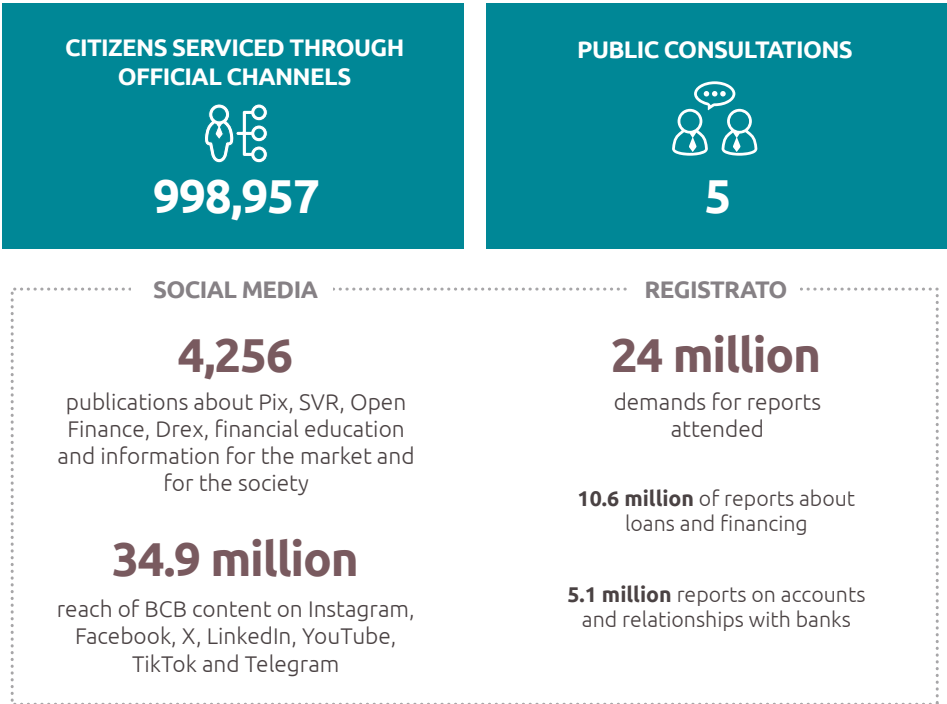
The BCB provides a system named [Registrato](#) through which citizens can quickly, easily, and securely consult their personal financial information without the need for human assistance. Registrato can be accessed on the My BCB page on the BCB's website. Between July 2023 and June 2024, users issued over 24 million reports using Registrato.

The BCB's service channels most used by citizens are [Contact Us](#), for registering demands online, and the 145 hotline (local), a service available on working days from 8 am to 8 pm. Din, launched in 2019, is the BCB's virtual assistant. It answers various queries from users regarding Registrato reports, it assists in calculating loan interest or the time required to save a specific amount of money and provides information on authorized operating institutions and inform users about the status of their requests or complaints registered with the BCB. Between July 2023 and June 2024, there were 980,288 service interactions through these channels, in addition to another 18,669 complaints handled by the Ombudsman, totaling nearly one million interactions in the period.

The BCB uses suggestions, compliments and complaints received by the Ombudsman’s Office to support and even stimulate internal assessments about possible innovations and improvements in the quality of institutional services and on its general performance. The transparency in the relationship among the customer, financial institution, and the BCB also benefits the strengthening of the entire SFN and the better employment of public and private resources, whereas clarity of information benefits the decision-making process and the exercise of financial citizenship.

The BCB is also present on social media and uses these resources to disseminate informative content on accessible and popular formats. Between July 2023 and June 2024, 4,256 posts were made on various topics related to BCB’s activities, providing information to the market and the public. The language used is simple and direct, and the information is accessible through the BCB’s profiles. In 2023, the BCB increased its social media presence, reaching approximately 34.9 million people.

To continuously improve its services, the BCB provides channels for citizens to contribute suggestions. Public consultations, seminars, and events involving external participants are examples of the BCB’s efforts in this direction. Accessibility is one of the ways of providing citizenship and, for this reason, the BCB adopts measures to favor access to digital content made available on social media, applications, and its website.



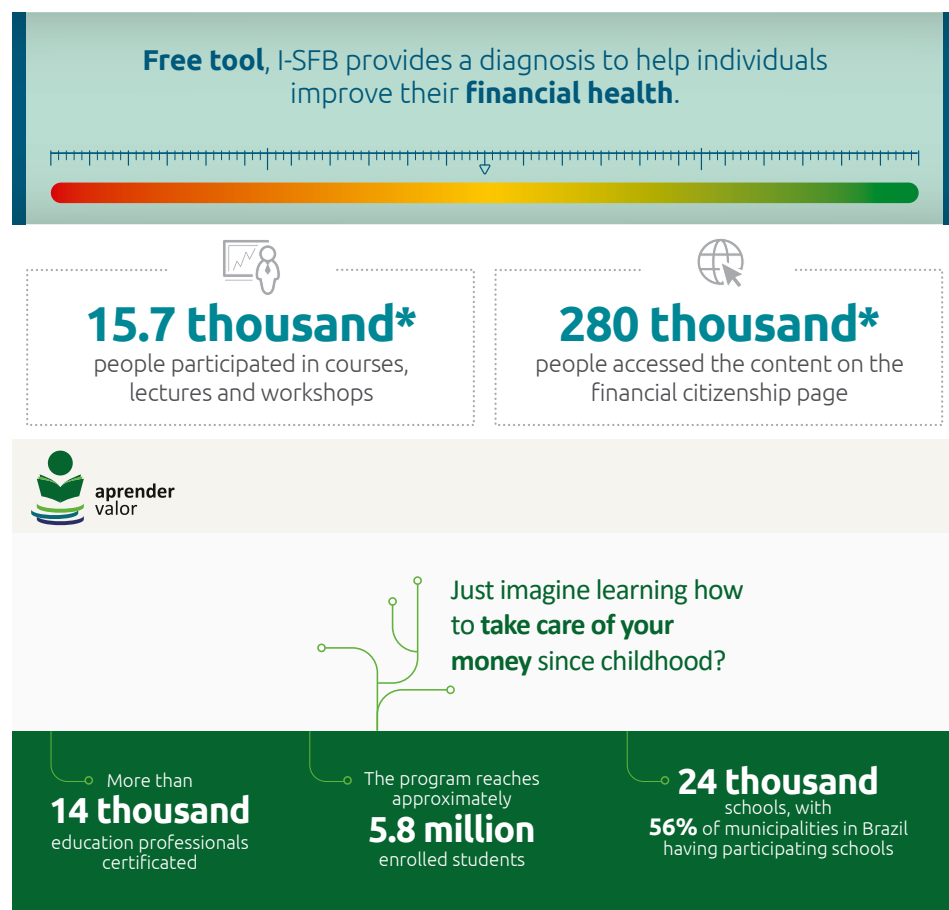
Note: Data between July 2023 and June 2024.

## 3.2 Financial citizenship

Financial citizenship involves the exercise of rights and duties that enable individuals to manage their financial resources effectively. The development of financial citizenship occurs through a context of financial inclusion (see section 4.1), financial education, consumer protection in financial services, and participation in discussions about the financial system.

One of the dimensions of the Agenda BC# and a key component of BCB's vision is promoting financial education. Financial education initiatives aim to provide citizens with greater knowledge about financial risks and opportunities.

Through accurate, plain-language information, consumers and financial investors develop the knowledge and skills to make choices that improve their financial well-being. The initiatives in the Education dimension also seek to encourage the habit of saving and reducing indebtedness.



\*Note: Data from July 2023 to June 2024.

Between July 2023 and June 2024, the BCB reached 3,500 people through 30 lectures, and 12,200 people through courses and workshops, including those conducted as part of the Aprender Valor Program. More than 14,000 education professionals were certified by this program since 2020. The next section (3.2.1) provides more details.

In the virtual environment, 280,000 users accessed financial citizenship content on the BCB's website. Among other information, citizens can find on the website links to the courses "Gestão de Finanças Pessoais" (Personal Finance Management) and "Formação de Multiplicadores da Série Eu e Meu Dinheiro" (Train the Trainer for the Me and My Money Series). During the report's analysis period, there were 16,350 accesses to BCB's Money Museum website, which also offers financial education content.

The BCB also relies on financial and payment institutions to promote financial education. According to the latest mapping data, in 2023, 100% of the mapped institutions (36 banks, 11 payment institutions, and 5 loan companies) promote financial education initiatives. Among credit unions, this percentage reaches 86% of the 619 entities mapped in 2021.

### **3.2.1 Aprender Valor program**

The Aprender Valor program offers free financial education to students in primary and secondary public schools nationwide. The program seeks to transform the relationship between young students and money, promoting awareness, responsibility, and autonomy in using financial resources.

Conceived by the BCB, Aprender Valor was financed, between June 2019 and June 2024, with resources from the Ministry of Justice and Public Security's Fund for the Defense of Diffuse Rights and developed in partnership with the Center for Public Policies and Evaluation of Education at the Federal University of Juiz de Fora.

The program's educational resources are available on an online platform, where it is possible to access school projects, training courses, and learning assessments. The school projects with financial education, which follow the guidelines of the National Common Base, are applied through the content of the Portuguese Language, Mathematics, and Human Sciences subjects.

The initiative is present in 56% of the country's municipalities, involving more than 24,000 public primary and secondary schools. As a result, the program has the potential to reach approximately 5.8 million students enrolled in these schools. Since 2020, more than 14,000 education professionals concluded the Program's courses. As from August 2024, the Program will be also available for private schools.

### **3.2.2 Brazilian Financial Health Index (I-SFB)**

The third round of measurement of the Brazilian Financial Health Index (I-SFB) was conducted by Febraban with technical support from the BCB between June and September 2023. This is the largest measurement ever carried out in Brazil about financial health, involving 4,769 Brazilians over the age of 18.

The I-SFB assesses the following financial health dimensions: proficiency (which encompasses measures of ability and behavior), security, and freedom. Ability measures the individual's capability to seek out and understand important information for their financial life, while behavior measures attitudes, especially concerning discipline and self-control.

Financial security represents people's perception of their financial situation and whether it is a source of worry and stress. Financial freedom, on the other hand, assesses whether an individual's relationship with money allow him or her to enjoy life.

The index is divided into seven brackets: bad, very low, low, ok, good, very good, and excellent, distributed on a scale of 0 to 110 points. The average result for Brazilians was 56.2 points, i.e., between low and ok. In 2022, the result was 56.0 points, and 57.2 in 2020.

Based on the I-SFB measurements, it is possible to assess the evolution of Brazilians' financial health and make various comparisons involving income bracket, gender, age, and geographic region. A fourth measurement and in-depth studies using the databases of the surveys already carried out are planned for 2024. Any citizen can calculate their index for free at [indice.febraban.org.br](https://indice.febraban.org.br).

The I-SFB is also essential for personalizing the user journey of the financial education platform [Meu Bolso em Dia](#), a free and gamified platform of financial education offering personalized learning paths (available only in Portuguese). Since its launch in November 2021 until June 2024, awareness campaigns have reached over 40 million people; 1 million accessed the platform's site, and 198,000 users registered to use it.

### 3.2.3 Over-indebtedness update in Brazil

In November 2023, a new edition of the Financial Citizenship Series was published with the study of Brazil's Over-indebtedness, updating the "risky indebtedness" figures and deepening the 2020 study. The volume of debt at risk was also mapped across the different financial segments, both in terms of the concentration of risk-takers and the modalities of credit involved.

According to the study, in March 2023, there were 15.1 million risky debtors in Brazil, or 14.2% of borrowers, the highest figure in the historical series.

The work also cross-references risky indebtedness data with the I-SFB survey. Over-indebtedness is related to lower levels of financial well-being, lower savings levels, and lower planning capacity. The continuous analysis of over-indebtedness reinforces the understanding of the diagnosis of financial well-being in Brazil, provides clues for the formulation of policies regarding financial education, and helps market conduct supervision to focus on the major gaps.

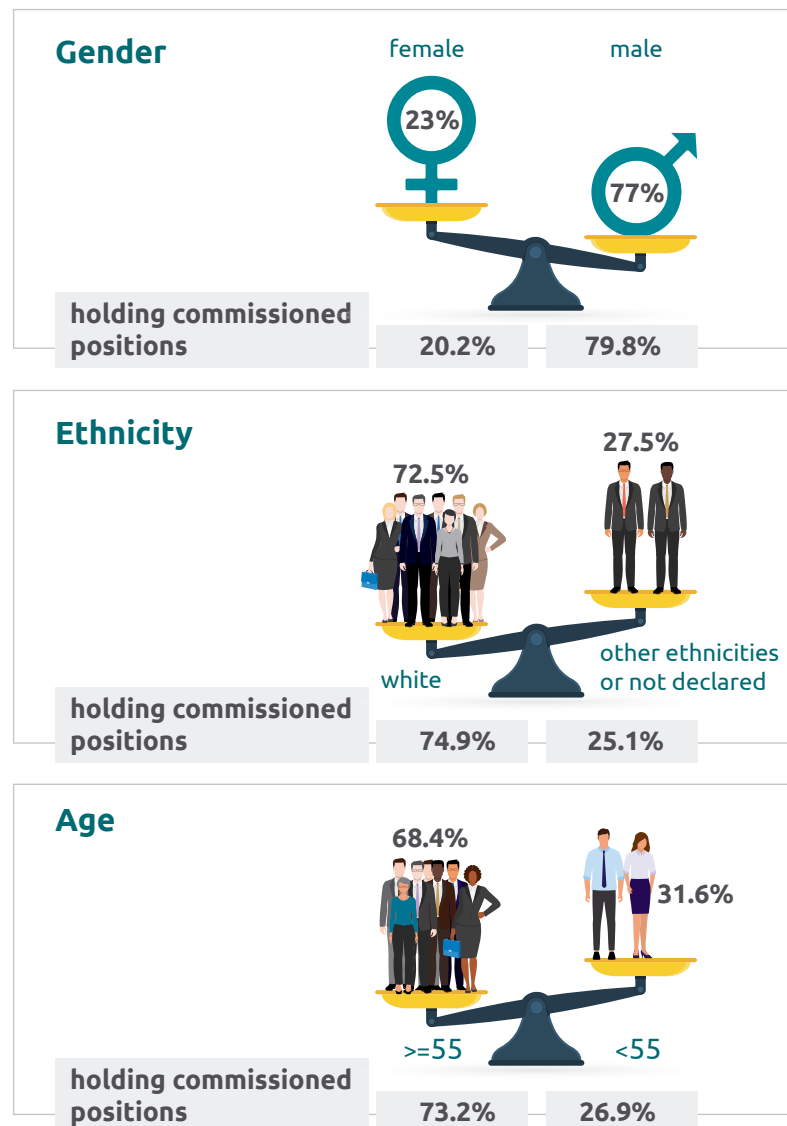
### 3.2.4 Regulating the financial education activities of financial institutions

In December 2023, the BCB and the CMN published a Joint Resolution on financial education measures to be adopted by financial institutions, payment institutions, and other institutions licensed by the BCB.

The regulation establishes the main objectives to be met by financial education measures and requires the adoption of a financial education policy based on ethics, responsibility, transparency, and diligence. It also establishes the guiding principles of value for the client such as broad outreach, suitability, and personalization. The Joint Resolution came into force on July 1, 2024.

### 3.3 Diversity, Learning, and Well-being Policies

Regarding the workforce, the BCB faced a reduction in active civil servants due to retirements and dismissals without replacements through civil service exams. As the institution has not held a public exam since 2013, the number of civil servants declined over the last few years. As of June 18, 2024, the BCB had 3,270 active civil servants, 49.37% less than the number established by law.



Note: Updated up to June 18, 2024.

#### 3.3.1 Diversity

Of this total of 3,270, only 2.9% are people with disabilities (PCD). Among 1,233 commissioned employees (those in managerial, advisory, or supervisory roles), 2.8% are PCD.

77% of the total employees are male, comprising 79.8% of the commissioned employees. While the proportions are similar in the overall analysis, in strategic levels this percentage rises to 89.5%, a difference of 12.5%. Among the Board of Governors, which has 9 members, there is only one woman.



Of the 3,270 active employees, only 66 identify as Black (2%) and 21 are commissioned (1.7%). Only 11 employees identify as Indigenous (0.3%), with 2 being commissioned. In total, 19.1% identify as Black or Brown, accounting for 19.5% of commissioned employees.

In terms of age, 37.8% of employees are between 45 and 55 years old, making up 41.8% of commissioned employees. Considering those up to 55 years old, they represent 68.4% of the total but hold a higher proportion of commissioned positions – 73.2%.

As a Federal Agency, the BCB must comply with Law 12,990 of 2014, which mandates reserving 20% of positions in all public exams for direct, autonomous, and foundational government administration for candidates who self-declare as Black or Brown. However, the last entrance exams were in 2013, before the promulgation of this law.

Another notable regulation is the more recent Decree 11,443 of 2023, which stipulates that some functions and commissioned positions throughout the Federal Executive must be filled by employees who self-declare as Black or Brown (with the percentage still pending regulation for autonomous agencies).

### 3.3.2 Learning

The technical expertise of civil servants is a fundamental intangible asset for fulfilling BCB's mission. To enable BCB employees to develop their technical and behavioral skills, the BCB invests in training and knowledge management activities through the BCB University (UniBC).

In terms of organizational learning, during the report's analysis period, 33 employees participated in field-specific learning activities through 19 different initiatives from institutions such as: Banco de Portugal, BIS/FSI, GIZ, University of Oxford, ASBA, Cemla, Coursera, Ministry of the Environment, Organization of Brazilian Cooperatives (OCB), among others. In total, these participations amounted to approximately 550 hours of training.

### 3.3.3 Well-being and quality of life at work

The BCB is committed to enhancing the well-being and health of its employees. Beyond the legally required occupational health initiatives, such as the Periodic Health Examination, the BCB also implements the Mental Health and Well-being at Work Program. This program is designed to promote initiatives that improve workplace well-being, reduce the risk of illness, and support recovery and return to work.

As part of its focus on well-being, the BCB organizes events and lectures that encourage open discussions on mental health and well-being. These lectures are delivered by external experts, while the *Balanço Alimentar* discussion groups are led by nutritionists

# 4

## Prosperity

The “Prosperity” section highlights the role of organizations in fostering economic growth and the importance of innovations for inclusive and sustainable development. It covers initiatives related to financial inclusion, innovation, and increased competitiveness within the SFN to enhance efficiency. The section also describes progress in sustainable bonds, emphasizing their potential to direct investments towards projects that create positive impacts on the environment and society.

### 4.1 Financial inclusion

Financial inclusion is the process by which individuals have effective access to financial services provided by financial institutions, such as credit, savings, payments, insurance, pension plans, and investments.

In 2023, the BCB conducted a study aimed at understanding the competitive dynamics and effects of the digitization of financial services. The study analyzed the evolution of the number of users conducting credit and/or payment transactions, segregating the information by different segments of SFN institutions and the Brazilian Payment System (SPB).

The digital credit/services segment experienced the most significant increase in its total base of active users. This growth was primarily driven by new market entrants during the analyzed period, due to the availability of Pix and credit cards. Public policies facilitated through the opening of digital accounts for individuals spurred the growth of active users in this segment, particularly with the largest banks in the country. For more details, refer to the study in [REB 2023](#).

Cooperativism is another important avenue for accessing financial services. They aim to simplify procedures and cut red tape to facilitate the entry of new participants. The sector has shown significant growth, with an expansion of over 50% in the last five years, both in terms of members and service units.

Supervised by the BCB, credit unions are financial institutions formed by individuals joining together to provide financial services to their members. The credit union members are, at the same time, owners and users of the credit union, participating in its management and benefiting from its products and services. Comparing 2023 to 2022, there was an 11.2% increase in the total number of members.

In credit unions, members find the main services available in banks, such as current accounts, financial applications, credit cards, loans, and financing. Cooperativism does not aim at profits, the rights and duties of all members are equal, and membership is voluntary. Credit unions can be present in places where other financial institutions do not operate and offer services to citizens with no bank account.

Any positive financial result of the credit union is known as a surplus and is distributed among the members, proportional to their transactions with the cooperative. Thus, the gains return to the members, and resources remain within the community.

Credit unions can act as social impact businesses by developing initiatives that reduce vulnerability and poverty. Benefits of cooperativism include increased financial inclusion, expanded competition, lower interest rates on credit, and promotion of regional socioeconomic growth.

## 4.2 Innovation and competitiveness

The Competitiveness dimension seeks to foster competition within the SFN, with the expansion in the number of participants and solutions. More agile and cheaper means of payment, in an environment of increasing refinement of the financial and payment systems, favor lower prices for citizens. In addition, competition promotes innovation, reduced business maintenance costs, and market improvement.

### 4.2.1 Consolidation and growth of Pix

Pix is a means of payment in which resources are transferred between accounts instantaneously all day long. It can be used in the most diverse payment situations: transfers between people, payment of purchases and invoices, payment of taxes and public fees, payments between companies, and involving government entities, among other use cases. Pix enables immediate transfers and payments, scheduling future transactions, or withdrawing money.

Created by the BCB to increase the efficiency of the retail payment market, encourage competition in payment services, and democratize access to digital payment methods for all Brazilians, Pix was awarded the BRAVO Beacon of Innovation by the Council of the Americas (COA) in October 2023.

With almost four years since its launch, Pix has become one of the primary payment methods in the country, responsible for over 99 billion transactions and totaling approximately BRL 43 trillion from November 2020 to May 2024. In May 2024, the volume of funds transferred via Pix in the country amounted to BRL 2.1 trillion, with 5.2 billion operations.

Pix surpassed the milestone of 25 transactions per capita in May 2024, meaning that, on average, a Brazilian resident performs about 25 transactions via Pix each month. These impressive numbers continue to grow, with transaction volume increasing by 73% in 2023 compared to 2022. Currently, 155.4 million people and 16.3 million companies use Pix.

Pix is expected to continue growing in the coming years, with new products and functionalities being made available to the Brazilian population. The BCB aims for Pix to effectively address situations and use cases that are not yet covered and to improve users' payment experience, fostering greater inclusion.

#### 4.2.2 Open Finance

Open Finance is a system for sharing standardized customer data and services between participants in this scheme, created and regulated by the BCB. Through this system, institutions' customers can authorize sharing their data with other participant to receive offers of financial products and services.

This system has evolved to encompass more data and possibilities for operations, including information on traditional financial products and services, products and services related to investments and soon, data related to foreign exchange, accreditation, insurance, and pension plans.

In addition to the launch of investment data sharing in 2023, the rules for renewing consents in Open Finance have been simplified, and the validity period for data sharing has been extended. The goal is to make the system easier and more convenient for individuals and corporate clients. This sharing of information helps to reduce the cost of credit through better comparability between different offers and can boost competition in markets related to insurance, pension, and foreign exchange clients.

Another important measure was the development of indicators and performance monitoring tools to measure the performance of participants and the quality of data shared. These enhancements will improve the supply of products and services.

Finally, customer journeys for sharing data and initiating payments have been improved to reduce barriers and enable a simpler, more interactive, and more agile customer experience.

Three years after its launch, Open Finance has reached more than 28 million customers who share data, with more than 42.8 million active consents in the system (sharing is done bilaterally between participating institutions so that a customer can have more than one active consent). More than 800 participating institutions, including banks, credit unions, and fintechs, are already active. [Find out more.](#)

#### 4.2.3 G20 TechSprint 2024

Under the Brazilian presidency of the G20, the BCB and the BISIH launched in 2024 the fifth edition of the G20 TechSprint, an international competition seeking solutions based on innovative technologies to address common challenges and priorities of the global community of Central Banks and regulators.

The goal of this edition is to promote the development of sustainable finance, with challenges aligned with the current G20 Priorities, including climate change, environmental degradation, and poverty reduction. Three challenges were introduced.

In the first challenge, innovative technological solutions are sought to encourage and attract sustainable and inclusive investments focused on biodiversity and nature preservation. The second challenge seeks innovative technological solutions that improve the collection, aggregation, and analysis of ESG data (assuring a high quality of data, such as correct units and the sum of parts matching the total) to facilitate due diligence, disclosure, and management of ESG risks and opportunities by large, medium, and small companies, investors, financial institutions, regulators, and supervisors.

Finally, the third challenge seeks open-data solutions that can support financial decisions and capital allocation aligned with the SDGs, including biodiversity preservation, climate change, financial and educational inclusion, clean energy, poverty reduction, etc. This problem statement intentionally focuses on open data or solutions that are accessible to all as a public good at zero (or low) cost, upon which other solutions can be built to promote the SDGs.

The G20 TechSprint attracted innovators, entrepreneurs, startups, changemakers, creators, programmers, data scientists, and sustainable finance experts from around the world to participate in the challenge. There was a record number of submissions in the history of the G20 TechSprint, with 110 proposals received. The proposals came from 21 different countries across various continents. Brazil was responsible for 55% of the proposals, followed by India (12%), the United States (5%), Hong Kong (5%), and Singapore (4%). The winners will be announced in November 2024, and first prize for each of the three challenges will be USD 25,000.

This initiative is seen as a significant step in stimulating technological innovation in finance towards what the planet, society, and economy need, in a sustainable manner. More information about the three challenges and the initiative as a whole can be obtained [here](#).

#### **4.2.4 Financial and Technological Innovations Laboratory (LIFT)**

LIFT is a joint initiative of the BCB and Fenabac aimed at developing prototypes of innovative products. All projects are proposed by the society, which makes the LIFT an open environment for the society's direct participation in the promotion of innovation in the SFN. Learn more about [LIFT Lab](#) and [LIFT Challenge](#).

Since the first edition of LIFT Lab, there have been 256 project proposals, with 91 selected. Over these five years, 76 projects were completed, and 37% received investment from the private sector during or after the initiative, totaling more than BRL 400 million.

LIFT Lab was voted one of the best innovation labs in the world, winning the 2023 edition of the World's Best Financial Innovation Lab award in the Economic Development Lab category.

The LIFT Lab Steering Committee received and analyzed 95 applications for the 2023 edition of LIFT Lab. The nine projects selected dealt with relevant topics such as blockchain, asset tokenization, crypto assets, Pix, social and environmental responsibility, and innovations to improve Know-Your-Customer

and Anti-Money Laundering processes. However, due to operational and human resource limitations, LIFT Lab 2023 was suspended and is being resumed in 2024, including a project focused on decentralized finance for sustainability.

### 4.3 Sustainable financial instruments

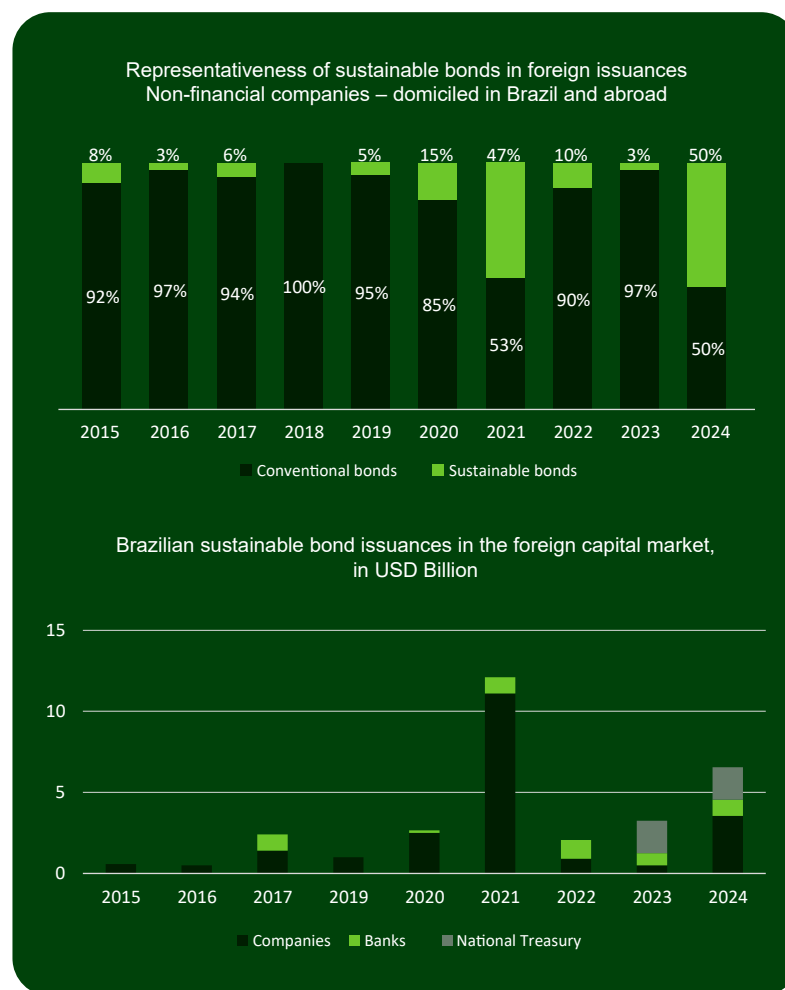
The BCB, committed to promoting a more sustainable and resilient economy, monitors the issuance of sustainable financial instruments by Brazil in both domestic and international markets. Sustainable financial instruments issued in the domestic market include debentures, Rural Product Notes (CPR) and Agricultural Receivables Certificates (CRA), among others. In the international market, they mainly correspond to bonds.

Financing through these financial instruments has the potential to direct investments towards projects that generate positive impacts on the environment and society.

2023 marked the National Treasury's debut in the sustainable bond market with a USD-denominated issuance in the international market in November. Regular issuances are expected at least over the next five years by the National Treasury. The sovereign issuance was awarded the "Latin American ESG Deal of the Year" by Global Capital and "Sustainable Debt Awards 2024" by Environmental Finance.

In 2024, there was a return of Brazilian issuers to the international market through "use of proceeds" bonds and "general purpose" bonds, and the National Treasury issued its second sustainable bond. By June 2024, there were USD 6.6 billion in issuances, with companies representing 54% of the total.

"Use of proceeds" bonds include green, social, and sustainable bonds and are exclusively intended to finance eligible social, environmental and climate projects. "General purpose" bonds involve the issuer committing to pursue sustainable goals and are referred to as sustainability-linked bonds. The percentage of sustainable bonds in external issuances has increased as can be seen in the graph below.



Source: BCB, Refinitiv, Green Bond Transparency, companies' websites, updated until June 2024.

Brazilian external issuances, aligned with global trends, saw significant growth in 2020 and 2021. There were no external issuances of sustainable bonds by Brazil in 2018. After the issuance boom in 2021, the following two years saw a less significant financial volume: 2022 was marked by a more restrictive external environment, with a decrease in conventional bond issuances, and 2023, despite a higher volume of external issuances, showed a small share of sustainable bonds.

Since Brazil entered the external sustainable bond market in 2015, Brazilian sustainable financial instruments' issuance volume in the external market is about 20% higher compared to the domestic market. The USD was the predominant currency for issuance.

In the domestic market, debentures with sustainability characteristics account for approximately 70% of adopted financial instruments. In the external market, bonds predominate, with 77% of issuances, and loans also play a significant role, with 19%.



## Main characteristics of Brazilian sustainable bond issuances



### From 2015 up to June 2024

<b>Amount issued</b>	<b>USD 31.1 billion</b>
<b>Issuer type</b>	<b>71%</b> non-financial companies – sustainable bond issuance was about 14% of foreign issuances <b>16%</b> banks <b>13%</b> National Treasury
<b>Credit Rating</b>	<b>36% of Brazilian issuances</b> by companies were rated as investment grade

The total amount issued by companies, banks, and the National Treasury in the external market totals USD 31.1 billion since 2015. There were 53 issuances by 31 different issuers across 15 economic sectors. Of this amount, 71% of the financial volume was issued by companies, and for these, sustainable bonds represented approximately 14% of the total external market issuances, including both conventional and sustainable bonds.

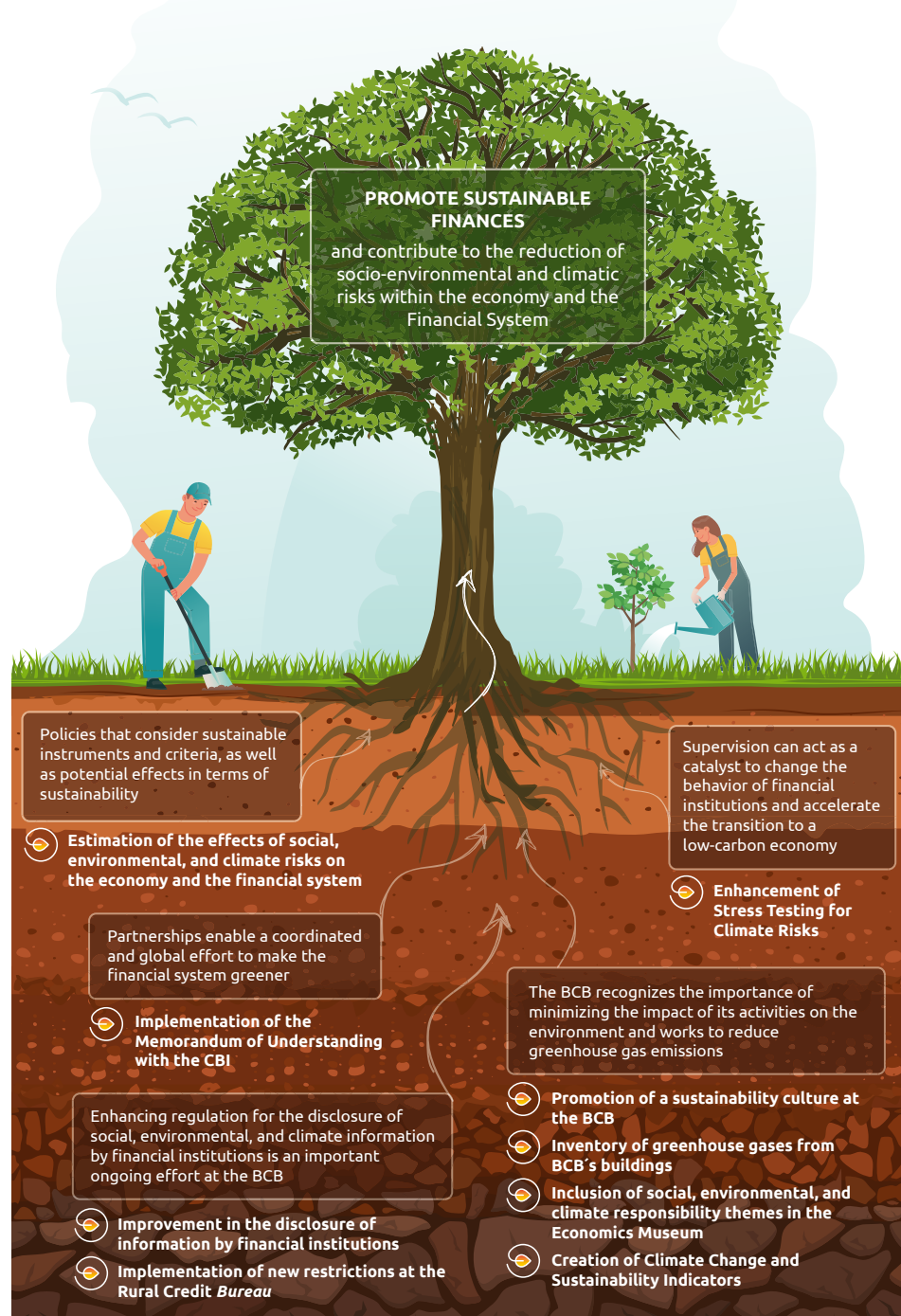
Regarding external reviews, issuance frameworks were reviewed by second-party opinions, predominantly from Sustainalytics and Institutional Shareholder Services Inc (ISS). In terms of alignment with internationally accepted standards, the issuances adhered to some ICMA principles or CBI's green definitions.

It is also noteworthy that Brazil is present in global and emerging market sustainability indices, as Brazilian GSS (green, social, sustainability) bond issuances, for example, are included in Bloomberg and JP Morgan fixed income indices. Finally, 26% of Brazilian issuances were rated as investment grade. This percentage rises to 36% when considering only corporate issuances.

# 5

## Perspectives

This section presents ongoing initiatives expected to be completed over the next year. The goal is to provide greater transparency not only about what the BCB has already achieved but also about what the institution is committed to accomplishing.



## 5.1 Ongoing research

In order to assess transition climate risks, the BCB is studying the development of a Computable General Equilibrium (CGE) model for the Brazilian economy. The model is being developed based on Caliendo, Dvorkin, and Parro (2019). The work is being conducted through a Technical Cooperation Agreement with the Institute of Applied Economic Research (Ipea).

This is a dynamic CGE model with multiple sectors and countries, capable of explaining greenhouse gas emissions endogenously according to firms' decisions to allocate resources for emission reductions against a cost (Pigovian tax) charged per volume of emissions. The theoretical model has been developed, and the assessment of the necessary data for its estimation is underway, with the construction of the Python/Julia program to solve and calibrate it numerically.

This model will explain both the behavior of macroeconomic variable and the future trajectory of emissions in Brazil, according to different environmental policy scenarios (e.g., Pigovian tax, carbon market, favored sectors, etc.). Since the model is already disaggregated by sector and country, and can be further disaggregated by Brazilian state, it will also address global environmental issues that affect different states differently (e.g., El Niño). Other interesting potential adaptations include converting the annual dynamics to quarterly format and analyzing the direct impact of emissions on the utility of agents.

Another ongoing project at the BCB is the Frosts and Extreme Events Project. This work aims, using empirical models, to evaluate the magnitude and spread of local shocks resulting from extreme climatic events based on real-time data on payments and loans. The research project seeks to understand how extreme frosts affect the financial flow of companies (payments) and the structure of the supply chain in locations affected by the climatic event.

To this end, the project will use episodes of frosts that occurred in Brazil in mid-2021. The severity of the frosts was considered outside the forecast range at the time of planting, with models predicting such events occurring only once every 50 to 100 years. This event can be considered a negative supply shock with spatial variation in exposure due to crop planting patterns, heterogeneity among crops in sensitivity to temperature, and perceived low temperatures.

Using these episodes and bilateral payment data between economic agents, the project aims to estimate semi-elasticities linking the occurrence of extreme physical events with losses of receipts or payments from affected clients and suppliers. These semi-elasticities are important because they allow for the transformation of a climatic event's effect into a monetary damage. Such estimations are crucial for integrating climate risk components into traditional risk and financial stability models and understanding heterogeneous effects in the production chain.

The project is being developed in partnership with researchers from the Massachusetts Institute of Technology (MIT). By mid-2024, the project had nearly completed its data collection, compilation, and pre-processing phase, with only adjustments needed for Pix database at the firm-client to firm-supplier payment level over time.

## 5.2 Regulation and supervision

The BCB is implementing the third phase of the process to regulate the disclosure of social, environmental and climate information by financial institutions. This third phase, currently under development, aims at aligning the GRSAC Report rules with the new requirements agreed upon by the BCBS. The possibility of incorporating the pronouncements issued by the Brazilian Committee on Sustainability Pronouncements (CBPS) is also being studied.

The CBPS is responsible for issuing technical documents in line with international standards issued by the ISSB, particularly those related to sustainability IFRS standards. IFRS S1 establishes general requirements for the disclosure of sustainability-related financial information, and IFRS S2 pertains to climate-related disclosures.

In the evolving agenda of rural credit, the BCB is working on a project with two pillars: (i) a system for monitoring rural credit operations post-contract; and (ii) a system for consulting credit and environmental information of borrowers.

The monitoring system will allow for automated tracking of the compliance of contracted operations with environmental standards throughout their duration, while the consultation system will, with borrower authorization, enable third parties to access credit data in both the banking system and the capital market. The consultation system will also provide access to environmental data related to properties, such as the CAR and embargoes in place.

The Rural Credit Bureau will facilitate the identification of sustainable practices in rural credit operations. This information could simplify the certification processes for issuing green bonds, as well as serve as a basis for government policies that promote rural credit operations with social, environmental, or both types of additional benefits. The Brazilian Sustainable Taxonomy could also make use of this information.

In terms of supervision, the BCB team specializing in SECR has been working on natural language processing tools to optimize the analysis of documents required to be published by supervised entities. The adoption of these tools facilitates more targeted action for cases requiring greater attention using fewer resources, while at the same time enabling a more horizontal view of practices adopted by participants.

Additionally, studies are being developed to apply nature-related risks to the Brazilian context, considering not only the understanding of the conceptual framework developed in international literature but also national specificities, which involve the availability and construction of existing databases.

In 2025, the BCB plans to revisit the impact estimates of physical risks from droughts and intense rains on financial institutions, conducted in 2023 and 2024, incorporating new methodologies and scenarios being developed within the NGFS framework.

Obtaining a more accurate diagnosis of the financial risk of entities supervised by the BCB will allow for prudent action towards the most exposed entities, ensuring good risk management and contributing to financial stability. Financial risk may be associated with damage to productive capacity resulting from droughts, intense rains, floods, and other climate change-related events.

As part of these studies, the BCB plans to develop solutions to georeference credit exposures to physical climate risks. This activity involves mapping the distribution of supervised entities' exposure to physical climate risks (such as floods, intense rains, and droughts) and identifying entities with the highest concentration of these risks. The information will be used to identify supervised entities more exposed to each type of physical climate risk, supporting targeted supervisory initiatives. Thus, supervision will focus on ensuring proper management of physical climate risks by these entities.

Another ongoing activity at the BCB is the identification of relevant sustainability and climate indicators, with the construction of one or more indicators to assist in evaluating the impact of climate change on financial institutions, as well as monitoring events to promote low-carbon practices within the SFN. Additionally, seminars are being planned to promote discussions on potential indicators and their implementation feasibility, considering data technical constraints and the costs of data collection, processing, and curation.

## 5.3 Internal measures

In the coming months, the BCB will continue to develop the GHG Inventory for the years 2022 and 2023, as well as study solutions proposed to mitigate our CO<sub>2</sub>e emissions, based on the results obtained from the 2019 GHG Inventory. Work will continue developing transition plans for low-carbon operations and various internal awareness campaigns to reduce the BCB's greenhouse gas emissions.

### 5.3.1 Sustainability criteria in contracting and procurement

The BCB already implements various practices across all its buildings aimed at reducing GGH emissions related to energy efficiency and resource management. Details of these practices can be found in the [BCB's Sustainable Logistics Management Plan 2023/2024](#), (available only in Portuguese).

Also noteworthy is the start of the renovation of the air-conditioning system in the Brasilia headquarter. The change is intended to ensure the continuity of air conditioning in office environments and critical areas, such as the Data Processing and Security Centers. The contract also provides for replacing the cooling units (chillers) with equipment that significantly reduces energy consumption and does not use gases that could damage the ozone layer.

The BCB has reviewed and improved purchasing and contracting processes to develop specifications for the acquisition of goods, services, and projects that contain environmental sustainability. The institution regularly reviews its practices to ensure compliance with current legislation and to serve as an example for other

institutions to follow. The bidding and procurement process is under review to align with the new parameters of the Federal Government's Sustainable Logistics Handbook. This review is expected to be completed by December 2024.

### 5.3.2 BCB Diversity and Inclusion Program

The BCB plans to resume its Diversity and Inclusion Program in 2024. The program, which started in 2023 with a survey of employees and service providers to gather more demographic data on diversity and inclusion within the BCB community, was temporarily halted due to adverse circumstantial factors, such as strong mobilization of the staff for career advancement, negotiations with the Federal Government's central personnel management agency, and discussions on the BCB's budgetary, financial, and administrative autonomy.

Once some of the aspects negatively affecting the organizational environment are resolved, the program will be resumed with the presentation of survey results and the establishment of initial affinity groups, aimed at collectively developing plans to expand and strengthen an inclusive culture within the BCB.

## 5.4 Financial literacy

Through the Aprender Valor program, the BCB provides educators with free certification and content, including ready-to-use lessons on financial education and sustainability for children and young people (see section 3.2.1).

Over the next few years, the BCB intends to continue executing this Program and producing new materials and lessons covering topics such as conscious consumption, environmental impact of consumption decisions, natural resource conservation, and proper waste disposal, among others.

### 5.4.1 Global Partnership for Financial Inclusion

In 2024, the year Brazil is chairing the G20, the BCB is coordinating the work meetings of the Global Partnership for Financial Inclusion (GPFI), a working group associated with the G20 financial track. Under Brazilian leadership, the GPFI is focusing on three initiatives:

**Consolidating Studies on Financial Well-being:** the first initiative involves consolidating studies and discussions to reach a common denominator regarding the concept and measurement of individuals' financial well-being. This is essential for monitoring and supporting the development of financial citizenship public policies. Notably, the concept of financial well-being, as it is currently being developed, will encompass financial resilience, which is crucial for addressing challenges arising from the climate crisis.

**Reaching Financially Excluded Populations:** the second initiative addresses drafting a document consolidating studies and discussions on how to reach the so-called "last mile" populations still financially excluded, such as those in rural areas, and on advancing the quality of financial inclusion. This includes a list of metrics that

can contribute to diagnosing and proposing interventions. Focusing on the quality of financial inclusion is vital, for instance, in combating over-indebtedness.

New action plan for micro, small, and medium enterprises: finally, a new plan will be developed to address the financing gap for micro, small, and medium enterprises, which is fundamental for the sustainability of these ventures.

#### 5.4.2 Sustainability in the New Economy Museum

Sustainability is one of the principles guiding the development of the new Economy Museum's exhibition and will be found either in a standalone or in a transversal manner throughout the exhibition. It should also be a practice of the museum itself and an invitation to visitors to adopt sustainable habits.

This topic will be mentioned at various points in the museum, prominently featured in two interactive exhibits and the second temporary exhibition, encouraging visitors to reflect on the challenges implicit in sustainable development.

The proposal is to demonstrate to the public how challenging it is to balance sustainable and economic development while keeping social issues in mind. Thus, visitors will be able to simply and clearly learn the importance of building a more just and sustainable world while exploring urgent topics such as recycling and the water and carbon costs of different products.

### 5.5 Drex – The BCB's digital currency

Drex contributes to financial inclusion in Brazil by democratizing the population's access to services such as investments, financing, and insurance. The platform will operate with digital assets and smart contracts, among other features, facilitating more efficient and secure financial services and products.

The goals of Drex include keeping pace with the technological evolution of the Brazilian economy; increasing the efficiency of the retail payment system; contributing to the emergence of new business models and other innovations based on technological advancements; and enhancing Brazil's participation in regional and global economic scenarios by improving efficiency in cross-border transactions.

The BCB has maintained an ongoing dialogue with academics, private sector experts, and representatives of central banks and multilateral institutions in initiatives such as workshops, virtual seminars, and the Drex Forum. These initiatives aim to provide transparency on implementation and encourage society's participation in the process. Another edition of the Drex Forum is scheduled for November 2024, to coincide with the closing ceremony of the G20 TechSprint 2024, in which the winners will be announced.

In 2023, the Drex Platform Pilot Project, the Drex Pilot, was launched, a test phase for operations with the BRL digital. At this stage, the benefits of programmability and the privacy guarantees the Drex Platform can provide are being assessed. The first stage of the project is scheduled for completion in May 2024. Drex's release has yet to set a specific date. More information is available on the [Drex webpage](#).



### 5.5.1 Federal public securities tokenized under the Drex project

As part of the Drex pilot project initiative, the BCB has developed codification in the form of smart contracts, which are programs that execute contractual clauses electronically for Federal Public Securities - TPF transactions, preserving the way they are currently implemented at Selic, the central depository for these securities.

The technology used in the Drex platform allows one to assess how financial assets can be represented in digital form, backed by cryptographic security (tokenized assets—TPFt). These assets can be traded by participants in the SFN or by their clients on the platform under the Delivery Versus Payment (DVP) rule. DVP determines that each transfer of assets is linked to a payment in digital BRL or tokenized BRL.

The project consists of evaluating these technologies with the participation of financial institutions through tests carried out on the platform. The BCB also participates in developing privacy solutions and assesses their adherence to the essential requirements necessary for TPF operations.

## 5.6 Taxonomy and investments

In the context of Sustainable Finance, taxonomy can be defined as a classification system comprising a set of criteria designed to define activities and economic sectors with a positive contribution to an economy more integrated with the environment, with lower GHG emissions, and with positive social impacts.

Currently, there are more than thirty taxonomies completed or under development worldwide. This movement aligns with the evolution of sustainable financial instruments emerging in the context of addressing the effects of climate change to finance private entities, supranational organizations, and nations. In the first quarter of 2024, global financing through sustainable financial instruments surpassed USD 6.7 trillion.

Given the relevance of the topic, Brazil developed a plan for a national taxonomy in 2023. This initiative is part of the Federal Government's Ecological Transformation Plan (PTE), which was proposed to decarbonize and promote technological advancement in the Brazilian productive sector. The Taxonomy falls under one of the six pillars of the PTE, the Sustainable Finance pillar, which also includes sustainable bond issuance by the National Treasury, carbon market regulation, among other initiatives.

The Brazilian taxonomy was designed to reflect the country's social and environmental challenges and its productive matrix. In addition to the common environmental objectives of existing taxonomies, it includes social objectives, focusing on reducing regional and social inequalities. In addressing social inequalities, the taxonomy incorporates aspects of gender and racial issues. It also includes the extractive industry, a sector of economic, social, and environmental relevance for the country, which is not covered by other taxonomies.

To align with existing models, the Brazilian document seeks to benefit from the challenges and lessons learned from the experiences of Latin American countries, such as Mexico and Colombia, and other regions, such as the European Union.

The Brazilian document was developed by an Interinstitutional Working Group (GTI) led by the Ministry of Finance. The development of the plan took seven months, from the first GTI meeting in May 2023, through public consultation, to its launch at COP 28 in December 2023.

The BCB, as part of the GTI, contributed to the development of the plan from initial discussions to analyzing public consultation contributions and reviewing the version launched in December 2023. The regulator's participation in the governance of the taxonomy falls within a broader context of Central Banks' roles in addressing climate change impacts and aligns with the participation of regional and global peers in their taxonomies.

In March 2024, the Brazilian Sustainable Taxonomy Interinstitutional Committee (CITSB) was established as the highest governance body for the national taxonomy. It is consultative and deliberative, responsible for coordinating the development and implementation of the taxonomy. One month after its creation, the CITSB approved its Regulations and established other governance bodies: the Supervisory Committee, Sectoral and Thematic Technical Groups, and issued a selection notice for civil society representation in the governance structure.

The BCB is part of the governance structure for the development of the Brazilian Sustainable Taxonomy, with representatives on the CITSB, the Supervisory Committee, and in sectoral and thematic technical groups. The BCB has been participating in discussions about a national taxonomy with other regulators, associations, and market participants since 2022.

As of June 2024, the development work is at the stage of selecting experts to form the technical bodies of the sectoral and thematic groups. These experts will work on defining criteria and limits for sectoral groups and on developing indices for reducing inequalities and designing the MRV (Monitoring, Reporting, and Verification) system for thematic groups. The first version of the Brazilian Sustainable Taxonomy is expected to be open for public consultation by the end of 2024.

The taxonomy presents itself as an important tool for achieving the country's social, environmental and climate objectives, including those related to international commitments. This is made possible through scientifically defined and aligned criteria and metrics. However, the challenges of developing and implementing the classification system are not trivial.

Considering the stage of development of the Brazilian taxonomy, one significant challenge relates to earlier initiatives, such as investments supported by Eco Invest, sustainable bond issuances by the National Treasury, and the Green Seal.

The challenge lies in identifying resource flows from these initiatives that can be associated with projects, activities, and sectors aligned with the taxonomy's

criteria and objectives. Resource flows from existing initiatives with alignment to the taxonomy's objectives and criteria can feed into the monitoring, reporting, and verification system. This aims to identify gaps that could hinder achieving national goals and address them accordingly.

#### **5.6.1 Eco Invest Brazil Program**

In 2024, the Federal Government established the Eco Invest Brazil Program. The program has the potential to stimulate external financing through financial instruments. Eco Invest consists of four lines of credit that have the potential to encourage external private financing, including the issuance of sustainable bonds. The lines cover financing through mixed capital to mobilize external private capital, liquidity for mitigating exchange rate volatility effects, credit for promoting long-term currency hedging, and credit for project structuring, addressing key structural challenges for foreign investments in the country.

The BCB has been working to facilitate the operationalization of the Eco Invest Brazil Program regarding the provision of long-term (10 to 15 years) currency protection for sustainability-related projects. The BCB will act as an intermediary, acquiring currency derivatives from the IDB and passing them on to authorized financial institutions, activated by investors with projects holding the Climate Fund's sustainability seal. The idea is for the IDB to use its AAA rating to gain access to liquidity in more favorable conditions in the international market and pass these conditions on to the final recipient of the derivative. The BCB has been working on various fronts, including legal, accounting, and technological areas, to support the operational process.



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