Landscape of Climate Finance for Land Use in Brazil

September 2023

CLIMATE POLICY INITIATIVE

PUC RIO

AUTHORS

Joana Chiavari
Research Director, CPI/PUC-Rio
joana.chiavari@cpiglobal.org

Gabriela Coser
Analyst, CPI/PUC-Rio

Renan Florias
Research Assistant, CPI/PUC-Rio

Priscila Souza
Head of Policy Evaluation, CPI/PUC-Rio
priscila.souza@cpiglobal.org

This work is funded by Climate and Land Use Alliance (CLUA) and Norway's International Climate and Forest Initiative (NICFI). This publication does not necessarily represent the view of our funders and partners..

ACKNOWLEDGMENTS

The authors would like to thank Juliano Assunção, Luiza Antonaccio and Mariana Stussi for their comments and suggestions, Natalie Hoover El Rashidi, Giovanna de Miranda, Camila Calado, Rogério Reis de Mello Filho and Letícia Miranda for the editing and revision of the text and Meyrele Nascimento for formatting and graphic design.

ABOUT CPI

CPI is an analysis and advisory organization with deep expertise in finance and policy. CPI has six offices around the world. In Brazil, CPI has a partnership with PUC-Rio. CPI/PUC-Rio supports public policies in Brazil through evidence-based research and strategic partnerships with members of the government and civil society.

KEYWORDS
Climate Finance, Agriculture, Forests, Land Use

SUGGESTED CITATION
Chiavari, Joana, Priscila Souza, Gabriela Coser and Renan Florias. *Landscape of Climate Finance for Land Use in Brazil*. Rio de Janeiro: Climate Policy Initiative, 2023.

LIST OF FIGURES AND TABLES

LIST OF ABBREVIATIONS AND ACRONYMS

ABC Program	National Program for Low-carbon emissions in Agriculture *(Programa para Redução da Emissão de Gases de Efeito Estufa na Agricultura - Programa ABC)*
AFS	Agroforestry systems
ANP	Brazilian National Agency for Petroleum, Natural Gas and Biofuels (*Agência Nacional de Petróleo, Gás Natural e Biocombustível*)
B3	Brasil, Bolsa, Balcão
BCB	Central Bank of Brazil *(Banco Central do Brasil)*
BNDES	Brazilian Development Bank *(Banco Nacional de Desenvolvimento Econômico e Social)*
BSM	Brazil Without Extreme Poverty Plan (*Plano Brasil Sem Miséria)*
CAF-PRONAF	National Registry of Family Farming - National Program for Family Farming *(Cadastro Nacional da Agricultura Familiar - Programa Nacional de Fortalecimento da Agricultura Familiar)*
CAR	Rural Environmental Registry (*Cadastro Ambiental Rural)*
CBI	Climate Bond Initiative
CBIO	Decarbonization Credit *(Crédito de Descarbonização)*
CEMADEN	National Center for Natural Disaster Monitoring and Alert *(Centro Nacional de Monitoramento e Alerta de Desastres Naturais)*
CIF	Climate Investment Funds
CMN	National Monetary Council *(Conselho Monetário Nacional)*
COP	United Nations Conference on Climate Change
CPI	Climate Policy Initiative
CPI/PUC-RIO	Climate Policy Initiative/Pontifical Catholic University of Rio de Janeiro
CRA	Agribusiness Receivables Certificates *(Certificado de Recebíveis do Agronegócio)*
DAC/OCDE	Development Assistance Comittee/ The Organization for Economic Co-operation and Development
EMBRAPA	Brazilian Agriculture Research Corporation (*Empresa Brasileira de Agropecuária*)
ESG	Environmental, Social and Governance
DAP	Declaration of Aptitude for PRONAF *(Declaração de Aptidão ao Pronaf)*
DR	Rural Duplicate *(Duplicata Rural*)
FAT	Workers' Support Fund *(Fundo de Amparo ao Trabalhador)*

FCFs	Constitutional Financing Funds (*Fundos Constitucionais de Financiamento)*
FCO	Constitutional Financing Fund of the Midwest Region (*Fundo Constitucional de Financiamento do Centro-Oeste*)
FINAME	Fund for the Purchase of Industrial Machines and Equipment *(Fundo de Financiamento para Aquisição de Máquinas e Equipamentos Industriais)*
FNE	Constitutional Financing Fund of the Northeast Region *(Fundo Constitucional de Financiamento do Nordeste)*
FNMC	National Fund for Climate Change (*Fundo Nacional sobre Mudança do Clima*)
FNO	Constitutional Financing Fund of the North Region (*Fundo Constitucional de Financiamento do Norte*)
FUNAI	Brazilian Indigenous Peoples Foundation (*Fundação Nacional dos Povos Indígenas*)
GHG	Greenhouse Gas
GBP	Green Bond Principles
GCF	Green Climate Fund
GEF	Global Environmental Facility
GI	Geographical Indication
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (*German International Cooperation Agency)*
GND	Nature of Expenditures Group (*Grupo de Natureza de Despesa*)
GLP	Green Loan Principles
IDB	Inter-American Development Bank
IBAMA	Brazilian Institute of Environment and Renewable Natural Resources *(Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis*)
ICMBIO	Chico Mendes Institute for Biodiversity Conservation *(Instituto Chico Mendes de Conservação da Biodiversidade)*
INCRA	National Institute for Colonization and Agrarian Reform (*Instituto Nacional de Colonização e Reforma Agrária*)
INMA	National Institute of the Atlantic Forest *(Instituto Nacional da Mata Atlântica)*
INPA	National Institute for Research in the Amazon *(Instituto Nacional de Pesquisas da Amazônia)*
INPE	National Institute for Space Research *(Instituto Nacional de Pesquisas Espaciais)*
INSA	National Institute for the Semi-Arid Region *(Instituto Nacional do Semiárido)*
IPCA	Extended National Consumer Price Index *(Índice Nacional de Preços ao Consumidor Amplo*)

LCA	Agribusiness Letter of Credit (*Letra de Crédito do Agronegócio)*
MAPA	Ministry of Agriculture and Livestock (*Ministério da Agricultura e Pecuária)*
MCFs	Multilateral Climate Funds
MJSP	Ministry of Justice and Public Security *(Ministério da Justiça e Segurança Pública)*
MMA	Ministry of the Environment and Climate Change *(Ministério do Meio Ambiente e Mudança do Clima)*
MME	Ministry of Mines and Energy *(Ministério de Minas e Energia)*
MODERAGRO	Program for the Modernization of Agriculture and Conservation of Natural Resources(*Programa de Modernização da Agricultura e Conservação dos Recursos Naturais)*
MPI	Ministry of Indigenous Peoples (*Ministério dos Povos Indígenas)*
MPO	Ministry of Planning and Budget (*Ministério de Planejamento e Orçamento)*
MCR	Rural Credit Manual *(Manual de Crédito Rural)*
NDC	Nationally Determined Contribution
NINT	Natural Intelligence Group
OGU	General Budget of the Union (*Orçamento Geral da União)*
PGPM	Minimum Price Guarantee Policy *(Política de Garantia de Preços Mínimos)*
PNMC	National Policy on Climate Change *(Política Nacional de Mudança do Clima)*
PSR	Rural Insurance Premium Subsidy Program *(Programa de Subvenção ao Prêmio de Seguro Rural)*
PRA	Environmental Regularization Program *(Programa de Regularização Ambiental)*
PREVFOGO	National Center for Forest Fire Prevention and Fighting *(Centro Nacional de Prevenção e Combate aos Incêndios Florestais)*
PRONAMP	National Program to Support Medium-Sized Rural Producers *(Programa Nacional de Apoio ao Médio Produtor Rural)*
PRONAF	National Program for Family Farming *(Programa Nacional de Fortalecimento da Agricultura Familiar)*
PROAGRO	Agricultural Activity Guarantee Program *(Programa de Garantia da Atividade Agropecuária)*
PRORENOVA	Program to Support the Renewal and Implementation of New Sugarcane Fields *(Programa de Apoio à Renovação e Implantação de Novos Canaviais)*
PTDRS	Territorial Plans for Sustainable Rural Development *(Planos Territoriais de Desenvolvimento Rural Sustentável)*
RBA	Gross Annual Agricultural Revenue *(Receita Bruta Agropecuária Anual)*

R&D	Research and Development
RENOVABIO	National Policy for Biofuels *(Política Nacional de Biocombustíveis)*
RENOVAGRO	Program for Finance Sustainable Agricultural Production Systems (*Programa para Financiamento a Sistemas de Produção Agropecuária Sustentáveis)*
SCN	System of National Accounts *(Sistema de Contas Nacionais)*
SES/SUSEP	Statistics System of the Superintendence of Private Insurance *(Sistema de Estatísticas da Superintendência de Seguros Privados*)
SFB	Brazilian Forest Service (*Serviço Florestal Brasileiro)*
SGDC	Geostationary Defense and Communications Satellite (*Satélite Geoestacionário de Defesa e Comunicações)*
SICOR	Rural Credit and PROAGRO Operations System *(Sistema de Operações do Crédito Rural e do Proagro)*
SIGEF	Land Management System *(Sistema de Gestão Fundiária)*
SIPAM	Amazon Protection System *(Sistema de Proteção da Amazônia)*
SIOP	Planning and Budget Integrated System *(Sistema Integrado de Planejamento e Orçamento)*
SNCR	National Rural Credit System *(Sistema Nacional de Crédito Rural)*
SNPA	National Agricultural Research System *(Sistema Nacional de Pesquisas Agropecuárias)*
SNUC	National System of Protected Areas *(Sistema Nacional de Unidades de Conservação)*
SUDENE	Superintendence for the Development of the Northeast (*Superintendência de Desenvolvimento do Nordeste*)
SUSEP	Superintendence for Private Insurance *(Superintendência de Seguros Privados)*
UN	United Nations
UNFCC	United Nations Framework Convention on Climate Change
URTs	National Agricultural Laboratory *(Unidades de Referência Tecnológica)*
ZARC	Agricultural Climate Risk Zoning *(Zoneamento Agrícola de Risco Climático)*

CONTENTS

INTRODUCTION

Climate finance is crucial for the transition to a low-carbon economy, as it allows financial flows to be geared towards mitigating greenhouse gas (GHG) emissions and adapting to the impacts of climate change. However, climate finance faces significant challenges, such as mobilizing sufficient resources to meet agreed-upon climate targets, prioritizing resource allocation, and effectively and transparently distributing funds.

In Brazil, activities related to land use play a central role in decarbonizing the economy, as agriculture and deforestation together account for almost three quarters of the country's GHG emissions (SEEG 2021). As such, finance strategies must be developed to promote a transition to low-carbon agriculture and forest protection, increase climate resilience, reduce socio-economic vulnerabilities, and support activities compatible with the preservation of forests and their inhabitants.

To understand climate finance for land use in Brazil, researchers from the Climate Policy Initiative/Pontifical Catholic University of Rio de Janeiro (CPI/PUC-Rio) conducted an unprecedented tracking exercise to quantify the financial flows directed towards agriculture and forest in alignment with climate goals. This work identifies the amounts allocated from public and private sources of finance, both domestic and international. It also specifies the disbursement channels and financial instruments used, the sectors financed, and climate objectives. As such, this report provides a baseline for characterizing financial flows that contribute to land-use-related climate mitigation and adaptation for the period 2015 to 2020.

In addition to a quantitative overview of climate flows, another relevant contribution of this work is the development of a methodology to characterize climate finance in Brazil and identify land use practices, technologies, sectors, and activities aligned with mitigation and adaptation objectives. This approach is based on CPI's international experience in tracking climate finance flows globally since 2011, by means of the Global Landscape of Climate Finance (Buchner et al. 2021). This methodology has been adapted to the specificities of the Brazilian context and can be replicated by other researchers, extended to other sectors, and used in the classification and disclosure of investments.

Information constraints posed a challenge when tracking financial flows. Finding relevant characteristics for the classification of financial flows proved impossible in some of the available databases. The private financial flows included in the map are also likely to be underestimated due to a lack of consistent and standardized data.

In this context, the careful characterization of climate finance flows for land use presented in this report aims to increase transparency and enable the monitoring of the evolution of finance, making it possible to assess whether they are growing in a way that is compatible with climate challenges. This work also helps with identifying finance gaps, designing investment and disinvestment strategies, and holding stakeholders accountable.

MAIN RESULTS

- Climate finance for land use in Brazil amounted to an average of US$ 6.6 billion/year[1] between 2015 and 2020. During this time, financial flows increased from US$ 6.6 billion in 2015 to US$ 7.1 billion in 2020, this represents a growth of 65% in Brazilian reais.
- Most of the finance aligned with climate objectives came from domestic sources, which channeled US$ 6.3 billion/year (95%).
- Two-thirds of domestic finance (US$ 4.1 billion/year) came in the way of private finance, which is largely explained by the fact that financial institutions are obligated to allocate finance to rural credit. As such, a relevant portion of climate finance for land use in Brazil comes from private finance directed by public policies.
- International finance accounted for 5% (US$ 327 million/year) of climate finance flows. International finance originated mostly from public sources: foreign governments (US$ 136 million/year), climate funds (US$ 125 million/year) and multilateral development banks (US$ 58 million/year), channeled mainly via grants (US$ 216 million/year).
- The Amazon Fund is the main climate fund channeling international finance for land use in Brazil. Despite this, the Amazon Fund approved an average of US$ 53 million/year in finance, which is equivalent to 0.7% of the total tracked for climate finance for land use in the country between 2015 and 2020.
- Rural credit is the main instrument to finance activities aligned with climate objectives for land use, as it channeled almost half of the flows tracked between 2015 and 2020 US$ 3.2 billion/year. However, climate-aligned flows account for only 8% of the total volume of rural credit in Brazil, whose annual average was US$ 42.2 billion/year in the period under analysis.
- Agricultural risk management instruments, which constitute the main tool for climate adaptation, accounted for US$ 1.1 billion/year in finance aligned with climate objectives. Rural insurance was the most relevant of these instruments, with a channeled total of US$ 625 million/year. Of this amount, US$ 500 million/year came from private funds used to take out insurance policies.
- Thematic bonds, which obtain resources to finance projects with social and environmental impact, raised, on average, US$ 1 billion/year (16%) in climate finance for land use, obtained mostly via issuances by Brazilian companies abroad. Although the volume of funds raised via thematic bonds has almost quadrupled in the period under analysis– from US$ 685 million in 2015 to US$ 1.6 billion in 2020– it still represents only a small portion of fixed-income capital market finance.
- The public budget channeled US$ 767 million/year (11%) of finance aligned with climate objectives and was the main instrument for the implementation of policies for the forest sector (US$ 572 million/year). In that same period, finance from international public sources amounted to US$ 320 million/year geared towards projects in this sector. There was a drop, however, in the amount of finance from the public budget, from US$ 993 million in 2015 to US$ 394 million in 2020.
- The crop sector was the main recipient of climate finance, receiving an average of US$ 3.9 billion/year, which corresponds to 60% of flows in the tracked period. The forest sector received US$ 1.7 billion/year (25%), cattle received US$ 532 million/year (8%), bioenergy and fuels received US$ 311 million/year (5%) and multi-sector received US$ 86 million/year (1%).
- Finance geared towards mitigating climate change amounted to US$ 4.5 billion/year, or 68% of the finance tracked. Finance for climate adaptation totaled US$ 1.2 billion/year (19%), while flows with both mitigation and adaptation objectives stood at US$ 859 million/year (13%).

1 The values refer to the average amount of financial flows in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (*Banco Central do Brasil* – BCB).

WHAT IS CLIMATE FINANCE?

Climate finance refers to capital flows that have direct or indirect effects on the mitigation of GHG emissions or which contribute to climate change adaptation. Flows can also be geared towards dual benefit activities, should they contribute to both mitigation and adaptation. According to the United Nations Framework Convention on Climate Change (UNFCCC), funds for climate finance may originate locally, nationally, or transnationally, from public, private, or alternative sources.

WHAT IS LAND USE?

This report tracks climate finance for land use, which includes:

Agriculture: crop and cattle production, all the way from the primary sector to activities in the secondary sector of the value chain, such as agroindustry. It includes infrastructure on rural properties, the purchase and production of inputs, rural extension activities, and financial services. It also spans measures for energy efficiency in agroindustry and renewable energy generation from sugarcane or crop residue, such as biofuel production. Finally, it covers policy management and planning, as well as research and development (R&D) for agriculture.

Forest: conservation, restoration, and reforestation activities, as well as use for economic purposes, as in the case of planted forests. This includes policies to combat deforestation, and on environmental and land tenure regularization and territorial planning.

Multi-sector: policies and projects aimed at reducing vulnerability to climate change, including meteorological monitoring and surveillance systems, natural disaster alerts, and risk management for hydrological and geological events, among others.

For more detail, see the list of climate-aligned activities in Appendix I and the definition of sectors in Appendix III.

METHODOLOGY

This report develops a methodology to quantify and compare financial flows for land use and their use for climate mitigation and adaptation objectives. The approach is based on CPI's international experience for over a decade in tracking climate finance globally, as well as in specific countries and sectors, within the Global Landscape of Climate Finance (Buchner et al. 2021).

This work adapts the Global Landscape's methodological criteria to reflect Brazil's climate context– including, for example, finance for the protection of the rights of indigenous and traditional peoples, land use policies such as combating deforestation and land tenure regularization, production management, and infrastructure on rural properties and agroindustry activities. This work draws on four main sources of information to incorporate criteria relevant to land use in Brazil:

1. **CPI Global** – Activities pertaining to agriculture and forest aligned with climate goals (Rosenberg et al. 2018; Chiriac, Naran and Falconer 2020; Buchner et al. 2021).
2. **Public Consultation No. 82 of 2021 by the Central Bank of Brazil** (*Banco Central do Brasil* – BCB) – Sustainability criteria applicable to the granting of rural credit (BCB 2021).[2]
3. **CPI/PUC-Rio** – Institutional analysis of government policies and actions for the conservation and restoration of forest and for the development of sustainable agriculture that contribute to achieving the climate targets in Brazil's Nationally Determined Contribution (NDC) (Antonaccio et al. 2018).
4. **Rio Markers for Climate Change** of the Development Assistance Committee – Organization for Economic Co-operation and Development (DAC/OECD) – Finance flows aligned with UNFCCC objectives (OECD 2018).

Appendix I shows a detailed list of the criteria used to define which financial flows are aligned with climate objectives. The criteria are divided by:

Climate objective: (i) mitigation; (ii) adaptation; (iii) mitigation and adaptation.

Area: (i) Agricultural credit policy; (ii) Agricultural risk management; (iii) Government expenditures; (iv) Financial market; (v) International cooperation and development.

Sectors: (i) crop; (ii) forest; (iii) cattle; (iv) bioenergy and fuels; (v) multi-sector.

Appendix II describes the five areas relevant for climate finance in Brazil; it also specifies the databases used for each of them. An important methodological measures were to avoid double counting financial flows.

Public and private finance sources, both domestic and international, were tracked for the period of 2015 to 2020. Financial flows were updated via indexation to the Extended National Consumer Price Index (*Índice Nacional de Preços ao Consumidor* Amplo – IPCA) using December 2020 as a reference. For finance originally granted in foreign currencies –such as US dollar or Euro – the amounts were converted into Brazilian Real (R$) according to the average exchange rate for the year corresponding to the flow in question, as provided by the Central Bank of Brazil, and then subsequently updated via indexation to the IPCA.

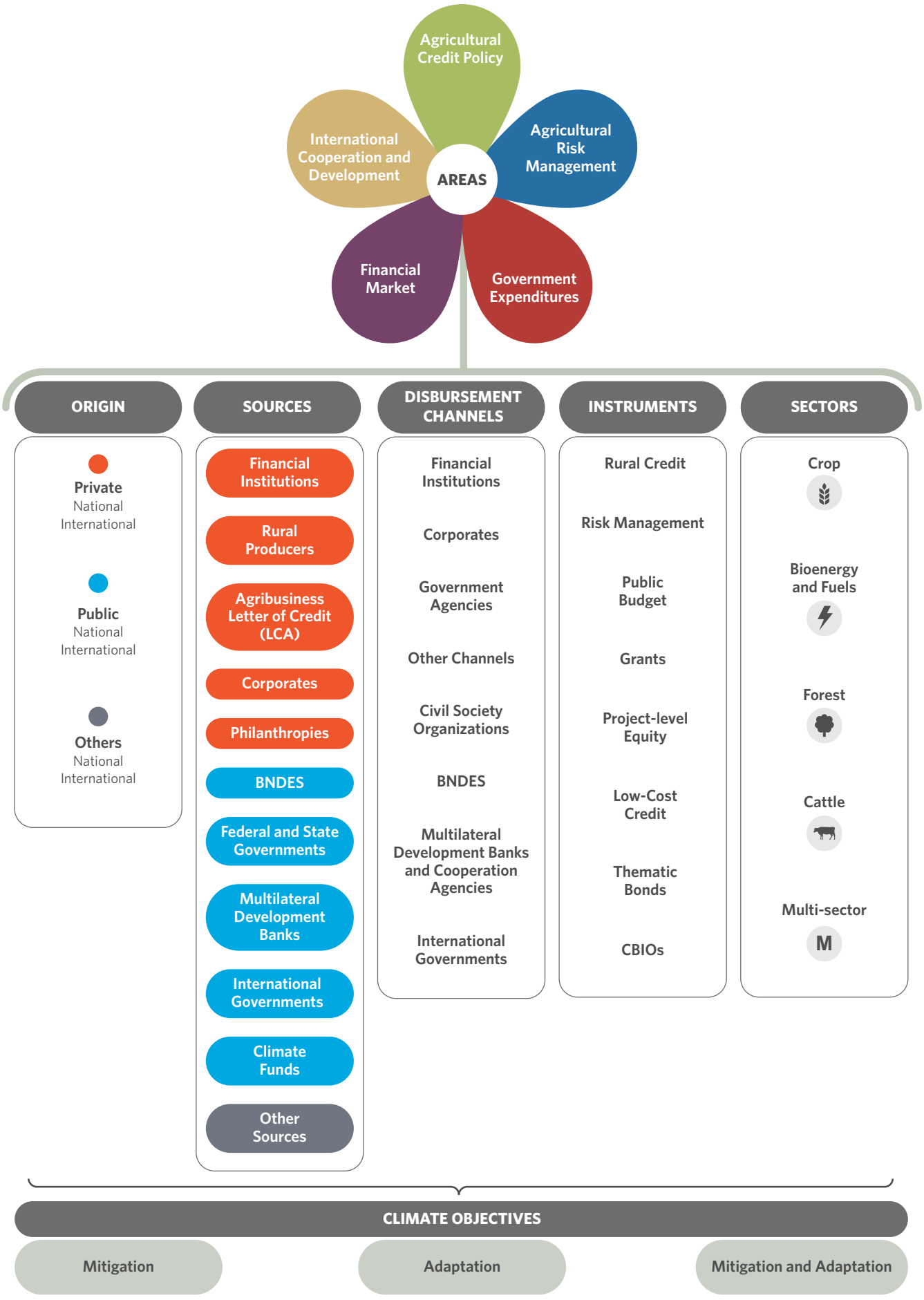
2 Although not listed in BCB Public Consultation No. 82, all lines in the following initiatives were deemed to be climate-aligned: the National Program for Low-carbon emissions in Agriculture (*Programa para Redução da Emissão de Gases de Efeito Estufa na Agricultura* – ABC+ Program), the National Plan for Family Farming under the ABC (*Programa Nacional de Fortalecimento da Agricultura Familiar no âmbito do ABC* – Pronaf ABC+) and the Constitutional Financing Fund of the North under the ABC (*Fundo Constitucional de Financiamento do Norte* – FNO-ABC).

This report provides a broad view of climate-aligned finance for land use activities. However, the list of climate finance flows is not exhaustive. Indeed, the methodology for measuring climate finance and its composition are constantly evolving (Meattle et al. 2022).

Transparency about the use of climate-aligned public and private finance needs to be improved. This issue is particularly critical for private finance that is not guided by public policy. In the context of strengthening the Environmental, Social and Governance (ESG) agenda, improving disclosure requirements is necessary to better understand project implementation and operation. Clearer disclosure regulations and standards will allow for more accurate estimates of private finance aligned with climate objectives.

Figure 1 presents the Climate Finance Ecosystem for the land use sector in Brazil, which organizes financial flows into five areas: agricultural credit policy; agricultural risk management; government expenditures; financial markets; and international cooperation and development (described in Appendix II). The Ecosystem structures the relationship between the various types of actors involved and characterizes climate-aligned financial flows. Analysis of the databases related to the five areas of climate finance made it possible to extract information to characterize the flows in terms of: origin of finance, sources of finance, disbursement channels, instruments, sectors, and climate objectives. The definitions of each of the categories and subcategories in this figure can be found in Appendix III.

Figure 1. Climate Finance Ecosystem for Land Use in Brazil

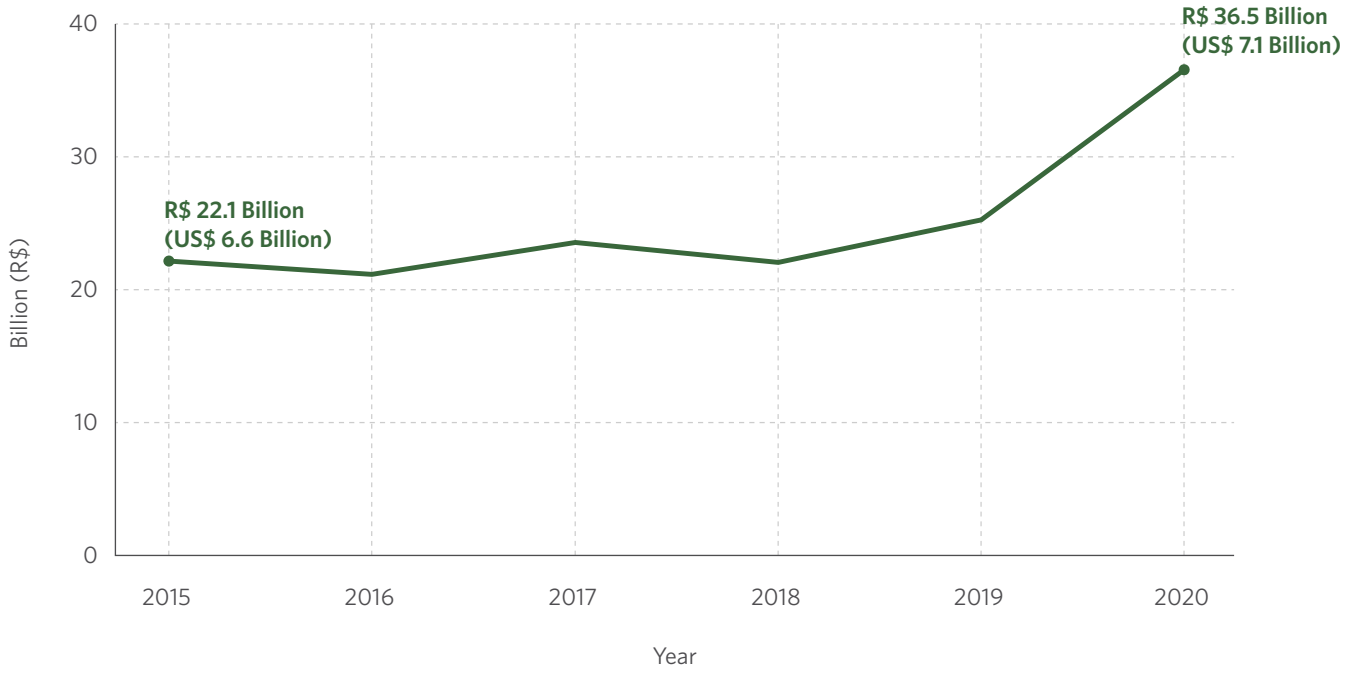


Source: *CPI/PUC-RIO, 2023.*

LANDSCAPE OF CLIMATE FINANCE FOR LAND USE

Climate finance for land use in Brazil amounted to an annual average of US$ 6.6 billion for the period between 2015 and 2020. Figure 2 shows a significant growth rate of 65% in flows over this period, with the total finance amount increasing from US$ 6.6 billion in 2015 to US$ 7.1 billion in 2020. This trend is mainly related to the increase in issuances of thematic bonds – which almost quadrupled in the period, reaching US$ 1.6 billion in 2020 – and rural credit, which channeled US$ 3.2 billion aligned with climate goals in that same year.[3] Furthermore, the establishment of new financial instruments, such as Decarbonization Credit (*Crédito de Descarbonização* – CBIO), has contributed to Brazil's efforts to promote climate finance.

Figure 2. Evolution of Climate Finance for Land Use, 2015-2020

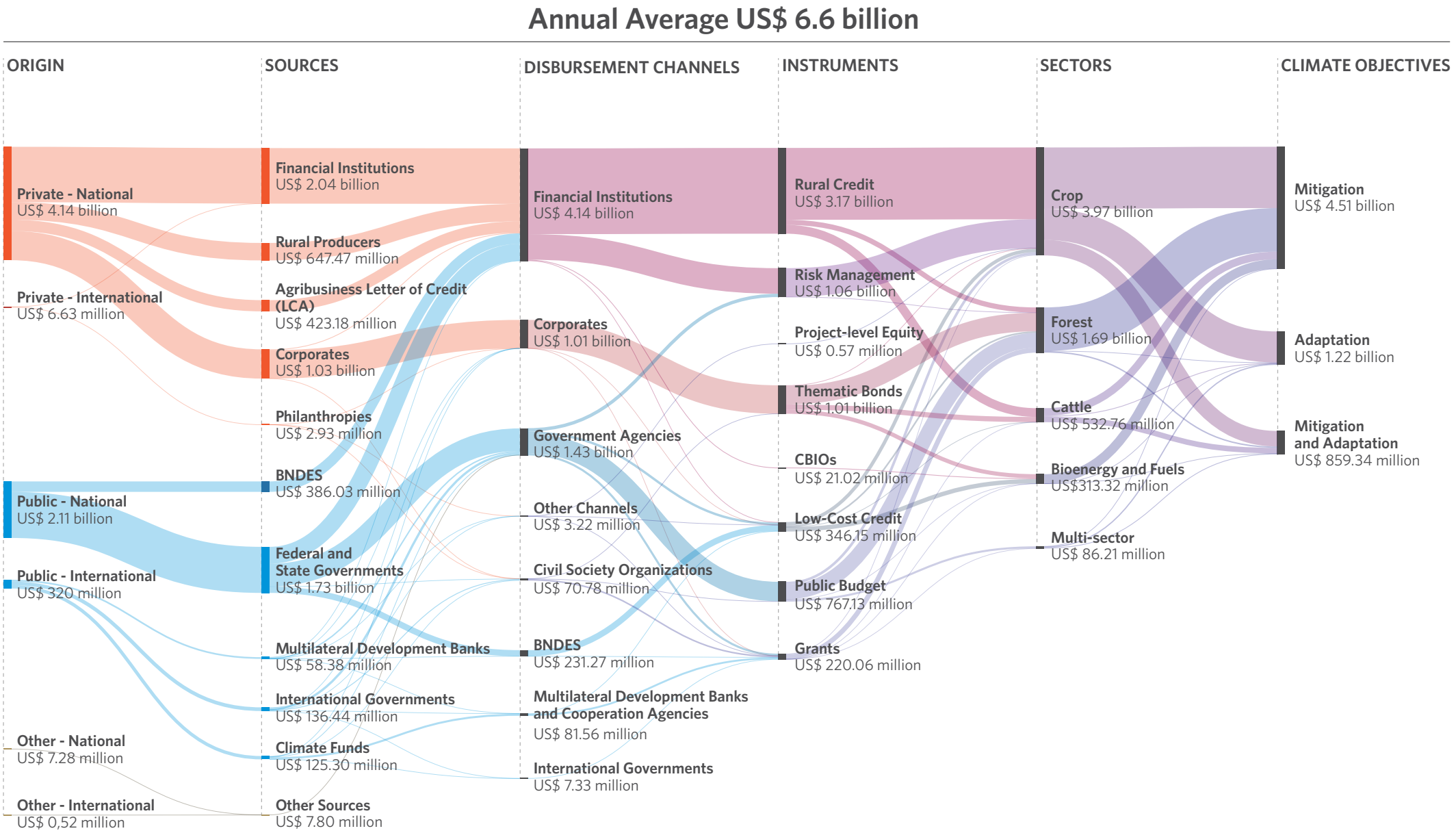


Note: *The values refer to the average amount of financial flows in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (Banco Central do Brasil – BCB).*
Source: *CPI/PUC-RIO with data from SICOR/BCB, SIOP/MPO, MAPA, SES/SUSEP, MMA, BNDES, MME, B3, NINT, OECD-DAC, and IDB, 2023*

Figure 3 shows the Landscape of climate finance for land use in Brazil by means of a sankey diagram, which tracks public/private and domestic/international finance flows, sources of finance, disbursement channels, financial instruments, beneficiary sectors, and climate objectives.

3 Detailed definitions of thematic bonds, rural credit, and other financial instruments can be found in Appendix III.

Figure 3. Landscape of Climate Finance for Land Use in Brazil, 2015–2020



Note: *The values refer to the average amount of financial flows in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (Banco Central do Brasil – BCB).*

Source: *CPI/PUC-RIO with data from SICOR/BCB, SIOP/MPO, MAPA, SES/SUSEP, MMA, BNDES, MME, B3, NINT, OECD-DAC, and IDB, 2023*

FUNDING FOR CLIMATE FINANCE

Most of the finance aligned with climate objectives came from domestic sources, which channeled US$ 6.3 billion/year (95%) between 2015 and 2020. Two-thirds of domestic finance US$ 4.1 billion/year came from private finance, which is largely explained by the fact that financial institutions in Brazil are obligated to allocate funds to rural credit.[4] Domestic private funding originated primarily from financial institutions (31%), corporations (16%), and rural producers (10%). The main sources of domestic public finance were the federal and state governments (26%) and the Brazilian Development Bank (*Banco Nacional de Desenvolvimento Econômico e Social* – BNDES) (6%).

International funds accounted for 5% (US$ 327 million/year) of climate finance flows. This international funding originated mostly from public sources: international governments (US$ 136 million/year), climate funds (US$ 125 million/year), and multilateral development banks (US$ 58 million/year). The main sources were the government of Germany (US$ 79 million/year), the Amazon Fund (US$ 53 million/year), the World Bank (US$ 39 million/year), the Green Climate Fund (GCF) (US$ 33 million/year), the Global Environment Facility (GEF) (US$ 32 million/year), and the government of Norway (US$ 20 million/year) – which, together, accounted for approximately 80% of climate-aligned international public funding. To avoid the double counting of financial flows, the source of finance called "international governments" does not include grants from the governments of Germany and Norway to the Amazon Fund.

The Amazon Fund is the main climate fund that channels international funding for land use in Brazil and, as such, is quite relevant in the promotion of conservation and sustainable land use in the country. Despite this, the Amazon Fund approved an average of US$ 53 million/year in project finance, which is equivalent to 0.7% of the total climate finance for land use in the country between 2015 and 2020.

DISBURSEMENT CHANNELS

Disbursement channels intermediate climate finance for land use in Brazil and allocate finance to various sectors. Financial institutions were responsible for channeling almost two-thirds (US$ 4.1 billion/year) of finance tracked from 2015 to 2020, most of which came from private sources (US$ 3.1 billion/year), mainly originating from the institutions themselves (US$ 2.0 billion/year). Financial institutions also intermediate finance from public sources, such as federal and state governments (US$ 608 million/year) and BNDES (US$ 386 million/year). Climate finance channeled from corporations accounted for 16% (US$ 1.0 billion/year) and originated mostly from the corporations' own funds, obtained by means of thematic bonds (US$ 1.0 billion/year).

Disbursements channeled via government agencies amounted to (US$ 1.0 billion/year) (15%) of climate finance, with (US$ 872 million/year) (84%) coming from federal and state government funds. Government agencies also channeled international finance (US$ 162 million/year) from international governments US$ 85 million/year, multilateral development banks (US$ 45 million/year), and climate funds (US$ 31 million/year).

4 Public policy in Brazil directs finance from financial institutions to rural credit. Financial institutions are required to allocate the equivalent of 30% of all bank deposits in checking accounts to rural credit operations through Compulsory Resources. Additionally, 65% of rural savings accounts (*Poupança Rural*, a form of savings account in certain public banks and cooperatives) funds must be directed to rural credit.

FINANCIAL INSTRUMENTS

Rural credit is the main financial instrument with climate-aligned finance for land use in Brazil, having channeled US$ 3.2 billion/year between 2015 and 2020, equivalent to 48% of all flows tracked in the same period. Approximately two-thirds (US$ 2 billion/year) of finance were sourced from the financial institutions that operate them. However, the total volume of rural credit in the country in the period under analysis was US$ 42.2 billion/year, meaning that the portion of rural credit aligned with climate objectives corresponded to only 8% of the total volume, in accordance with the criteria established in this work.[5]

Agricultural risk management instruments, which constitute the main tool for climate adaptation, accounted for US$ 1.0 billion/year in finance aligned with climate objectives between 2015 and 2020. The most relevant of these instruments was rural insurance, which directed US$ 625 million/year in climate finance for agricultural risk management. Rural insurance relied on private finance expressed in the amount paid by producers to take out the insurance policies (US$ 500 million/year and), in the case of subsidized premiums, it also relied on public finance from the Rural Insurance Premium Subsidy Program (*Programa de Subvenção ao Prêmio de Seguro Rural* – PSR), in the amount of US$ 124 million/year.

Thematic bonds, which obtain resources to finance projects that have social and environmental impact, captured US$ 1.0 billion/year (16%) in climate finance for land use, corresponding to only a small portion of traditional capital market finance. These securities were issued following voluntary guidelines and standards, such as the Green Bond Principles (GBP), and include global notes (US$ 686 million/year), bonds (US$ 100 million/year), Eurobonds (US$ 114 million/year), Agribusiness Receivables Certificates (*Certificado de Recebíveis do Agronegócio* – CRA) (US$ 85 million/year), debentures (US$ 22 million/year), and promissory notes (US$ 0.4 million/year).

The public budget channeled US$ 767 million/year (11%) in climate-aligned finance and constituted the main financial instrument for the implementation of policies aimed at the forest sector (US$ 572 million/year). Among the activities financed for this sector, the public budget disbursed US$ 22 million/year for actions to prevent and control deforestation and fires, and US$ 16 million/year for environmental and land regularization policies and territorial planning.

Public international finance (US$ 320 million/year) were mainly channeled via grants (US$ 216 million/year) and were mostly earmarked for the forest sector (US$ 221 million/year).

5 The trade purpose was excluded from the calculation of the total value of total rural credit granted in the period. This purpose was not considered because it can be used to finance the purchase of products by means of the Minimum Price Guarantee Policy (*Política de Garantia de Preços Mínimos* – PGPM) or for refinance, as in the cases of Rural Duplicate (*Duplicata Rural* – DR) and Rural Promissory Note (*Nota Promissória Rural* – NPR) discounts. The annual average of rural credit granted for all purposes – funding, investment, industrialization and trade – was US$ 49.4 billion in 2020 prices.

SECTORS

The crop sector received, on average, US$ 3.9 billion/year in climate finance, which corresponds to 60% of the flows tracked from 2015 to 2020. This is explained by the prevalence of rural credit as the main financial instrument for climate-aligned finance. The forest sector received US$ 1.7 billion/year (25%); the cattle sector received US$ 532 million/year (8%); bioenergy and fuels received US$ 311 million/year (5%); and multi-sector received US$ 86 million/year (1%).

CLIMATE OBJECTIVES

Finance aimed towards mitigation activities amounted to US$ 4.5 billion/year, i.e., 68% of climate finance for land use in the period from 2015 to 2020. Adaptation activities amounted to US$ 1.2 billion/year (19%). Furthermore, flows targeting both mitigation and adaptation accounted for US$ 859 million/year (13%). The high share of finance directed towards mitigation is in line with the GHG reduction commitments set in Brazil's NDC, given that most of the country's emissions come from changes in land use and agriculture.

In some rural credit lines and development and international cooperation projects, it is possible to identify the beneficiaries of the finance and ascertain whether they are small, medium or large rural producers, producer cooperatives, corporations, indigenous peoples, *quilombolas,* or other traditional communities. But this is not possible for most climate finance tracked in this report. Furthermore, a portion of the flows accounts for the provision of a public good, having been allocated to activities such as forest conservation. However, for climate finance to support the transition more effectively to low-carbon land use in Brazil, the design and information about finance will need to be improved in order to increase transparency about who the beneficiaries are and their locations.

AGRICULTURAL CREDIT POLICY

Rural credit is the primary climate finance instrument for land use in Brazil, amounting to an average of US$ 3.2 billion/year between 2015 and 2020. This value, however, represents only 8% of all rural credit operations for the purposes of finance, investment, and industrialization in the country during this period, which averaged US$ 42.2 billion/year.[6]

Private finance from financial institutions that operate rural credit – which include public and private banks and credit cooperatives – amounted to US$ 2.0 billion/year (65%) of climate-aligned rural credit, as shown in Figure 4. When operating rural credit, financial institutions need to follow a set of rules established by the country's main agricultural policy, the Brazilian Agricultural Plan (*Plano Safra*).[7] One such rule mandates financial institutions to allocate part of the deposits in their checking and savings accounts to rural credit.[8] This mandate applies to public and private sources, which explains the relatively high share of climate-aligned rural credit originating from the private sector.

Public finance accounted for US$ 700 million/year (22%) of climate flows in rural credit. BNDES was the main source of public finance at US$ 386 million/year (12%). Constitutional Finance Funds (*Fundos Constitucionais de Financiamento* – FCFs) also played a prominent role, having directed, jointly, US$ 314 million/year (10%) of the finance tracked in the period through rural credit, broken down as follows: US$ 199 million/year from the Constitutional Financing Fund of the Northeast Region (*Fundo Constitucional de Financiamento do Nordeste* – FNE), US$ 71 million/year from the Constitutional Financing Fund of the North Region (*Fundo Constitucional de Financiamento do Norte* – FNO) and US$ 37 million/year from the Constitutional Financing Fund of the Midwest Region (*Fundo Constitucional de Financiamento do Centro Oeste* – FCO).

The Brazilian Agricultural Plan regulates the sources of finance, the amounts allocated to each credit line, and the main conditions to finance crop and cattle activities for the purposes of funding, investment, trade, and industrialization. In fact, there is a wide range of finance sources and programs for rural producers under different finance conditions. The complexity of the rules leads to artificial variations in finance available for credit, giving rise to distortions and inefficiency (Souza, Herschmann and Assunção 2020).[9]

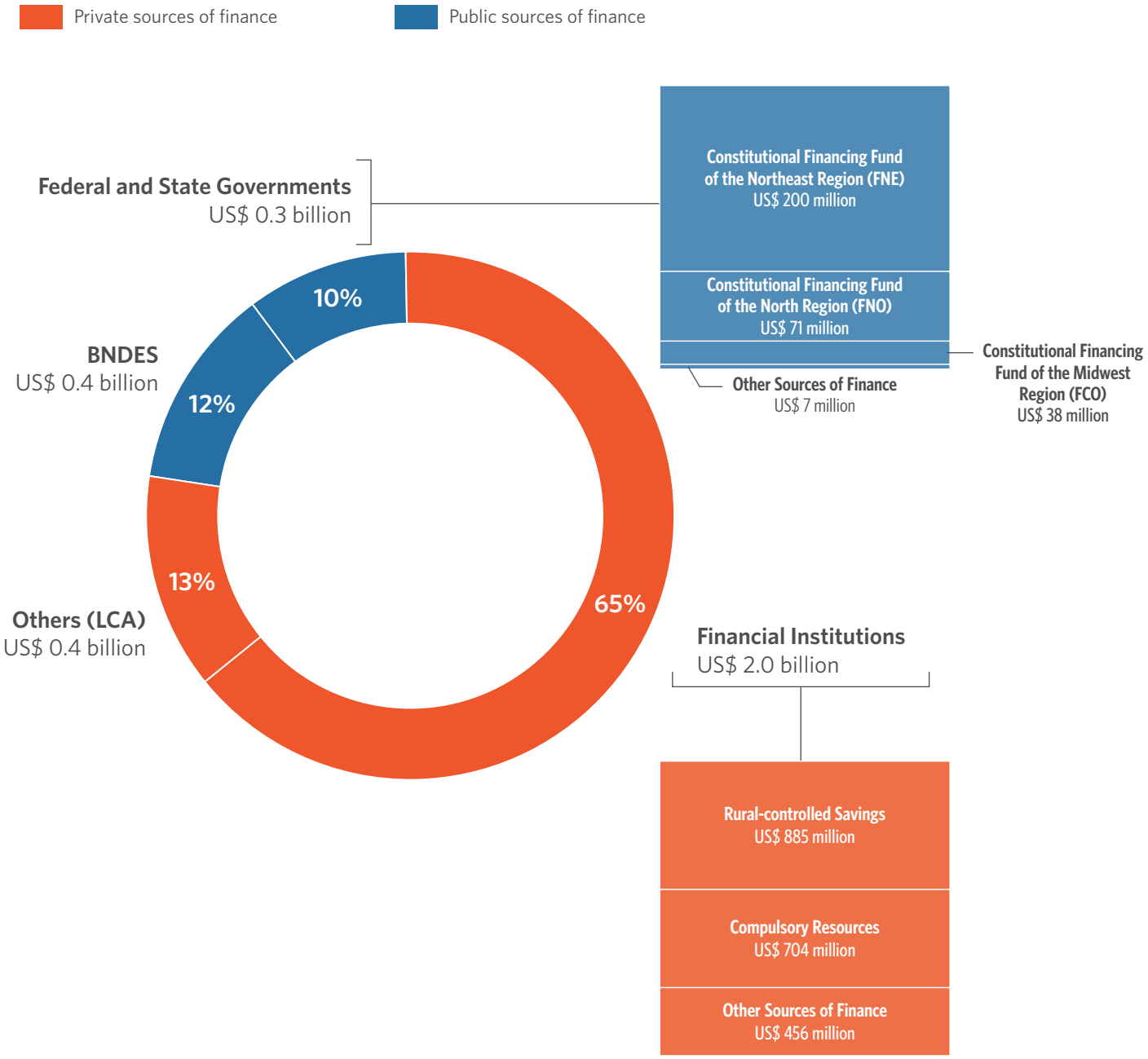
6 Rural credit for trade purposes was not considered, as previously explained.

7 The Brazilian Agricultural Plan is announced annually by the federal government. Specific conditions for the credit lines are subject to approval by the National Monetary Council (*Conselho Monetário Nacional* – CMN) and are recorded annually in the Rural Credit Manual (*Manual de Crédito Rural* – MCR) by the BCB (BCB 2023; Souza, Herschmann and Assunção 2020).

8 The two main sources of finance for rural credit are mandatory resources – corresponding to 30% of current account deposits – and rural savings – where 65% of savings deposits in certain public banks and cooperatives are allocated to finance the rural sector. Financial institutions are also obliged to comply with sub-requirements and allocate a fraction of their funds to credit programs such as Pronaf (for family farming) and Pronamp (for medium rural producers) (Souza, Herschmann and Assunção 2020).

9 In the 2020/21 crop year, the Brazilian Agricultural Plan set interest rates between 2.75% and 7.5% for credit controlled by the government, depending on the credit line, producer size and loan purpose (finance, investment, trade or industrialization). Government subsidies lead to lower interest rates than in the private market, which helps boost the use of credit.

Figure 4. Climate Finance of Rural Credit in Brazil by Source of Finance, 2015-2020



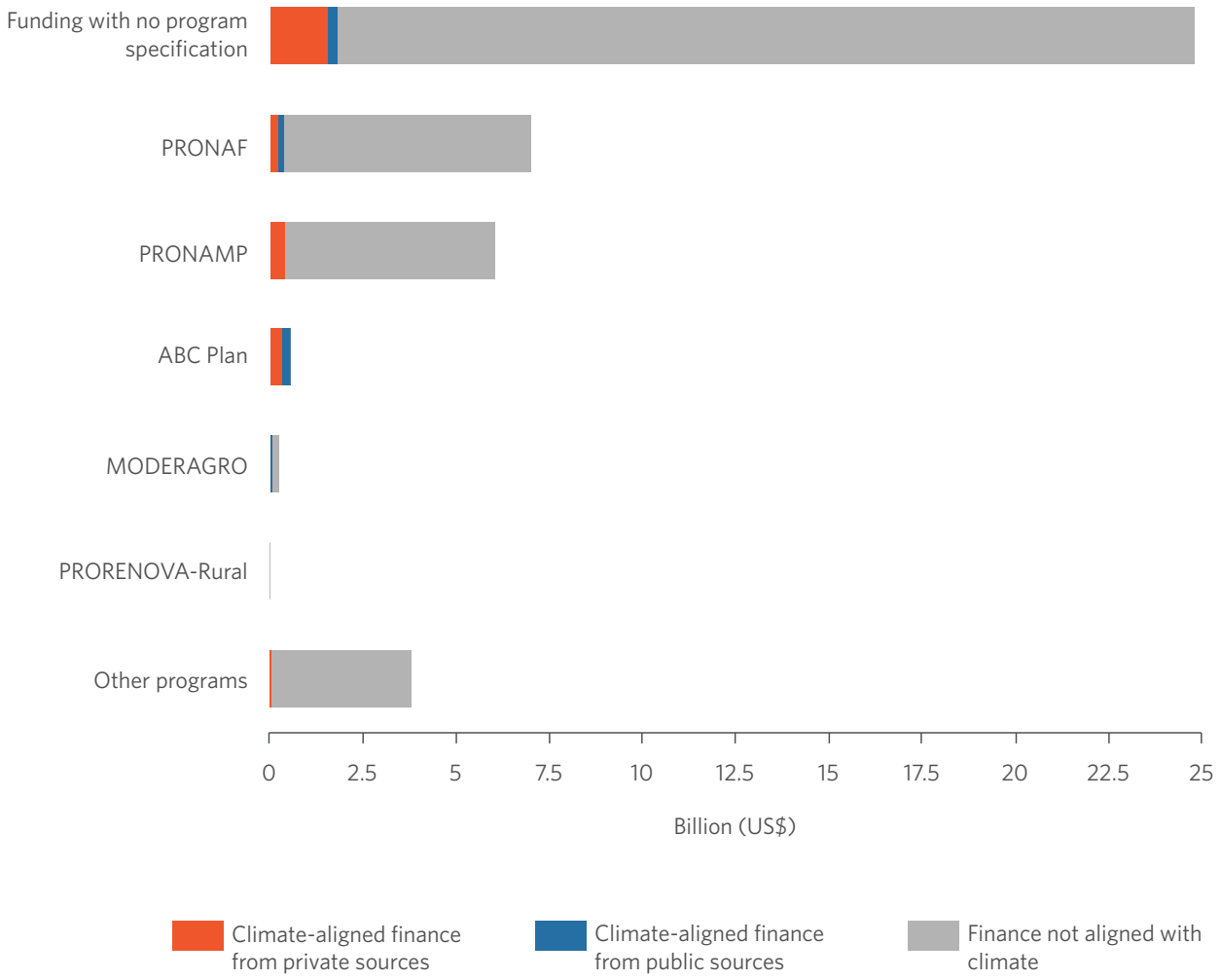
Note: *The values refer to the average amount in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (Banco Central do Brasil – BCB).*

Source: *CPI/PUC-Rio with data from SICOR/BCB, 2023*

Figure 5 shows climate finance for land use in Brazil by rural credit line. The National Program for Low-Carbon Emissions in Agriculture – ABC Program (*Programa para Redução da Emissão de Gases de Efeito Estufa na Agricultura* – Programa ABC) was the main rural credit line contributing to climate finance in that period. This line was created to achieve the objectives of the ABC Plan, the main government initiative to reduce emissions and promote the adaptation of the agricultural sector to climate change, prepared for the decade from 2011 to 2020. The plan is currently in a new phase, called ABC+ Plan, to be implemented

between 2021 and 2030. In the Brazilian Agricultural Plan for 2023/2024, the investment lines for the ABC Program have been renamed and are now part of the newly created Program for Finance Sustainable Agricultural Production Systems (*Programa para Financiamento a Sistemas de Produção Agropecuária Sustentáveis* – RENOVAGRO) (MAPA 2023).

Figure 5. Climate Finance for Land Use in Brazil by Rural Credit Line and Source of Finance, 2015-2020



Note: *The values refer to the average amount in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (Banco Central do Brasil – BCB).*
Source: *CPI/PUC-Rio with data from SICOR/BCB, 2023.*

Between 2015 and 2020, an average of US$ 539 million/year was channeled via the ABC Program, which represents 17% of tracked climate finance flows via rural credit. This credit line corresponded to only 1% of the total annual amount for rural credit operations.[10]

Nevertheless, most of the climate finance via rural credit was not linked to a specific program, corresponding to US$ 1.8 billion/year (56%). Furthermore, US$ 396 million/year (13%) were channeled by the National Program to Support Medium-Sized Rural Producers

10 Rural credit for trade purposes was not considered, as explained above. The ABC Program has an investment purpose.

(*Programa Nacional de Apoio ao Médio Produtor Rural* – PRONAMP),[11] a credit line that serves medium-scale rural producers, while US$ 333 million/year (11%) were channeled by the National Program for Family Farming (*Programa Nacional de Fortalecimento da Agricultura Familiar* – PRONAF),[12] a credit line geared towards family farmers.

One challenge involves identifying the final beneficiaries of climate finance channeled via rural credit. The data do not allow for quantifying the flows destined to indigenous peoples, *quilombolas,* and traditional communities.[13]

11 PRONAMP beneficiaries are rural producers with at least 80% of their annual gross income derived from agriculture/vegetable extractive activities and whose annual gross income is up to US$ 596.

12 In August 2023, according to the Rural Credit Manual (MCR 1-2-5E), small-scale rural producers and beneficiaries of PRONAF are considered to be those who earn up to US$ 99 thousand (according to average exchange in july of 2023) in Gross Annual Agricultural Revenue (*Receita Bruta Agropecuária Anual* – RBA) or who hold a Declaration of Aptitude for PRONAF (*Declaração de Aptidão ao* Pronaf – DAP) or a document from the – National Registry of Family Farming – National Program for Family Farming (*Cadastro Nacional da Agricultura Familiar – Programa Nacional de Fortalecimento da Agricultura Familiar* – CAF-PRONAF). These conditions are valid so long as the producer owns up to four fiscal modules of land (contiguous or otherwise) and that 50% of the household's gross income come from agricultural activities. A fiscal module is a unit of measurement, expressed in hectares, whose value is set by the National Institute for Colonization and Agrarian Reform (*Instituto Nacional de Colonização e Reforma Agrária* – INCRA) for each municipality and corresponds to the minimum area needed for a rural property to be economically viable. The size of a fiscal module can vary significantly from one municipality to another (Souza, Oliveira and Stussi 2022).

13 These types of beneficiaries are currently included under PRONAF's definition of family farmers.

AGRICULTURAL RISK MANAGEMENT

Agricultural risk management instruments accounted for US$ 1.0 billion/year in climate finance between 2015 and 2020. These instruments constitute Brazil's primary climate adaptation mechanism, as they increase the resilience of agricultural activities and reduce vulnerability to climate events that cause production losses, such as excessive rains and droughts.[14]

Agricultural risk management, like rural credit, is encouraged by public policies. Currently, the main Brazilian programs in this area are the PSR, the Agricultural Activity Guarantee Program (*Programa de Garantia da Atividade Agropecuária* – PROAGRO), the *Garantia-Safra*, and the Minimum Price Guarantee Policy (*Política de Garantia de Preços Mínimos* – PGPM).[15] These programs operate differently from one another and envisage distinct objectives and target audiences.

The share of public and private finance sources in risk management instruments considers finance from the different stakeholders in the aforementioned policies. The premium paid by producers for hiring an agricultural risk management instrument is considered a private financial resource. Therefore, private climate finance included both the premium paid by producers for contracting rural insurance (US$ 500 million/year) and the amount for joining PROAGRO (US$ 146 million/year).[16] Thus, approximately US$ 647 million/year of the finance originated from private sources, which corresponds to 60% of climate finance via agricultural risk management instruments in the period.

Public finance for risk management instruments totaled US$ 408 million/year and included federal government expenditures for operating the PSR (US$ 124 million/year),[17] PROAGRO (US$ 157 million/year) and the *Garantia-Safra* (US$ 126 million/year).

The purpose of the PSR is to support rural producers in mitigating risks associated with agricultural activity and ensuring financial recovery capacity in case of adverse weather events (Souza and Assunção 2020). The PSR is managed by the Ministry of Agriculture and Livestock (*Ministério da Agricultura e Pecuária* – MAPA) and used by the federal government to subsidize the cost of acquiring rural insurance policies hired by producers from private insurers (Souza, Pereira and Stussi 2022).

PROAGRO, in turn, exonerates producers from having to fulfil financial obligations in rural credit finance operations and indemnifies producers for their out-of-pocket expenses to cover operational production costs in case of losses resulting from weather events. Financial institutions are responsible for the operational part of the program, but the federal

14 The analysis only includes financial flows for agricultural risk management with coverage exclusively related to climate risks, such as excessive rain, drought, extreme temperature fluctuations, hail, frost, strong winds and cold winds, and diseases and pests, among others. Therefore, only a subset of rural insurance policies is accounted for in the numbers presented here; they do not include, for example, producers' life insurance modalities. See Appendix II.

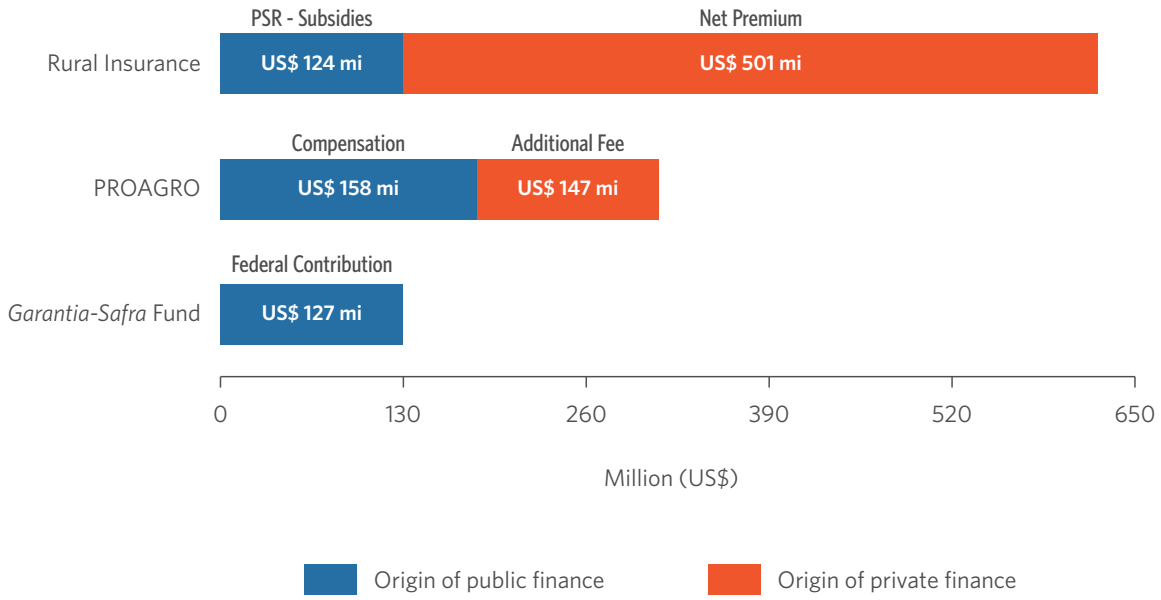
15 The PGPM is a policy focused on correcting price distortions for agricultural products and, therefore, is not directly tied to the occurrence of weather events. As such, this policy was not included in the tracking of climate finance in this report.

16 Rural insurance private flows indicate the sum of net premiums paid by producers, which were calculated by the total amounts of the policies deducted from the amounts of PSR subsidies. Additionally, the total amount of premiums paid by producers for rural insurance policies without the PSR was also accounted for.

17 The PSR flows under analysis cover agricultural and forest insurance.

government assumes the risks since the program indemnities are paid with public finance (Souza, Pereira and Stussi 2022).[18] Thus, this report counted the indemnities paid by the federal government within the scope of PROAGRO as public finance, which totaled, in average, US$ 157 million/year in the period under analysis.

Figure 6. Climate Finance for Agricultural Risk Management in Brazil by Type and Finance Source, 2015–2020



Note: *The values refer to the average amount in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (Banco Central do Brasil – BCB). The additional fee is similar to a "premium" paid when taking out an insurance policy. In PROAGRO, this rate is calculated as a rate of the total amount to be covered by PROAGRO (BCB 2022).*
Source: *CPI/PUC-Rio with data from SICOR/BCB, SIOP/MPO, MAPA, and SES/SUSEP, 2023*

The *Garantia-Safra* is a public policy that supports family farming in Brazil's semi-arid region. It is integrated into the PRONAF rural credit line. Its payment is a conditional benefit for producers residing in municipalities that are proven to have suffered crop losses due to drought events or excessive rainfall.[19] The creation and maintenance of the *Garantia-Safra* Fund enables payouts to beneficiaries from contributions made by producers – a small membership fee – and from federal contributions set annually by the Fund's Management Committee. The federal government is the guarantor of the fund and in case there is not enough money in the fund to cover the amount to be paid out to the beneficiaries, the federal government must provide the rest (Souza, Herschmann and Assunção 2020). The federal government's contributions to the *Garantia-Safra* Fund totaled US$ 126 million/year from 2015 to 2020.[20]

18 Financial institutions operating rural credit play a central role in providing PROAGRO insurance.
19 The *Garantia-Safra* is a conditional benefit to provide a minimum of protection and ensure the survival of the population. To receive the benefit, producers must (i) have a monthly household income of up to 1.5 minimum wage; (ii) grow between 0.6 and 5 hectares of cotton, rice, beans, cassava, corn or other crop activities as defined by the Ministry of Agrarian Development (*Ministério do Desenvolvimento Agrário* – MDA); (iii) and reside in a municipality either in the area covered by the Superintendence for the Development of the Northeast (*Superintendência de Desenvolvimento do Nordeste* – SUDENE) or in the state of Espírito Santo, pursuant to Law no. 9,690/1998, and have proven to have lost at least 50% of their set of produced crops due to drought or excessive rainfall.
20 Municipal and state contributions were not accounted for in the presented flows, the additional data effort was outside the scope of this report.

AGRICULTURAL RISK AND CLIMATE CHANGE

Agriculture is extremely vulnerable to climate change. The sensitivity of crops, cattle, and fisheries to temperature, water availability, and extreme weather events put yields, historical productivity gains, and farmers themselves at risk (Sadler 2016).

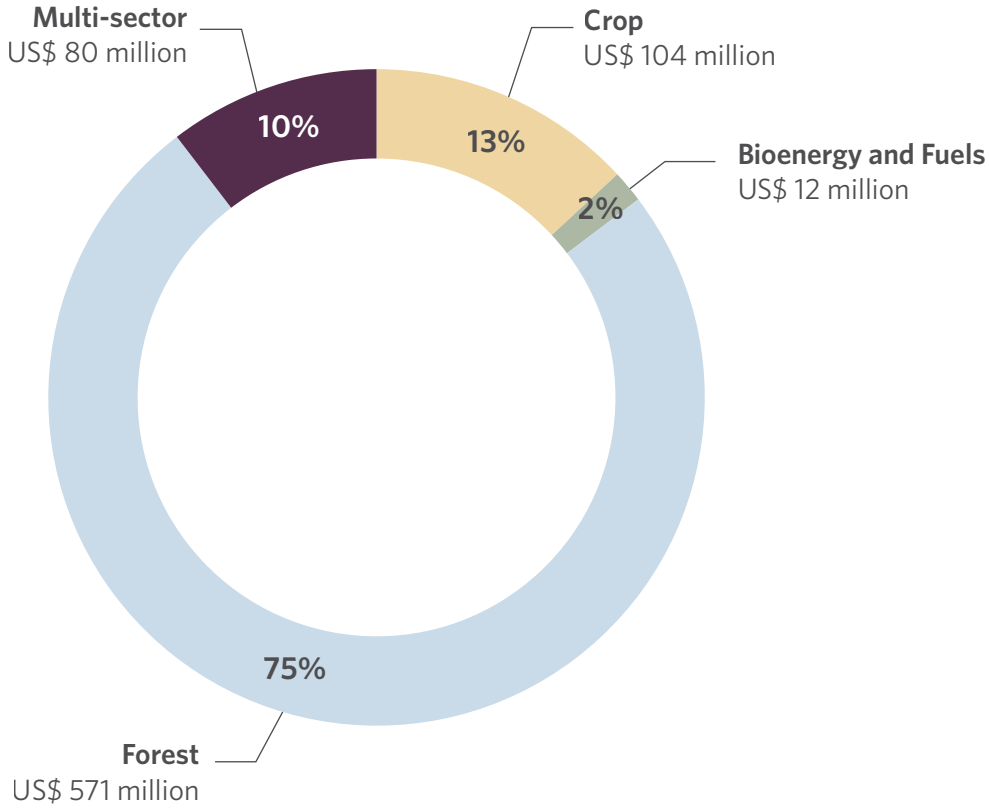
Risks tied to agricultural activity have intensified in recent years. Droughts and other increasingly frequent climate events have been causing significant losses in production. The rise in claims also increases the amount of indemnities and, consequently, the expenses borne by the government and insurance companies. Meanwhile, massive production losses can prompt producers to seek more government aid (Souza, Pereira and Stussi 2022; Souza, Stussi and Oliveira 2022).

Agricultural risk management instruments are increasingly important in this context, as they contribute both to increasing the resilience of producers to climate change and to encouraging investment in the adoption of sustainable practices (Chiriac, Naran and Falconer 2020). In fact, inadequate risk management instruments can lead to underinvestment in crops and, consequently, to a loss in production efficiency, causing adverse impacts on land use and increasing the pressure on forest (Souza, Pereira and Stussi 2022). As such, public policies must be effective in increasing productivity and fostering the adoption of new technologies and improved agricultural practices. Finance must also be directed to rural producers in regions more vulnerable to extreme weather events to ensure better risk coverage.

GOVERNMENT EXPENDITURES

Expenditures from the federal public budget geared towards climate finance for land use totaled, on average, US$ 767 million/year between 2015 and 2020, which accounts for 11% of the total amount tracked for that period. The public budget is the main instrument for channeling finance for policies in the forest sector. Approximately US$ 571 million/year in the forest sector were directed to activities (see Figure 7). The budget allocated to climate-aligned federal government actions for the crop sector totaled US$ 103 million/year, whereas the allocation for multi-sectoral activities totaled US$ 79 million/year).

Figure 7. Climate Finance via Public Budget by Sector, 2015-2020



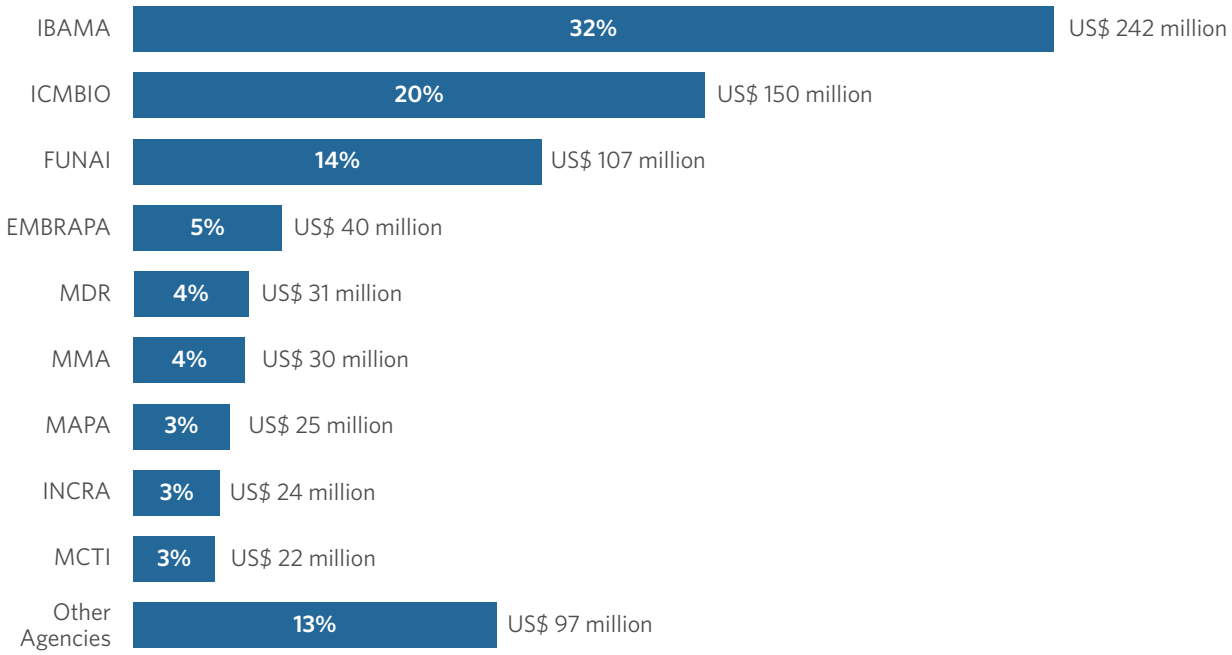
Note: *The values refer to the average amount in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (Banco Central do Brasil – BCB).*
Source: *CPI/PUC-Rio with data from SIOP/MPO, 2022*

Public budget finance were mainly channeled via government agencies linked to the Ministry of the Environment and Climate Change (*Ministério do Meio Ambiente e Mudança do Clima* – MMA), particularly the Brazilian Institute of Environment and Renewable Natural Resources (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* – IBAMA), at a rate of (US$ 241 million/year, and the Chico Mendes Institute for Biodiversity Conservation

(*Instituto Chico Mendes de Conservação da Biodiversidade* – ICMBio) at(US$ 150 million/year (see Figure 8). The Brazilian Indigenous Peoples Foundation (*Fundação Nacional dos Povos Indígenas* – FUNAI), which was linked to the Ministry of Justice and Public Security (*Ministério da Justiça e Segurança Pública* – MJSP) between 2015 and 2020, also channeled US$ 107 million/year in climate finance.[21]

More than half of the climate finance channeled via the public budget was directed to IBAMA, ICMBIO, FUNAI and Brazilian Forest Service (*Serviço Florestal Brasileiro* – SFB), with the largest portion geared towards civil servants' payroll expenses (US$ 345 million/year) and the management and maintenance of administrative structures (US$ 73 million/year). These expenses are key to the execution of actions related to land use and that contribute to climate mitigation and adaptation.[22] An additional US$ 163 million/year in climate finance were also allocated to strategies and policies related to forest sector activities.

Figure 8. Climate Finance via Public Budget by Government Agency, 2015-2020



Note: *The values refer to the average amount in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (Banco Central do Brasil – BCB).*
Source: *CPI/PUC-Rio with data from SIOP/MPO, 2022*

The mandates of these environmental agencies are tied directly to activities that help Brazil meet its climate commitments to reduce GHG emissions. IBAMA is a key player in combating deforestation across the country, as it is in charge of command and control activities to combat deforestation and protect native vegetation on federal lands. The agency also operates as a national environmental authority and has the mandate to inspect and issue administrative sanctions for environmental violations.

21 In 2023, FUNAI became linked to the Ministry of Indigenous Peoples (*Ministério dos Povos Indígenas* – MPI) instead, as mandated by Provisional Decree no. 1,154/2023.
22 These expenditures were identified by the Federal Budget's Nature of Expenditures Group (*Grupo de Natureza de Despesa* – GND) in (i) Personnel and Social Charges and (ii) Other Current Expenses.

ICMBIO is responsible for proposing, implementing, managing, protecting, inspecting, and monitoring federal protected areas (*Unidades de Conservação* – UCs). These activities in the protected areas channeled an average of US$ 34 million/year between 2015 and 2020.

During this period, the public budget also financed US$ 22 million/year in actions to prevent and control deforestation and wildfires; IBAMA (US$ 15 million/year) and ICMBio (US$ 6 million/year) were the main agencies to disburse finance for these purposes.

FUNAI, on the other hand, coordinates the demarcation process of lands traditionally occupied by indigenous peoples, in addition to monitoring and inspecting such lands.

Activities pertaining to environmental and land regularization and territorial planning – key factors to the success of policies against deforestation – received US$ 16 million/year in finance via the public budget, executed mostly by FUNAI (US$ 5 million/year) and National Institute for Colonization and Agrarian Reform (*Instituto Nacional de Colonização e Reforma Agrária* – INCRA) (US$ 6 million/year).[23] INCRA is the agency responsible for implementing agrarian reform policy, through the creation and management of rural settlements, and for carrying out national land planning. INCRA is responsible for the collection of vacant federal lands, the regularization of land ownership on public land, and the titling of land occupied by *quilombola* communities. Finally, INCRA manages two important databases, National Rural Credit System (*Sistema Nacional de Crédito Rural* – SNCR), used for agrarian reform, land and agricultural planning purposes, and the Land Management System (*Sistema de Gestão Fundiária* – SIGEF), which stores georeferenced information on properties and is spatial database used in property registration and land regularization.

The MMA is the central environmental authority, responsible for promoting strategies for the protection and recovery of the environment, the sustainable use of natural resources, and the inclusion of sustainable development in public policies (Antonaccio et al. 2018). This Ministry's climate-aligned expenditures for land use totaled US$ 30 million/year, including only the direct expenditures of the MMA; the budgets of its related entities – IBAMA and ICMBIO – were analyzed separately. The MMA's finance was disbursed for the management and maintenance of its administrative structure (US$ 14 million/year) and with the federal program *Bolsa Verde*, that ran from 2015 to 2017, channeled US$ 13 million/year, to the forest sector. Around US$ 13 million were spent via the public budget to pay the benefit to families, while US$ 1 million were invested in operating and monitoring the program.

In the crop sector, the public budget allocated US$ 39 million/year to R&D activities and knowledge management systems by means of the Brazilian Agricultural Research Corporation (*Empresa Brasileira de Agropecuária* – EMBRAPA). Rural extension received US$ 39 million/year, with disbursements by MAPA (US$ 22 million/year) and INCRA (US$ 16 million/year). Rural extension – a set of initiatives aimed at disseminating knowledge to rural producers – contributes to reducing environmental impacts by promoting the adoption of best practices in agricultural production, which are crucial to facing the challenges posed by climate change (Souza et al. 2022).

The volume of climate finance channeled via the public budget dropped from US$ 993 million in 2015 to US$ 394 million in 2020, a 39% reduction in real terms. This drop was mostly in expenses with the payroll of civil servants and with the management and maintenance of government agencies. A relevant portion of this drop in disbursements is tied to knowledge management systems and R&D activities, mainly by EMBRAPA and the Ministry of Defense.

23 The US$ 16 million/year do not include public budget expenditures with protected areas – which, as mentioned above, were considered separately.

CLIMATE FUND

The National Fund for Climate Change (*Fundo Nacional sobre Mudança do Clima* – FNMC), also called the Climate Fund, seeks to allocate resources to finance projects or studies related to climate change mitigation and adaptation. The fund was created in 2009. It is an instrument of the National Policy on Climate Change (*Política Nacional de Mudança do Clima* – PNMC) and is linked to the MMA.[24]

The Climate Fund is funded mainly by taxed revenues from national oil companies, but also receives funds from public and private institutions (CEPAL 2016).

The Climate Fund operates in two ways. Under the reimbursable modality, BNDES operates loans with finance from the fund by means of the Climate Fund Program. In the non-reimbursable modality, carried out by the MMA, finance is channeled via grants mainly to subnational government projects, which usually contribute with their own resources as a counterpart to the finance provided by the Fund.

Reimbursable funds from the Climate Fund were accounted for as low-cost credit operated by BNDES; they are analyzed in the Financial Market section of this report. Between 2015 and 2020, the BNDES Climate Fund Program approved US$ 15 million/year in climate finance for companies.

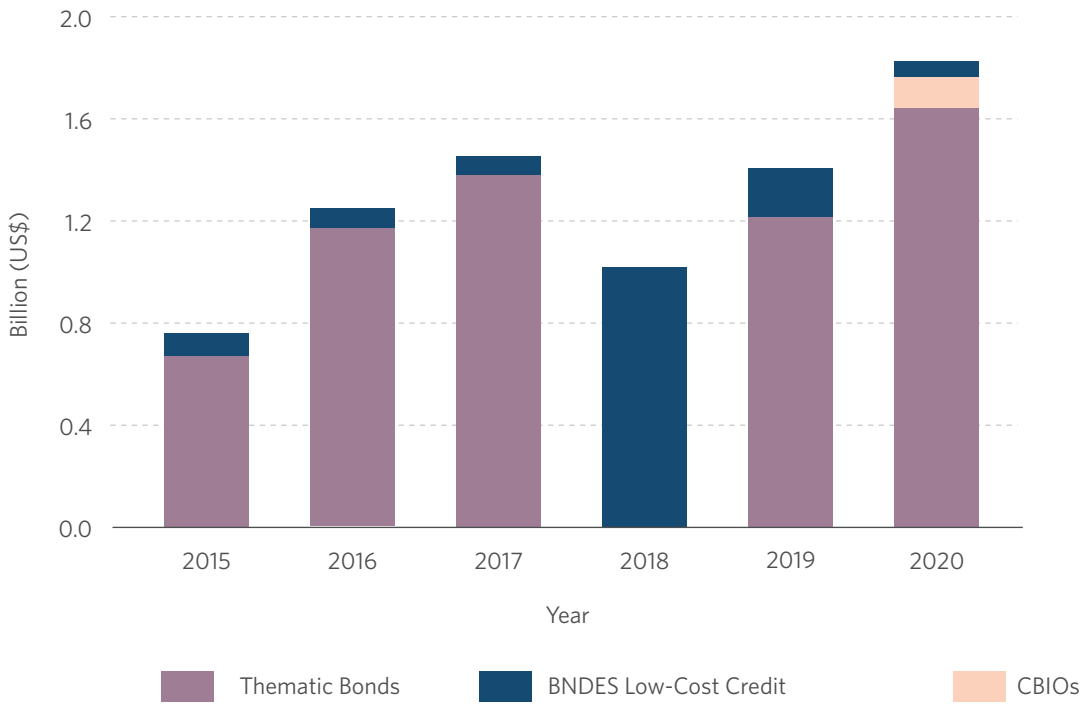
In the same period, the Fund's non-reimbursable finance channeled by the MMA corresponded to US$ 1.5 million/year in climate finance. Municipal government projects (US$ 0.7 million/year) were the main beneficiaries.

24 The FNMC is an accounting fund created by Law no. 12,114/2009 and regulated by Decree no. 7,343/2010.

FINANCIAL MARKET

Three financial market instruments are relevant to climate finance: thematic bonds, low-cost credit operated by BNDES, and CBIOs (Figure 9). However, tracking climate finance in this area is hampered by a scarcity of data at the project level, which means that flows tend to be underestimated due to a lack of consistent and standardized disclosure of information. Data on the issuance of thematic bonds is currently the best type of information available.[25]

Figure 9. Climate Finance for Land Use in Brazil in the Financial Market by Instrument, 2015-2020



Note: *The values refer to the average amount in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (Banco Central do Brasil – BCB).*

Source: *CPI/PUC-Rio with data from BNDES, MME, B3, and NINT, 2022*

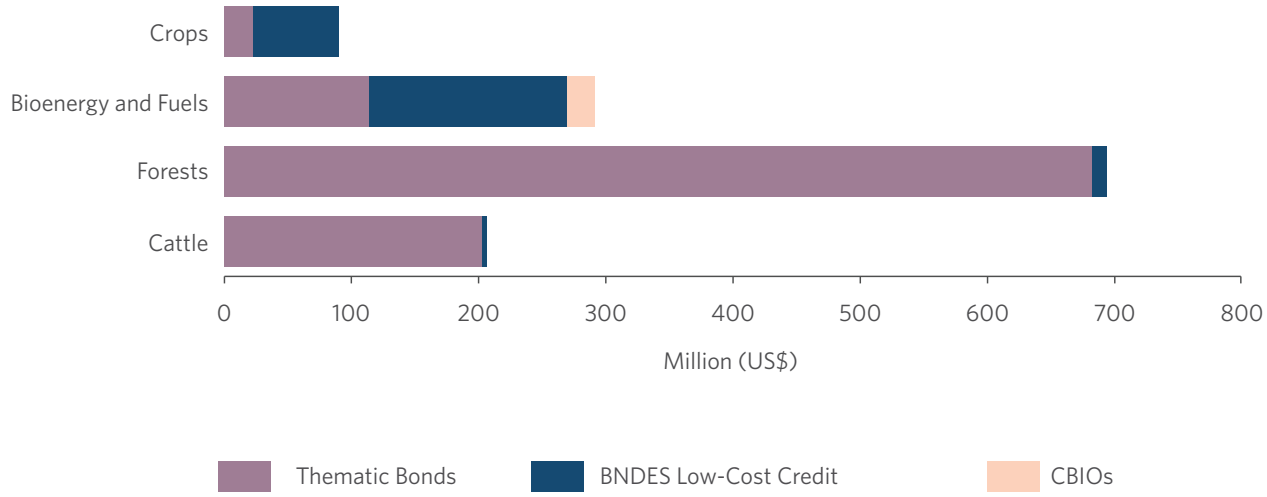
Between 2015 and 2020, climate finance for land use raised via thematic bond issuances totaled US$ 1.0 billion/year, accounting for 16% of the tracked finance. Most of this amount was from issuances by Brazilian companies abroad, which have experience in obtaining finance in the capital market. Twenty operations involving the issuance of these securities were identified in total.

25 Standards and guidelines in the thematic bonds market are far from uniform; this situation affords a great deal of discretion to external reviewers, who use different evaluation methods to verify adherence to the guidelines and standards when such bonds are issued. The information on the emissions of these securities is generally at the project level, which means it is possible to pinpoint operations that finance climate mitigation or adaptation activities. This occurs because bonds undergo a project evaluation and selection process, which features requirements such as transparency reports and information on the management of finance raised, and which often require information on the use of proceeds.

The volume of resources raised via this instrument has increased almost fourfold, from US$ 685 million in 2015 to US$ 1.6 billion in 2020, but these amounts constitute only a small portion of finance via the capital market. By way of comparison, finance channeled via thematic bonds in 2020 were equivalent to 57% of the total volume of CRA issued that year (US$ 2.9 billion/year).[26]

Thematic bonds were used to raise finance mainly for the forest sector (US$ 678 million/year) (see Figure 10). This was achieved by means of the work of pulp and paper producing companies, which have experience in securing finance in the capital markets and were pioneers in obtaining finance via thematic bonds.[27]

Figure 10. Climate Finance for Land Use in Brazil in the Financial Market by Sector, 2015-2020



Note: *The values refer to the average amount in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (Banco Central do Brasil – BCB).*
Source: *CPI/PUC-Rio with data from BNDES, NINT, B3, and MME, 2022*

Cattle was another sector that used thematic bonds for climate finance (US$ 201 million/year). In 2015, Brasil Foods S.A. – BRF used this instrument to finance company projects related to energy efficiency, reduction of GHG emissions, renewable energy, water management and waste management, among other activities. Marfrig Global Foods S.A. was the other company, in the cattle sector, to raise climate-aligned finance via thematic bonds; it secured finance for the purchase of cattle for slaughter from non-deforested areas and areas that do not overlap with protected areas or lands.

BNDES approved US$ 242 million/year for climate finance with low-cost credit for company-run projects; most finance was granted to the bioenergy and fuel sector (US$ 155 million/year) to finance, mainly, projects about bioenergy production.[28] BNDES finance can combine different credit lines and conditions and, therefore, can be used to

26 A query was made for "capital market in numbers" and the column "CRA" was selected to calculate the average issued volume of this security (ANBIMA 2023).
27 In 2016 Suzano Papel e Celulose issued its first green bond, certified by the Climate Bonds Initiative (CBI), in the amount of US$ 500 million (CBI 2016).
28 This finance is mostly carried out by means of direct operations requested by corporations and negotiated directly with BNDES. BNDES operations pertaining to rural credit were analyzed in the section on agricultural credit policy.

finance different activities within the same project. In general, finance was directed towards energy co-generation activities based on sugarcane bagasse, including the development of transmission lines and investments in machinery and crop production and for energy production. These operations were financed by BNDES FINEM, a product geared towards medium and large-sized enterprises for investment purposes.[29]

CBIOs averaged US$ 21 million/year in climate finance for land use in the period considered in this report (2015 to 2020). However, it should be noted that 2020 was its first year of issuance, and that year saw US$ 126 million in CBIOs traded, an amount equivalent to more than twice the climate finance tracked for BNDES low-cost credit in that same year (US$ 60 million).[30]

CBIOs were established by the National Policy for Biofuels (*Política Nacional de Biocombustíveis* – RENOVABIO) to increase the use of renewable fuels in the Brazilian transport grid and reduce CO2 emissions.[31] CBIOs are certificates issued by biofuel producers and importers based on the trade of their products; they are certified by the Brazilian National Agency for Petroleum, Natural Gas and Biofuels (Agência *Nacional do Petróleo, Gás Natural e Combustível* – ANP). The ANP also sets compulsory annual targets individually for the reduction of GHG for distributors that sell fuels, which can only be met through the purchase of CBIOs (ANBIMA 2023; B3 2020).[32]

The tracked flows show an opportunity for public policies that encourage instruments that contribute to directing private finance and investments meant for climate mitigation and/or adaptation objectives.

29 BNDES finance is classified according to the product to which it belongs, which sets the general rules for the finance operation. BNDES FINEM, BNDES Project Finance, and BNDES FINAME constitute the most relevant products of that nature (Holz, Schutze and Assunção 2022).

30 As presented, this flow represents the financial value of CBIOs traded in 2020 on B3 (*Brasil, Bolsa, Balcão*), the main stock exchange in Brazil (B3 2020). The price of CBIO credit is negotiated in the market.

31 CBIO is a security traded on the stock exchange, in which each credit is equivalent to 1 ton of CO2. Law no. 13,576/2017 gave rise to RENOVABIO, a policy devised to meet the obligations taken on by Brazil at the United Nations Conference on Climate Change 2015 (COP 21) (B3 2020).

32 With the aim of providing greater liquidity to this market, individuals or legal entities resident and non-resident in Brazil are allowed to invest in CBIOs. However, this so-called non-obliged investor is not obligated to comply with GHG emission reduction targets (ANBIMA 2020, CBI 2020).

THE ROLE OF BNDES IN CLIMATE FINANCE FOR LAND USE

BNDES plays a central role in climate finance for land use, operating on different fronts. Primarily, the Bank was the main source of public finance that channeled finance to rural credit operations (US$ 386 million/year).

BNDES also channeled US$ 242 million/year in low-cost credit to companies in the land use sector. Such finance is made up of different lines of credit, including the Climate Fund Program – (US$ 15 million/year).

BNDES also manages the Amazon Fund, the main climate fund to channel international finance for land use in Brazil; it approved an average of US$ 53 million in project finance between 2015 and 2020.

WHY IS IT DIFFICULT TO ESTIMATE THE SHARE OF PRIVATE CLIMATE FINANCE?

In recent years, the ESG agenda – in which climate change plays a key role – has gained relevance in the risk assessment of investments and corporate strategies. These developments were accompanied by the adoption of transparency requirements in the disclosure of investments, but improvements are still needed in that regard.

There are no regulations in the private market that make it mandatory to disclose information about finance at the project level and there is little transparency about the allocation of finance raised, mainly due to the high number of players involved in these operations and because of confidentiality issues (Rosenberg et al. 2018). Furthermore, available reports use different criteria and methodologies to disclose their information and fail to produce essential information that may be comparable across companies or across different sectors (The Climate Risk Disclosure Law and Policy Lab/SLS 2021).

This context makes it challenging to track and quantify the extent to which banking operations and fundraising in the capital market contribute to climate finance. It is critical to improve the transparency of data sources, establish guidelines for classifying flows, and increase the availability of granular data at the project level, as well as information on project locations. Disclosure requirements must also be improved to enable a better understanding of project implementation and operation. Clearer disclosure regulations and standards will allow for more accurate estimates.

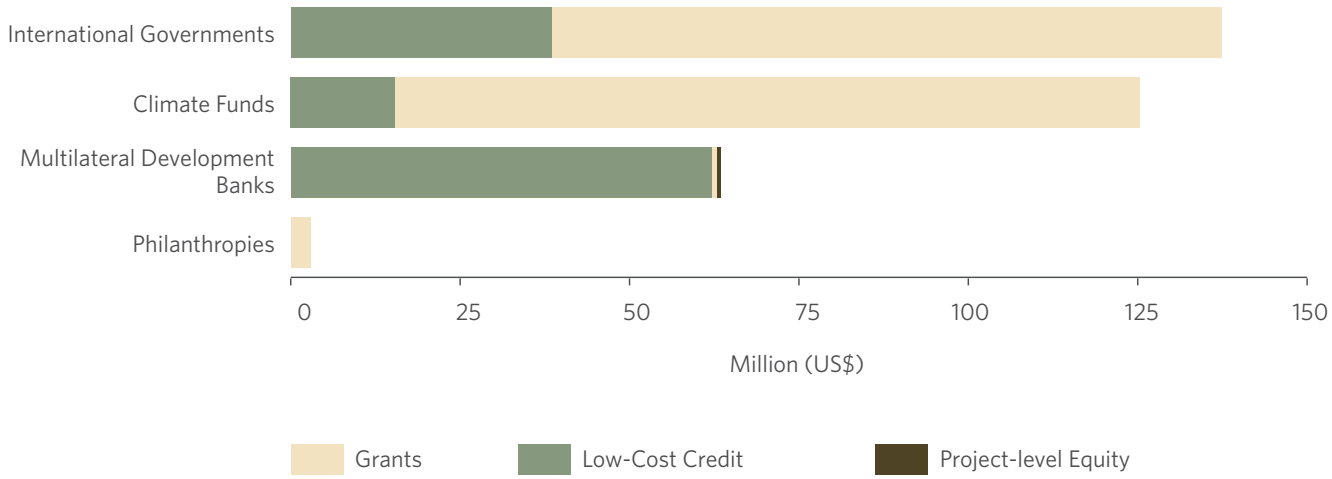
These improvements are particularly important for land use, given the stark heterogeneity across rural producers throughout the country and the need to finance a just rural transition (Chiavari and Antonaccio 2023). For example, financial structures must be fostered and developed to channel large-scale private finance to smaller actors in the land use value chain, such as family farmers, indigenous peoples, and traditional communities, among others, and to monitor effective implementation.

INTERNATIONAL COOPERATION AND DEVELOPMENT

Sources of finance for international cooperation and development channeled US$ 320 million/year in climate finance for land use in Brazil between 2015 and 2020, accounting for 5% of climate-aligned financial flows.

International finance originate mostly from public sources (Figure 11). International governments (US$ 136 million/year), climate funds (US$ 125 million/year) and multilateral development banks US$ 58 million/year channeled finance mainly via grants (US$ 216 million/year). These sources include the German government (US$ 79 million/year), the Amazon Fund (US$ 20 million/year), the GCF (US$ 33 million/year), the GEF, (US$ 32 million/year) and the government of Norway (US$ 20 million/year). To avoid the double counting of financial flows, the source of finance called "international governments" does not include grants from the governments of Germany and Norway to the Amazon Fund.

Figure 11. Climate Finance for Land Use in Brazil in International Cooperation and Development by Funding Sources and Instruments, 2015-2020



Note: *The values refer to the average amount in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (Banco Central do Brasil – BCB).*
Source: *CPI/PUC-Rio with data from BNDES, OECD-DAC, and BID, 2022*

The Amazon Fund is the main climate fund channeling international finance for land use in Brazil. Despite this, the Amazon Fund approved an average of US$ 20 million/year, equivalent to approximately 0.7% of the total climate finance tracked for land use in the country between 2015 and 2020.

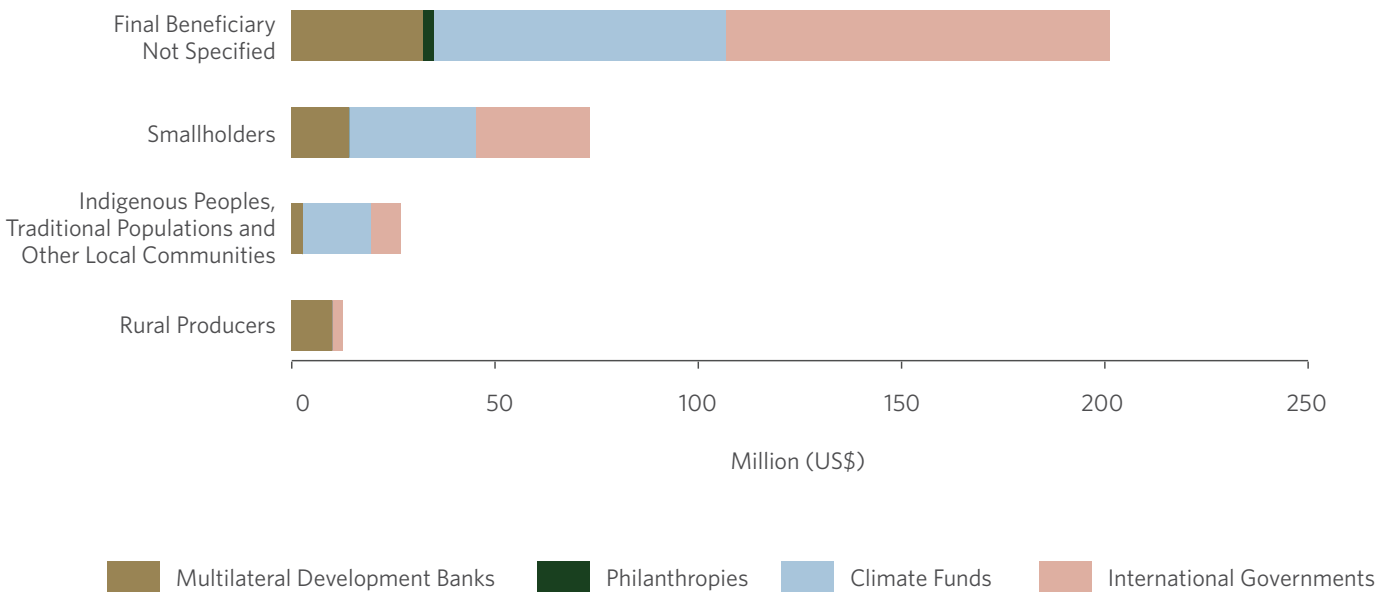
While a large part of international public finance is made through grants, multilateral development banks channeled 98% of finance tracked via low-cost credit (US$ 57 million/year). Most of this finance was allocated by the World Bank (US$ 39 million/year) via loans to state governments, with finance geared towards activities tied to the forest sector (US$ 25 million/year).

Much of the international finance tracked was earmarked for projects in the forest sector (US$ 223 million/year), with the aim of contributing to public policies and strategies related to deforestation reduction, protected areas, environmental and land regularization and territorial planning. As such, this portion of the flows represents the provision of a public good.

In these structures, finance is approved for an "umbrella" project with actions or subprojects focused on potentially different objectives or target audiences. These projects are usually carried out by networks of public and private stakeholders, from federal and state agencies to the third sector.[33] In such projects, only the first beneficiary – i.e., the one who receives the funds to execute the project – can be identified, but not the final beneficiaries – i.e., those who indirectly and ultimately benefit from the funds (Chiriac, Naran and Falconer 2020).

Bearing these challenges in mind, US$ 31 million/year in climate finance were tracked for projects whose final beneficiaries were indigenous peoples, traditional populations and other local communities (Figure 12). The sources of finance were mainly international governments (US$ 8 million/year) and climate funds (US$ 19 million/year).

Figure 12. Climate Finance for Land Use in Brazil in International Cooperation and Development by Final Beneficiary and Instrument, 2015-2020



Note: *The values refer to the average amount in Brazilian Real (R$) during the analyzed period, deflated by the IPCA using December 2020 as reference. The values were converted into United States Dollar (US$), according to the average exchange rate for the corresponding year, as provided by the Central Bank of Brazil (Banco Central do Brasil – BCB).*

Source: *CPI/PUC-Rio with data from BNDES, OECD-DAC, and BID, 2022*

33 In finance structures of this nature, resources can be channeled via concession or subsequent contracting of the other players involved in making projects operational (El Rashidy 2021).

OPPORTUNITIES FOR CLIMATE FINANCE FOR LAND USE

Brazil's transition to a low-carbon economy will require finance compatible with the climate target set by the country in its NDC under the Paris Agreement. Knowing the origin of the finance in pursuit of the intended target, however, remains a central question.

Despite the "economy wide" nature of Brazil's NDC – i.e., a binding GHG emission reduction target is set for the entire economy, rather than having sector-level targets –, land use activities are undeniably relevant in view of the country's emissions profile. Given this situation, finance strategies must be developed to promote the transition to low-carbon agriculture, protect forest, increase climate resilience, and reduce socioeconomic vulnerabilities to the negative impacts of climate change.

The climate finance ecosystem for land use in Brazil is complex, with no shortage of stakeholders and institutional arrangements of different kinds. This report tracks finance flows to agriculture and forest that are aligned with climate mitigation and adaptation objectives and provides a comprehensive view of which financial instruments and sources are driving investment, as well as how much is flowing and to which sectors. Publishing information on these flows is crucial to measuring progress, identifying gaps and optimizing the allocation of public and private finance, thereby providing greater transparency and holding the stakeholders involved accountable.

This work identified an average of US$ 6.6 billion in climate finance for land use in Brazil between 2015 and 2020. An important highlight is the fact that 95% of finance aligned with climate objectives come from domestic sources, which accounted for US$ 6.3 billion/year in the period under review. There is a strong expectation that the country will be successful in attracting large volumes of international finance to the climate agenda, but the numbers show that the inflow of international finance remains far below its full potential.

Furthermore, the public sector is relevant to climate finance for land use both as a source of finance itself and in mobilizing private finance. Expenditures from the federal public budget channeled 11% of tracked finance. A significant portion of the finance from private sources, however, is mobilized by public policies. This is particularly the case for rural credit, in which the agricultural policy requires financial institutions to allocate part of their funds to certain credit lines. It is also the case for CBIOs, as distributors that sell fuel are mandated to reduce CO_2 emissions.

It should also be noted that 68% of financial flows are associated with mitigation actions, while 19% are geared towards adaptation and 13% have both mitigation and adaptation objectives. In a context where rural producers are increasingly impacted by extreme weather events, adaptation actions have become necessary to manage risk and increase the resilience of agricultural activities. Increasing climate finance flows for adaptation remains a global challenge (Buchner et al. 2021).

For climate finance to be improved and scaled up to the dimensions needed to tackle Brazil's mitigation and adaptation challenges, a set of measures and actions must be put in place by public and private stakeholders in different areas:

AGRICULTURAL CREDIT POLICY

Rural credit is the main source of climate finance for the land use sector in Brazil, with US$ 3.2 billion/year identified as aligned with mitigation and/or adaptation objectives. This amount, however, corresponds to only 8% of the total volume of rural credit for finance, investment and industrialization purposes.

Brazilian Agricultural Plan must be committed to sustainability, offering improved credit conditions to producers who employ modern, low-carbon practices. In doing so, the public policy will be encouraging innovation and increasing agricultural productivity and environmental protection. It is also necessary to ensure no credit is granted to properties engaged in illegal deforestation or embargoed by federal or state agencies in any biome (Stussi and Souza 2023).

The 2023/2024 Brazilian Agricultural Plan introduced relevant mechanisms to promote socio-environmental attributes in agricultural production and to prevent any illegality in the granting of rural credit. However, there are still important definitions and gaps that must be addressed for the policy to have a true impact on the transition to low-carbon agriculture and on the protection of native vegetation.

AGRICULTURAL RISK MANAGEMENT

Agricultural risk management instruments – the primary climate adaptation mechanism for making producers less vulnerable to extreme events – totaled US$ 1 billion/year between 2015 and 2020.

Brazilian agriculture has been suffering the consequences of increasingly frequent extreme events caused by climate change. In the 2021/2022 crop year, a severe drought caused widespread crop failure and rural insurance indemnities skyrocketed to more than four times the amount for the previous harvest, according to data from the Superintendence for Private Insurance (*Superintendência de Seguros Privados* – SUSEP).

The coverage of rural insurance and other agricultural risk management instruments, however, is still limited. Furthermore, the increasingly high risk of crop losses tends to reduce the supply of insurance and increase premium prices, which may further restrict access to insurance services. Public policy – including subsidies for rural insurance premiums, like the PSR – can encourage the expansion of this coverage to include as-yet underserved producers and regions, in addition to producers who engage in sustainable practices (Souza, Oliveira and Stussi 2023).

GOVERNMENT EXPENDITURES

Federal public budget expenditures for land use with climate mitigation and adaptation objectives totaled, on average, US$ 767 million/year between 2015 and 2020, equivalent to 11% of the total tracked for that period. It is important to highlight the 39% drop in real terms in climate finance channeled via the public budget, from US$ 993 million in 2015 to US$ 394 million in 2020.

The public budget is the main instrument for channeling finance for policies in the forest sector, which encompass conservation, restoration and reforestation actions. The operations of the MMA and of agencies such as IBAMA, ICMBIO and FUNAI – which are essential for environmental preservation, the fight against deforestation and the protection of indigenous peoples – rely on such government expenditures.

The continuity of public policy is necessary for government programs and actions to produce effective and long-lasting results. As such, it is important that the planning and finance of government initiatives related to climate change be concrete and long-term.

FINANCIAL MARKET

Climate finance for land use raised via thematic bond issuances increased almost fourfold over the period under review, from US$ 685 million in 2015 to US$ 1.6 billion in 2020. Thematic bond issuances amounted to 16% of finance tracked between 2015 and 2020. Also relevant was BNDES's approval of US$ 242 million/year for climate finance via low-cost credit in that period. An additional US$ 126 million in CBIOs were traded in 2020, the first year they were issued.

It is challenging to track and quantify the extent to which banking operations and fundraising in the capital market contribute to climate finance. Difficulties in accessing information mean that these climate finance flows tend to be underestimated. It is important to improve the transparency of data sources, establish guidelines for classifying flows, and increase the availability of granular data at the project level, as well as information on project locations. Clearer disclosure regulations and standards will allow for more accurate estimates.

Mobilizing private finance at scale is critical to finance the transition to a low-carbon economy. Public finance will not be enough to meet climate targets. Brazil's potential to leverage sustainable agricultural practices and promote the conservation and restoration of forest is a great opportunity to attract private finance. The carbon market in particular can be an important source of finance for the agenda.

INTERNATIONAL COOPERATION AND DEVELOPMENT

Sources of finance for international cooperation development channeled US$ 320 million/year in climate finance for land use in Brazil between 2015 and 2020, accounting for 5% of climate-aligned financial flows. International governments (US$ 136 million/year) and climate funds (US$ 125 million/year) are the main sources of finance, with emphasis on the Amazon Fund (US$ 53 million/year).

Much of the international finance was allocated to public policies and strategies related to deforestation reduction, protected areas, environmental and land regularization, and territorial planning.

To attract more international climate finance in Brazil, the country must have a government policy in place committed to the environment and the climate, with clear guidelines and ambitious targets. This includes a commitment to zero deforestation, the transition to low-carbon agriculture and a more widespread use of clean energy. Setting finance targets for specific sectors can help allocate flows to strategic areas.

REFERENCES

Antonaccio, Luiza, Juliano J. Assunção, Maína Celidonio, Joana Chiavari, Cristina Leme Lopes et al. *Ensuring Greener Economic Growth for Brazil*. Rio de Janeiro: Climate Policy Initiative, 2018. bit.ly/GreenerEconomic.

Associação Brasileira das Entidades dos Mercados Financeiro e de Capitais (ANBIMA). *Boletim de Mercado de Capitais*. 2023. Access date: August 9, 2023. bit.ly/3rVzU7V.

Associação Brasileira das Entidades dos Mercados Financeiro e de Capitais (ANBIMA). *Guia de Operacionalização do CBIO*. 2020. Access date: August 9, 2023. bit.ly/3OtKDOG.

Assunção, Juliano and Clarissa Gandour. *Protected Territories, Though Critical, are Not Enough to Slow Amazon Deforestation: Brazil Requires Coordinated and Targeted Conservation Policies*. Rio de Janeiro: Climate Policy Initiative, 2020. bit.ly/ProtectedTerritories.

Assunção, Juliano and Clarissa Gandour. *The Deforestation Menace: Do Protected Territories Actually Shield Forests?* Rio de Janeiro: Climate Policy Initiative, 2018. bit.ly/DeforestationMenace.

Banco Central do Brasil (BCB). *Manual de Crédito Rural*. 2023. Access date: May 20, 2023. bit.ly/3I2V5yR.

Banco Central do Brasil (BCB). *Resumo de Instruções para o Beneficiário*. 2022. Access date: July 20, 2023. bit.ly/42Ig9ii.

Banco Central do Brasil (BCB). *Consultas Públicas Encerradas nº. 82/2021*. 2021. Access date: July 20, 2023. bit.ly/42BCuge.

Banco Central do Brasil (BCB). *Matriz de Dados do Crédito Rural – Crédito Concedido*. 2020. Access date: July 20, 2023. bit.ly/3O3nX7w.

Banco Nacional de Desenvolvimento Econômico e Social (BNDES). *Fundo Nacional sobre Mudança do Clima (FNMC)*. nd. Access date: July 10, 2023. bit.ly/3Jnhq5z.

Banco Nacional de Desenvolvimento Econômico e Social (BNDES). *Fundo Amazônia: Relatório de Atividades 2021*. 2021. Access date: July 14, 2023. bit.ly/3EYLTpa.

Brasil, Bolsa, Balcão (B3). *Serviços de natureza informacional – Dados por Ativo: CBIO*. 2020. Access date: August 9, 2023. bit.ly/3OP4rNS.

Buchner, Barbara, Baysa Naran, Pedro de Aragão Fernandes, Rajashree Padmanabhi, Paul Rosane et al. *Global Landscape of Climate Finance 2021*. Londres: Climate Policy Initiative, 2021. bit.ly/GlobalLandscape2021.

Casa Civil. *Law no. 4,829*. 1965. Access date: March 15, 2023. bit.ly/4298NUP.

Casa Civil. *Law no. 10,303*. 2001. Access date: June 16, 2023. bit.ly/45pLZR9.

Casa Civil. *Law no. 4,962*. Access date: August 10, 2023. bit.ly/3OMXU6d.

Casa Civil. *Law no. 10,420*. 2002. Access date: June 14, 2023. bit.ly/3OOkOKy.

Casa Civil. *Law no. 12,114*. 2009. Access date: April 3, 2023. bit.ly/3rSM41h.

Chiavari, Joana and Luiza Antonaccio. *Brazilian Agricultural Mitigation and Adaptation Policies: Towards Just Transition.* Rio de Janeiro: Climate Policy Initiative, 2023. bit.ly/TowardsJustTransition.

Chiriac, Daniela, Baysa Naran and Angela Falconer. *Examining the Climate Finance Gap for Small-Scale Agriculture*. Londres: Climate Policy Initiative, 2020. bit.ly/ClimateFinanceGap.

Climate Bonds Initiative (CBI). *Climate Bonds Standard Version 4.0*. 2023. bit.ly/43Mt7uM.

Climate Bonds Initiative (CBI). *Unlocking Brazil's Green Investment: Potential for Agriculture 2020*. 2020. bit.ly/3SZxjDq.

Climate Bonds Initiative (CBI). *1st Green Bond in Brazilian Currency: Suzano Papel & Celulose, BRL1 bn (USD 294m), No2 from Suzano!* 2016. Access date: July 20, 2023. bit.ly/44a3O5H.

Climate Policy Initiative. *Proteção Florestal Baseada em Evidência*. Ferramenta de visualização de literatura acadêmica. 2021. bit.ly/3FxBfWC.

Climate Risk Disclosure Law and Policy Lab at Stanford Law School (Climate Risk Disclosure Law and Policy Lab/SLS). *Response to Call for Public Input on Climate Change Disclosures.* 2021. bit.ly/3qu0tkt.

Comissão Econômica para a América Latina e o Caribe (CEPAL). *Avaliação do Fundo Clima*. 2016. bit.ly/443b6bI.

Comissão de Valores Mobiliários (CVM). *Direito do mercado de valores mobiliários – 2ª edição*. Rio de Janeiro: Comissão de Valores Mobiliários, 2022. bit.ly/456f2tA.

Coser, Gabriela, Ícaro Moreno de Souza Melo and Rafael Gabay. *Financiamento Climático Como Oportunidade Para o Brasil*. Rio de Janeiro: Climate Policy Initiative, 2022. bit.ly/3ZMay84.

El Rashidy, Natalie Hoover. *International Funding for Amazon Conservation and Sustainable Management: A Continued Analysis of Grant Funding Across the Basin*. Washington D.C.: Amazon Sustainable Landscapes Program, 2021. bit.ly/3OrrsVL.

Fundação Nacional dos Povos Indígenas (FUNAI). *A Funai*. 2020. Access date: June 20, 2023. bit.ly/3FqX0r2.

Gandour, Clarissa. *Public Policies for the Protection of the Amazon Forest: What Works and How to Improve*. Rio de Janeiro: Climate Policy Initiative, 2021. bit.ly/ProtectionPoliciesAMZ.

Garcia, Jose Javier Gómez, Marco van der Ree, Renata Junqueira Ayres Villas Boas and Camila Gramkow. *Relatório de Avaliação de Meio Termo da Efetividade do Fundo Amazônia: 2008 – 2018.* Comissão Econômica para a América Latina e o Caribe (CEPAL), 2019. bit.ly/3mvQlFs.

Holz, Rhayana, Amanda Schutze and Juliano J. Assunção. *BNDES in the Legal Amazon*. Rio de Janeiro: Climate Policy Initiative, 2022. bit.ly/BNDESIntheLegalAMZ.

International Capital Market Association (ICMA). *Princípios para Títulos Verdes: Diretrizes Voluntárias para Emissão de Títulos Verdes*. 2021. Access date: June 30, 2023. bit.ly/44YO7zq.

Instituto Nacional de Pesquisas Espaciais (INPE). *Monitoramento do Desmatamento da Floresta Amazônica Brasileira por Satélite.* nd. Access date: December 16, 2021. bit.ly/3zV4C3e.

Loan Market Association (LMA). *Green Loan Principles*. 2018. bit.ly/3DqikLN.

Meattle, Chavi, Rajashree Padmanabhi, Pedro de Aragão Fernandes, Anna Balm, Githungo Wakaba et al. *Landscape of Climate Finance in Africa.* Londres: Climate Policy Initiative, 2022. bit.ly/3grfU7C.

Ministério da Agricultura e Pecuária (MAPA). *Presidente anuncia Plano Safra 2023/2024 com financiamento de R$ 364,22 bilhões*. 2023. Access date: June 28, 2023. bit.ly/3Y806s4.

Ministério do Meio Ambiente (MMA). *Info Hub Brasil*. nd. Access date: June 28, 2023. bit.ly/2DCjYgs.

Organization for Economic Co-operation and Development (OECD). *OECD DAC Rio Markers for Climate: Handbook.* 2018. bit.ly/2z2BZjV.

Rosenberg, Anja, Adeline Dontenville, Angela Falconer, Charlie Parker and Padraig Oliver. *Landuse Finance Tool*. EU REDD Facility, Climate Policy Initiative, 2018. bit.ly/3ypDzLs.

Sadler, Marc Peter. *Making climate finance work in agriculture*. Washington, D.C.: The World Bank, 2016. bit.ly/41US4nW.

Secretaria-Geral. *Law no. 13,576*. 2017. Access date: March 14, 2023. bit.ly/3yfadz1.

Secretaria-Geral. *Provisional Measure no. 1,154*. 2023. Access date: March 27, 2023. bit.ly/3J2i8oE.

Sistema de Estimativa de Emissão de Gases (SEEG). *Emissões Totais*. 2021. Access date: February 27, 2023. bit.ly/3JneYh3.

Solomon, Matthew. *Private Financial Institutions' Paris Alignment Commitments.* United States: Climate Policy Initiative, 2022. bit.ly/3sdcSK0.

Souza, Priscila Z. and Juliano J. Assunção. *Risk Management in Brazilian Agriculture: Instruments, Public Policy, and Perspectives*. Rio de Janeiro: Climate Policy Initiative, 2020. bit.ly/AgricultureRisk.

Souza, Priscila Z., Leila Pereira and Mariana Stussi. *Revealing Incentives: Implications of the Design of Public Rural Insurance Policies in Brazil*. Rio de Janeiro: Climate Policy Initiative, 2022. bit.ly/RuralInsuranceinBrazil.

Souza, Priscila, Mariana Stussi and Wagner de Oliveira. *Riscos climáticos e ambientais: os desafios da agropecuária e do seguro rural no Brasil.* Nexo Políticas Públicas. 2022. Access date: July 7, 2023. bit.ly/42oIWbt.

Souza, Priscila Z., Stela Herschmann and Juliano J. Assunção. *Rural Credit Policy in Brazil: Agriculture, Environmental Protection, and Economic Development*. Rio de Janeiro: Climate Policy Initiative, 2020. bit.ly/RuralCredit.

Souza, Priscila Z., Wagner Faria de Oliveira and Mariana Stussi. *Challenges of Rural Insurance in the Context of Climate Change: the Case of Soybeans*. Rio de Janeiro: Climate Policy Initiative, 2023. bit.ly/ChallengesofRuralInsurance.

Souza, Priscila Z., Wagner Faria de Oliveira, Mariana Stussi and Arthur Bragança. *The Challenges in the Adoption of Sustainable Practices by Small Ranchers. The Case of ABC Cerrado*. Rio de Janeiro: Climate Policy Initiative, 2022. bit.ly/ABC-CerradoChallenges.

Stussi, Mariana and Priscila Z. Souza. *Contributions to Sustainability in the Brazilian Agricultural Plan 2023/24*. Rio de Janeiro: Climate Policy Initiative, 2023. bit.ly/PlanoSafraContributions.

Subchefia para Assuntos Jurídicos da Presidência da República. *Decree no. 1,775*. 1996. Access date: March 3, 2023. bit.ly/3yn49Vs.

Wong, Po Yin, Torfinn Harding, Karlygash Kuralbayeva, Liana O. Anderson and Ana M. Pessoa. *Pay For Performance and Deforestation: Evidence from Brazil*. 2018. bit.ly/3OCoCgO.

World Wide Fund for Nature Inc (WWF). *Financiamento Público em Meio Ambiente.* 2018. bit.ly/3lbyHGP.

APPENDIX I. CRITERIA FOR DEFINING FINANCIAL FLOWS ALIGNED WITH CLIMATE OBJECTIVES

Table A1 shows the criteria used to identify climate-related financial flows for land use. The table identifies mitigation and adaptation activities and those that act to mitigate and adapt to climate change.

Table A1. Criteria for Classifying Climate Financial Flows for Land Use in Brazil

Caption

Area

- Agricultural Credit Policy
- Agricultural Risk Management
- Government Expenditures
- Financial Market
- International Cooperation and Development

Sector

- Crop
- Bioenergy and Fuels
- Forest
- Cattle
- M — Multi-sector

CLIMATE OBJECTIVE: MITIGATION

ACTIVITIE	SUB-ACTIVITIES
Crop production projects that improve and/or do not eliminate existing carbon pools	No-tillage, implementation and improvement of no-tillage with straw mulching systems.
Environmental adaptation, policies on property rights and land regularization	Creation, management, inspection and implementation of Protected Areas. National System of Protected Areas (*Sistema Nacional de Unidades de Conservação* – SNUC).
	Environmental recovery of family farming properties through the Environmental Regularization Program (*Programa de Regularização Ambiental* – PRA).
	Land governance and management of the Rural Environmental Registry (*Cadastro Ambiental Rural* – CAR). Environmental regularization of rural properties in the states. Support to subnational bodies to implement the CAR and environmental regularization.
	Regularization, demarcation and inspection of indigenous lands and protection of isolated indigenous peoples. Recognition and reparation of *quilombola* territories. Environmental management and ethno-development.
	Adaptation of rural properties to environmental legislation, including recovery of legal reserves, permanent preservation areas, recovery of degraded areas and implementation and improvement of sustainable forest management plans.
	Modernization of land management and land regularization of state and federal public lands and settlements.

CLIMATE OBJECTIVE: MITIGATION

ACTIVITIE	SUB-ACTIVITIES
Sugar cane production, including for energy generation	Expansion and renovation of sugarcane fields, harvesting optimization and expansion of sugarcane crushing capacity. Includes purchase of machinery, equipment and construction of storage units for ethanol and sugar.
Renewable energy generation and measures for energy efficiency	Environmental sustainability and renewable energy actions. Renewable energy technologies, environmental and small hydroenergetic applications.
	Industry and crop modernization to increase efficiency, expansion of renewable energy exports, investments in energy efficiency.
	Energy conservation and demand-side efficiency measures to reduce energy consumption.
	Construction of substations and transmission lines for connection to the national electricity grid.
	Solar energy for centralized grids, including photovoltaic cells and concentrated solar power systems, and for isolated grids and autonomous systems, including mini-grids and residential solar systems.
	Water and waste treatment for energy production from biogas.
	Production of steam and energy co-generation from sugarcane.
	Power plants powered by biofuels that use biomass and biogases for direct energy generation.
Farming, processing, industrialization or extraction of native species or sustainable products	Açaí, cocoa, sugar cane, Brazil nut, cedar, cupuaçu, palm oil, yerba mate, wood, walnut, olive and rubber tree.**

** Product considered sustainable in the BCB's public consultation No. 82 of 2021.

Caption

Area
- Agricultural Credit Policy
- Agricultural Risk Management
- Government Expenditures
- Financial Market
- International Cooperation and Development

Sector
- Crop
- Bioenergy and Fuels
- Forest
- Cattle
- M Multi-sector

CLIMATE OBJECTIVE: MITIGATION

ACTIVITIE	SUB-ACTIVITIES
Payroll with staff from government agencies directly linked to activities that will allow Brazil to achieve its climate commitments to reduce GHG emissions	IBAMA.
	ICMBIO.
	FUNAI.
	SFB.
Payment for forest conservation	Forest Grant Program.
	Payment to families in extreme poverty for providing natural resource conservation services in rural areas through the Support Program for Environmental Conservation – Green Grant Program. Registration, implementation and monitoring of income transfer and promotion of socio-productive inclusion actions of the program.
Actions to prevent and control deforestation and fires	Budget support to federal or subnational authorities for deforestation control and environmental management policies, in addition to other technical assistance activities, including awareness raising and training.
	Development and implementation of deforestation monitoring systems, in addition to control, inspection, environmental monitoring and fight against environmental infractions, including through satellite systems.
	Amazon Protection System (*Sistema de Proteção da Amazônia* – SIPAM) and development, launch and operation of satellites, and associated infrastructure. Implementation of the Amazônia System (SAR).
	Construction of the headquarters of the National Center for Forest Fire Prevention and Fighting (*Centro Nacional de Prevenção e Combate aos Incêndios Florestais* – PREVFOGO.
Production of biofuels, including biodiesel and bioethanol	Modernization of equipment, processes and industrial and farming facilities. Construction of ethanol storage tanks. Investments to mitigate environmental, legal, labor and operational risks.
	Issuance of CBIOs by biofuel producers and importers based on commercialization of their production.
Projects that reduce methane or other GHG emissions	Purchase of cattle for slaughter from non-deforested areas and from areas that do not overlap with protected areas and protected territories.

Caption

Area

- Agricultural Credit Policy
- Agricultural Risk Management
- Government Expenditures
- Financial Market
- International Cooperation and Development

Sector

- Crop
- Bioenergy and Fuels
- Forest
- Cattle
- M Multi-sector

CLIMATE OBJECTIVE: ADAPTATION

ACTIVITIES	SUB-ACTIVITIES
Production of biological and organic crop pesticides	Development and innovation of the bioinput sector.
	Manufacturing of organic fertilizers, biological pest control products and development of new technologies.
Development of climate risk zoning and matrix	Studies, implementation and maintenance of the Agricultural Climate Risk Zoning (*Zoneamento Agrícola de Risco Climático* – ZARC). Development of an agricultural risk matrix.
	Carrying out productive environmental zoning and application of sustainability indicators in agroecosystems in selected territories.

CLIMATE OBJECTIVE: MITIGATION AND ADAPTATION

ACTIVITIES	SUB-ACTIVITIES
Financial services	Financial intermediaries and services for the agricultural sector.
	Microcredit, savings and credit cooperatives, etc.
	ABC Program, Pronaf ABC and FNO-ABC.
	PROAGRO.
	PSR.
	Garantia-Safra Program.
	Rural insurance for farming and forestry.

Caption

Area

- Agricultural Credit Policy
- Agricultural Risk Management
- Government Expenditures
- Financial Market
- International Cooperation and Development

Sector

- Crop
- Bioenergy and Fuels
- Forest
- Cattle
- M Multi-sector

CLIMATE OBJECTIVE: MITIGATION AND ADAPTATION

ACTIVITIES	SUB-ACTIVITIES
Activities to reduce emissions from deforestation and degradation	Forest conservation, restoration and recovery of degraded areas, including native vegetation and permanent preservation areas, to improve water supply. Private forest reserve projects.
	Technologies aimed at recovery, conservation and sustainable use of the Amazon biome.
	Management of protected areas (protected areas and indigenous lands), including territorial and environmental management plans.
	Agroecological systems, agroforestry systems (AFS) and organic agricultural production systems.
	Extractive production, community forest management and socio-environmental projects of agroextractive organizations, with skills development , technical support and associativism actions. Plant oil, wild cocoa and rubber value chains and strengthening of non-timber forest production chains.
Management and monitoring for water use and sanitation	Water supply, sanitation and hygiene programs.
	Construction or restoration of dams, tanks and water collection systems. Implementation of water storage systems to protect against the effects of seasonal drought.
	Infrastructure projects and institutional activities for integrated management of river basins.
	Drip irrigation, other types of irrigation, reservoirs and groundwater exploitation for agriculture.
	Implementation of gray water reuse systems for agroecological production, consumption, commercialization by families and schools to reduce vulnerability to local climate change.
	Public water supply in riverside communities on the São Francisco, Parnaíba, Itapecuru and Mearim rivers (Water for All Program). Construction and adaptation of public sewage systems in riverside communities.
Rural extension to improve agronomic practices and access to technology and infrastructure	Technical assistance and rural extension, training of technical experts and producers, structuring of state entities for technical assistance.
	Non-formal agricultural training.

Caption

Area

- Agricultural Credit Policy
- Agricultural Risk Management
- Government Expenditures
- Financial Market
- International Cooperation and Development

Sector

- Crop
- Bioenergy and Fuels
- Forest
- Cattle
- M Multi-sector

CLIMATE OBJECTIVE: MITIGATION AND ADAPTATION

ACTIVITIES	SUB-ACTIVITIES
Farming infrastructure and technologies	Protected cultivation and farming in a controlled environment to prevent damage caused by weather, disease or pests. Greenhouses, nurseries (artificial lighting, seedlings, seeds, bags, canvas, trays, vases).
	Biological nitrogen fixation.
	Equipment and tools for precision agriculture.
	Cattle and buffalo traceability systems.
Waste treatment	Implementation, improvement and maintenance of animal production waste management systems for energy generation and composting.
	Biodigestor, manure pit, biological oxidation tanks and water and sewage treatment.
Erosion, soil quality and pasture management	Improvement of soil water retention (e.g. through use of cover crops, organic fertilizers, minimum tillage).
	Pasture.**
	Renovation and recovery of degraded pastures. Soil recovery, intensive correction or intensive fertilization.
Activities related to the planted forest, pulp and paper industry	Implementation, maintenance and improvement of the management of commercial forests, including those intended for industrial use or charcoal production, as well as commercial eucalyptus and pine forests, both through renovation and implementation of new areas.
	Procurement and construction of infrastructure for wood processing. Planting and replanting, production and purchase of seedlings, soil preparation, and protection and maintenance of planted seedlings until harvest.
	Investments in industrial modernization and maintenance of the productive capacity of the pulp and paper industry in line with the environment.
Agroforestry, silvopastoral or pasture/ field management systems that offset CH4 emissions	Implementation and improvement of integrated crop-cattle, crop-forest, cattle-forest or crop-cattle-forest and AFS.

** Product considered sustainable in the BCB's public consultation No. 82 of 2021.

Caption

Area
- Agricultural Credit Policy
- Agricultural Risk Management
- Government Expenditures
- Financial Market
- International Cooperation and Development

Sector
- Crop
- Bioenergy and Fuels
- Forest
- Cattle
- M Multi-sector

CLIMATE OBJECTIVE: MITIGATION AND ADAPTATION

ACTIVITIES	SUB-ACTIVITIES
Monitoring and surveillance systems	Meteorological and climatological services in the national network.
	Platforms for collecting meteorological and oceanographic data.
	National Center for Natural Disaster Monitoring and Alerts (*Centro Nacional de Monitoramento e Alerta de Desastres Naturais* – CEMADEN).
	Interoperability of defense systems and flood warning information.
	Studies, projects and works carried out to contain or buffer floods and to contain marine and river erosion.
	Management of geological information, geological-geotechnical mapping in critical municipalities susceptible to geological risks. Operation of the hydro-meteorological network, hydro-geological surveys, implementation of infrastructure for water security. Research, studies and geoscientific surveys.*
	Development and monitoring of agro-food traceability systems.
	Surveillance and control of activities with genetically modified organisms, control of the production and sale of animal genetic material, raw material for animal feed and products for veterinary use.*

* For OGU financial flows, the values are weighted based on the scoring system for climate markers from the OECD-DAC Rio Markers (OECD 2018). Due to the specificities of Brazilian public policies, different assumptions were adopted for some activities, and therefore, the marker may differ from the OECD methodology. The financial flows of actions not explicitly related to climate objectives but indirectly contribute to the country achieving these objectives accounted for 40% of the total expenditure value.

Caption

Area

- Agricultural Credit Policy
- Agricultural Risk Management
- Government Expenditures
- Financial Market
- International Cooperation and Development

Sector

- Crop
- Bioenergy and Fuels
- Forest
- Cattle
- M Multi-sector

CLIMATE OBJECTIVE: MITIGATION AND ADAPTATION

ACTIVITIES	SUB-ACTIVITIES
Policy management and planning, training and guidance	Policies, laws, regulations, economic instruments, seminars and meetings for measures related to conservation, energy, environment and water use, such as the National Policy on Climate Change (*Política Nacional sobre Mudança do Clima* – PNMC), among others.
	Tax policy, administration and non-tax revenue.
	Science, technology and innovation at the National Institute of the Atlantic Forest (*Instituto Nacional da Mata Atlântica* – INMA), National Institute for Research in the Amazon (*Instituto Nacional de Pesquisas da Amazônia* – INPA), National Institute for Space Research (*Instituto Nacional de Pesquisas Espaciais* – INPE), National Institute for the Semi-Arid Region (*Instituto Nacional do Semiárido* – INSA).*
	Management and maintenance of administrative structure: FUNAI, IBAMA, ICMBIO, INPA, MMA and SFB.*
	Projects and studies for municipalities or municipal public consortia to mitigate GHG emissions and adapt to the effects of climate change.
	Studies and research and development projects related to climate change and oceanographic and climatological monitoring of the Blue Amazon. Logistical support for scientific research in Antarctica.*
	Low-carbon farming and sustainable production systems, regional production chains, control of organic farming (Pro-Organic), sustainable development of farming production chains and their territories and fighting rural poverty in the semiarid region of the Northeast.
	Conservation and sustainable use of genetic resources for farming and food. Artisanal agro-food production. Geographical Indication (GI) of Agricultural Products. Structuring and consolidation of family farming socio-productive networks.*
	Digital and precision agriculture.
	RENOVABIO and agroenergy development.
	Design and social management of Territorial Plans for Sustainable Rural Development (*Planos Territoriais de Desenvolvimento Rural Sustentável* – PTDRS) and promotion of the structuring and consolidation of family farming socio-productive networks within the scope of the Territories of Citizenship Program.

* For OGU financial flows, the values are weighted based on the scoring system for climate markers from the OECD-DAC Rio Markers (OECD 2018). Due to the specificities of Brazilian public policies, different assumptions were adopted for some activities, and therefore, the marker may differ from the OECD methodology. The financial flows of actions not explicitly related to climate objectives but indirectly contribute to the country achieving these objectives accounted for 40% of the total expenditure value.

Caption

Area
- Agricultural Credit Policy
- Agricultural Risk Management
- Government Expenditures
- Financial Market
- International Cooperation and Development

Sector
- Crop
- Bioenergy and Fuels
- Forest
- Cattle
- M Multi-sector

CLIMATE OBJECTIVE: MITIGATION AND ADAPTATION

ACTIVITIES	SUB-ACTIVITIES
R&D, knowledge management systems	Databases, inventories, environmental profiles, impact studies.
	Research related to plant improvement, genetic resources, animal health and crop biotechnology.
	Generation and dissemination of information on agriculture and agri-food supply. Development of a management platform for agro-environmental sustainability indicators and indicators for agro-environmental policies. Demographic, Agricultural and Geographical Censuses.*
	Adaptation, expansion, revitalization and modernization of the infrastructure of EMBRAPA units. R&D for sustainable and low-carbon agricultural production, adaptation to global environmental changes, increased competitiveness of production by family farmers and traditional communities.
	Research and technology transfer on pest management in agricultural and forestry production systems.
	Technological Reference Units (*Unidades de Referência Tecnológica* – URTs) of the Brazil Without Extreme Poverty Plan (*Plano Brasil Sem Miséria* – BSM) and the National Agricultural Research System (*Sistema Nacional de Pesquisas Agropecuárias* – SNPA). Research, monitoring and evaluation of crops and post-harvest losses. Survey and interpretation of soil information.*
	R&D, innovation and studies of the biofuel industry.
	Development and launching of satellite operations, suborbital rockets and satellite launch vehicles and associated infrastructure.* Transfer for development of the Geostationary Defense and Communications Satellite (*Satélite Geoestacionário de Defesa e Comunicações* – SGDC).*
	Technology dissemination and transfer for sustainable development of agriculture and agroforestry systems in cocoa producing regions.
Nutrient management and pest control Cattle and veterinary services	Projects for animal health and management, genetic resources, food resources.
	Plant protection, pest control and agrochemical supply.
	National Agriculture Laboratory (*Laboratório Nacional Agropecuário* – LANAGRO) Control of residues and contaminants of animal and plant products, inspection of crop and cattle production services.*
	Conservation and sustainable use of genetic resources for food and farming. National Platform of Genetic Resources.*

* For OGU financial flows, the values are weighted based on the scoring system for climate markers from the OECD-DAC Rio Markers (OECD 2018). Due to the specificities of Brazilian public policies, different assumptions were adopted for some activities, and therefore, the marker may differ from the OECD methodology. The financial flows of actions not explicitly related to climate objectives but indirectly contribute to the country achieving these objectives accounted for 40% of the total expenditure value.

Caption

Area
- Agricultural Credit Policy
- Agricultural Risk Management
- Government Expenditures
- Financial Market
- International Cooperation and Development

Sector
- Crop
- Bioenergy and Fuels
- Forest
- Cattle
- M Multi-sector

CLIMATE OBJECTIVE: MITIGATION AND ADAPTATION

ACTIVITIES	SUB-ACTIVITIES
Biosphere and biodiversity conservation and restoration	Measures to protect endangered species, habitats and nature reserves.*
	Expansion and modernization of infrastructure for the study of biodiversity, technological innovation and sustainability of Amazonian ecosystems in the face of global changes.
Incentives for democratic participation by civil society on climate change	Associations, human rights institutions, feminist and women's rights organizations that promote democracy, citizen participation, advocacy and civic education.
Farming projects and development	Farmers' organizations and cooperatives.
	Integrated projects for rural development, land management and rural-urban integration.
	Marketing, storage, transportation and strategic reserve policies.
Education and training for climate change	Education and training programs on environmental and energy issues.
Development of fishing activities	Exploitation, use and protection of fish stocks, as well as aquaculture and integrated fishery projects.

* For OGU financial flows, the values are weighted based on the scoring system for climate markers from the OECD-DAC Rio Markers (OECD 2018). Due to the specificities of Brazilian public policies, different assumptions were adopted for some activities, and therefore, the marker may differ from the OECD methodology. The financial flows of actions not explicitly related to climate objectives but indirectly contribute to the country achieving these objectives accounted for 40% of the total expenditure value.

Source: *CPI/PUC-Rio based on the classifications of Rosenberg et al. (2018), Chiriac, Naran and Falconer (2020), BCB (2021), Antonaccio et al. (2018) and OECD (2018)*

Caption

Area
- Agricultural Credit Policy
- Agricultural Risk Management
- Government Expenditures
- Financial Market
- International Cooperation and Development

Sector
- Crop
- Bioenergy and Fuels
- Forest
- Cattle
- M Multi-sector

APPENDIX II. CLIMATE FINANCE AREAS AND DATA

Table A2. Areas and Databases Related to Climate Finance for Land Use in Brazil

Area	Description/ Instrument	Data and Sources
Agricultural Credit Policy	Finance for rural producers (individuals or legal entities) and their cooperatives, under the conditions established annually in the Rural Credit Manual (*Manual de Crédito Rural* – MCR) of the BCB. The finance in these operations are registered in the SNCR. **Instrument:** rural credit.	**1) Data:** Amount of rural credit operations contracted with financial institutions, for finance, industrialization and investment purposes. **Source:** BCB Rural Credit PROAGRO Operations System (*Sistema de Operações do Crédito Rural e do Proagro* – SICOR). **Note:** Despite the agricultural credit policy being defined for the crop year (July to June), this study used data considering the calendar year (January to December) to make it compatible with the other databases.

Area	Description/ Instrument	Data and Sources
Agricultural Risk Management	Insurance and other financial mechanisms that cover losses in agriculture and the forest sector resulting from climate phenomena, such as excessive rain, drought, sudden temperature changes, hail, frost, strong winds, cold winds, diseases and pests, among others. Government programs to protect rural producers from climate risks: PSR, *Garantia-Safra* and PROAGRO. **Instrument:** risk management.	**1) Data:** Government expenditures paid within the System of National Accounts (*Sistema de Contas Nacionais* – SNC): (i) Federal contributions to the *Garantia-Safra* Fund (ii) PROAGRO indemnities by the federal government. **Source:** Planning and Budget Integrated System/ Ministry of Planning and Budget (Sistema Integrado de Planejamento e Orçamento/Ministério do Planejamento e Orçamento – SIOP/MPO). **2) Data:** PSR. **Source:** Rural Insurance Atlas/ MAPA. **3) Data:** Amount of net premium paid for contracting a rural insurance policy. **Source:** Statistic System of the Superintendence of Private Insurance (*Sistema de Estatísticas da Superintendência de Seguros Privados* – SES/SUSEP) and Rural Insurance Atlas/MAPA. **4) Data:** Amount paid by rural producers to contract PROAGRO (additional fee). **Source:** SICOR/BCB. **Note:** The financing source is considered private when it is paid for by rural producers, and is considered public when paid by the government.

Area	Description/ Instrument	Data and Sources
Government Expenditures	Federal government expenditures on policies, actions and institutions that govern land use, including forest conservation and restoration and the development of sustainable agriculture. States and municipalities expenditures as financial counterpart for projects approved with non-reimbursable finance from the FNMC. **Instruments:** public budget and grants.	**1) Data:** Government expenditures paid within the SNC. **Source:** SIOP/MPO. **2) Data:** Amount approved for non-reimbursable projects of the FNMC. **Source:** MMA. **Note:** Government expenditures paid within the System of National Accounts (*Sistema de Contas Nacionais* – SCN) do not include federal government expenditures on transfers to the BNDES, credit and rural insurance policies, and finance for FNMC non-reimbursable operations. This is done to avoid overlap with flows identified in other government areas.

Area	Description/ Instrument	Data and Sources
Financial Market	BNDES operations granted to legal entities requested and negotiated directly with the bank or through a financial institution. Issuance of CBIOs in the primary securities market. Thematic bonds issued in the primary securities market, including in foreign currency, such as CRA, debentures, among others. **Instruments:** low cost credit, CBIOs, thematic bonds.	**1) Data:** Amount approved for non- automatic direct and indirect BNDES operations. It does not include rural credit operations with BNDES finance, as these are already accounted for in the agricultural credit policy area. **Source:** BNDES. **2) Data:** CBIOs traded financial value in the primary market. **Source:** Ministry of Mines and Energy (*Ministério de Minas e Energia* – MME) and market data from B3. **3) Data:** Financial value of the issuance of thematic bonds in the domestic and international primary market. **Source:** Natural Intelligence Group (NINT). **Note:** For CBIOs and thematic bonds, only issuances in the primary market were considered, i.e., the one in which a new issuance of a security is negotiated directly between the issuer and investors (subscribers of the issuance) and the finance are allocated to investment projects or the issuer's cash equity (CVM 2022). Law no. 10,303/2001 determines the bond and collective investment contracts that are considered securities, such as shares, debentures and commercial notes, among others.

Area	Description/ Instrument	Data and Sources
International Development and Cooperation	International financing channeled through specific programs or projects as well as through technical cooperation with the federal government, subnational governments, multilateral banks or civil society organizations, among other arrangements. They include, among others, financing operated by the Amazon Fund and Multilateral Climate Funds (MCFs), such as the Green Climate Fund (GCF), Adaptation Fund, Climate Investment Funds (CIF) and the Global Environment Facility (GEF). **Instruments:** grants, low-cost credit, and project-level equity.	**1) Data:** Approved value for projects financed by MCFs, multilateral development banks, private philanthropy foundations and foreign governments, such as cooperation agencies in developed countries. **Source:** OECD creditor reporting system (OECD/DAC) and Inter-American Development Bank (IDB)[34]. **2) Data**: Amount approved for projects financed by the Amazon Fund. **Source:** BNDES.

Source: *CPI/PUC-Rio, 2023*

34 Grants from to the international governments to the Amazon Fund were excluded from OECD data, as flows from this Fund were accounted for at project level based on data available by BNDES.

APPENDIX III. DEFINITIONS OF THE FINANCE LANDSCAPE CATEGORIES

Table A3. Description of categories of climate financial flows for land use in Brazil

Category	Category Definition	Subcategory	Subcategory Definition
Origin of Finance	Finance can be public or private, national or international.	Private	Finance that originate from private actors, such as financial institutions, corporations, rural producers and philanthropic foundations, among others.
		Public	Finance from government sources such as the National Treasury, Constitutional Finance Funds, BNDES' own finance, finance from multilateral development banks and international government agencies, among others.
		National	Finance from the country's governmental or private internal sources.
		International	Finance from government or private sources in other countries.

Category	Category Definition	Subcategory	Subcategory Definition
Source of Finance	Organizations providing finance.	Financial Institution	Public banks, private banks, and credit unions. These are resources belonging to these financial institutions for rural credit operations offered at non-controlled rates (free negotiation with the customer) and at controlled rates (operations receiving government subsidy for interest rate equalization).
		Rural producers	Investments are made with the producers' own resources, regardless of their profile – family, medium or large.
		LCA	Finance from rural credit are raised via Agribusiness Letter of Credit (*Letra de Crédito do Agronegócio* – LCA).
		Corporations	Companies in the agribusiness chain. Includes companies dedicated to crop production, agribusiness (sugarcane, bioenergy, planted forests, pulp and paper, animal protein and fertilizer production) and fuel distributors.
		Philanthropies	Non-profit private foundations financed by resources from families, private companies or individuals. The Citi Foundation of Citi Bank and the Gordon and Betty Moore Foundation are examples of philanthropic entities.
		BNDES	Free-reign BNDES resources, those offered at uncontrolled rates (free negotiation with the customer), and Financing Fund for the Acquisition of Industrial Machinery and Equipment (*Fundo de Financiamento para Aquisição de Máquinas e Equipamentos Industriais* – BNDES/FINAME).

Category	Category Definition	Subcategory	Subcategory Definition
Source of Finance	Organizations providing finance.	Federal and state governments	FCFs, Workers' Support Fund (*Fundo de Amparo ao Trabalhador* – FAT), national treasury bonds, financial counterparts from subnational governments for FNMC projects, and other finance operationalized by the General Budget of the Union (*Orçamento Geral da União* – OGU).
		Multilateral development banks	Institutions created by a group of countries, which provide financing and professional advice for development purposes, such as the World Bank, Development Bank of Latin America (*Corporación Andina de Fomento* – CAF) and the IDB, among others.
		International governments	Finance administered mainly through international cooperation agencies and programs such as the German International Cooperation Agency (*Deutsche Gesellschaft für Internationale Zusammenarbeit* – GIZ), UK government Prosperity Fund, Norwegian government programs, among others.
		Climate Funds	Finance established within and outside the UNFCCC and financial mechanisms of the Paris Agreement with the aim of supporting developing countries in fighting climate change, such as the Amazon Fund and the Green Climate Fund, among others.
		Others	Other sources of finance that could not be classified properly.

Category	Category Definition	Subcategory	Subcategory Definition
Disbursement Channels	Organizations that intermediate flows to their final beneficiaries or grant financing.	Financial Institution	Public and private banks, non-federal development banks and national development agencies, credit unions and insurance companies.
		Corporations	They are the companies (legal entities) in the agribusiness chain. This includes companies devoted to crop production, agribusiness (sugarcane, bioenergy, planted forests, pulp and paper, animal protein and fertilizer production) and fuel distributors.
		Government agencies	Ministries of the Brazilian Executive Branch and their related agencies, state-owned companies and subnational government agencies (states and municipalities).
		Others	Channels that could not be identified or categorized.
		Civil society organization	Civil society organizations are non-profit private entities that carry out public interest activities (IPEA 2018). They include community organizations and village associations, environmental groups, women's rights groups, farmers' associations, religious organizations, trade unions, cooperatives, professional associations, chambers of commerce, independent research institutes (OECD 2018).
		BNDES	Operations granted to legal entities negotiated and intermediated by BNDES.
		Multilateral development banks and cooperation agencies	Multilateral development banks and specialized agencies of the UN.
		International governments	International cooperation agencies and programs such as GIZ, the UK government's Prosperity Fund, Norwegian government programs, among others.

Category	Category Definition	Subcategory	Subcategory Definition
Instruments	Financial instruments used to channel tracked finance.	Rural credit	Financing for rural producers (individuals or legal entities) and their cooperatives, under the conditions established annually in the MCR of the BCB).
		Risk management	Insurance and other financial mechanisms that cover losses in agriculture and forest resulting from climate phenomena (rural insurance, PSR, *Garantia-Safra* and PROAGRO).
		Equity at project level	Capital investment that depends on the project's cash flow for repayment (Buchner et al. 2021).
		Thematic bonds	Private bonds issued in the primary securities issuance market that follow voluntary guidelines and standards, such as the GBP, Green Loan Principles (GLP), and the Climate Bonds Standard, among others.
		Low-cost credit	Financing granted under preferential conditions compared to those practiced in the market (Buchner et al. 2021). It does not include Rural Credit operations.
		CBIOs	CBIO issuance by biofuel producers and importers.
		Public budget	Expenditures paid by the federal government, including transfers to subnational governments (states and municipalities). It also includes counterpart financing by subnational governments in projects with non-reimbursable finance from the FNMC.
		Grants	Transfers made in cash, goods or services for which reimbursement is not required (Buchner et al. 2021).

Category	Category Definition	Subcategory	Subcategory Definition
Sectors	Economic activity sectors in which the financing was applied.	Crop	Activities related to farming production, such as implementation of crop practices and infrastructure on rural properties, purchase and production of inputs, among others. It also includes ancillary activities such as rural extension, financial services and policy management and planning, training and guidance for the sector.
		Forest	Forest conservation, restoration and reforestation activities, as well as economic exploitation, such as planted forests, pulp and paper. It also includes environmental adaptation policies, property rights, and land regularization.
		Cattle	Cattle production, through activities such as implementation of systems for integration and infrastructure on rural properties, waste treatment and pasture renewal, among others. It also includes ancillary activities such as rural extension, financial services and policy management and planning, training and guidance for the sector.
		Bioenergy and fuels	Renewable energy generation and measures for energy efficiency from sugarcane or crop residue. Production of biofuels, including biodiesel and bioethanol, and policy management and planning, training and guidance for the sector.
		Multi-sector	Policies and projects aimed at reducing vulnerability to climate change. Monitoring and surveillance systems for meteorology, natural disaster alerts, risk management for hydrological and geological events, among others.

Category	Category Definition	Subcategory	Subcategory Definition
Climate Objective	Contribution that the financed activities provide in the face of climate change: mitigation, adaptation, or both.	Mitigation	Activities that contribute to reducing or avoiding GHG emissions, including gases regulated by the Montreal Protocol, or to the maintenance or improvement of GHG sinks and reservoirs (Buchner et al. 2021).
		Adaptation	Activities that aim to reduce the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, while maintaining or increasing adaptive capacity and resilience (Buchner et al. 2021)
		Mitigation and Adaptation	When the financed project generates a double benefit as it finances activities with both adaptation and climate mitigation components and meets the respective criteria for each category (Buchner et al. 2021).

Source: *CPI/PUC-Rio, 2023*

climatepolicyinitiative.org