

# Unlocking Brazil's Green Investment Potential for Agriculture

2020



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## Climate Bonds INITIATIVE

Prepared by the  
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#### Climate Bonds Initiative

The Climate Bonds Initiative is an international investor-focused not-for-profit organisation working to mobilise the USD 100 (BRL 424) trillion bond market for climate change solutions. It promotes investment in projects and assets needed for a rapid transition to a low carbon and climate resilient economy. The mission focus is to help drive down the cost of capital for large-scale climate and infrastructure projects and to support governments seeking increased capital markets investment to meet climate policy and GHG emission reduction goals. The Climate Bonds Initiative carries out market analysis, policy research, market development; advises governments and regulators; and administers a global green bond standard and certification scheme. Climate Bonds Initiative screens green finance instruments against its Climate Bonds Taxonomy to determine alignment and uses sector specific criteria for certification. The Climate Bonds Taxonomy is on the back cover. Please see page 61 for information on the Climate Bonds Standard and Certification Scheme.

#### Members:

Banco do Brasil « B3 - Brasil Bolsa Balcao « Cargill « *Confederação da Agricultura e Pecuária do Brasil* CNA « Ecoagro « Freitas Leite Advogados « Mattos Filho Advogados « Natcap « Pinheiro Neto Advogados « Proactiva « Sociedade Rural Brasileira.



BRAZIL  
GREEN  
FINANCE  
INITIATIVE



SUBCOMITÊ DE  
AGRICULTURA

In partnership with  
**The Brazil Agriculture Subcommittee**

**Andre Gustavo Salcedo Teixeira Mendes**,  
Lead Author, Brazil Green Finance Initiative

#### The Brazil Agriculture Subcommittee

The Agriculture Subcommittee is part of the Brazilian Green Finance Initiative (BGFI), which aims to address market challenges to leverage green finance in Brazil. The BGFI first came together in September 2016 as an informal group of senior executive-level stakeholders from public and private banks, private companies (energy, agriculture and infrastructure), asset managers, pension funds and insurers. Currently, BGFI is an investor-only group where members represent over USD 3.5 (BRL 14.8) trillion in AUM. As part of the efforts of developing green bonds for the agriculture sector, the Brazil Agriculture Subcommittee was created to identify and propose green finance opportunities, including strengthening existing lines of financing and creating new alternatives to attract long term domestic and international capital for sustainable projects in Brazil. These efforts also include the development of a pipeline of projects in strategic segments to attract capital market investment to scale sustainable agriculture.

## Foreword

**Tereza Cristina**,  
Minister of Agriculture,  
Livestock and Food Supply

The Ministry of Agriculture, Livestock and Food Supply (MAPA) and the Climate Bonds Initiative (CBI) signed a Memorandum of Understanding - MoU, in November 2019, to develop a green finance market for Brazilian Agriculture. This Investment Roadmap is one of the many activities we expect to deliver under this partnership over the next two years.

MAPA recognizes Brazil has the largest agro-environmental assets in the world and believes this can be scaled through green investments. The country has developed a sustainable tropical agriculture model that has expanded production through an increase in efficiency - it is possible to harvest three crops a year - and there is also available land to expand our agriculture without the need of new areas. This efficiency has meant Brazil has been able to preserve 66% of its native vegetation and green finance is a driver for us to continue to fulfil this potential.

The definition of sustainable standards for agriculture is essential to maintain these efforts for the long term. Thus having CBI, the leading authoritative voice on green bonds and the only global green bond certifiers, publish their Agriculture Criteria gives the market further guidance on the projects and assets that can access this type of investments. The Brazilian Agricultural Research Corporation - Embrapa has developed a wide range of sustainability protocols and technologies, such as integrated crop-livestock-forestry systems, which can benefit from these investments.



This Investment Roadmap uncovers opportunities for investors interested in investing Brazil's sustainable agriculture and brings together the different elements needed to leverage this market. In addition to the sustainable opportunities mapped in this Roadmap, sustainable finance can unlock further investments in Brazilian agriculture. The annual working capital needed is of USD 100 billion per year, and increases considering agribusiness as a whole.

Brazil is an important global agricultural player and this role will continue to increase over the next decades, highlighting the potential of unlocking green investment opportunities for our agriculture. The current pandemic has further demonstrated the need for production and systems that are more resilient.

I am confident that this Roadmap will promote green bonds as one of the important financial tools for driving investments in agriculture in Brazil. Our pipeline presents immense potential and I am specially looking forward to witnessing the development of this market.

# Unlocking Brazil's Green Investment Potential

This Roadmap highlights the vast investment opportunities in Sustainable Agriculture in Brazil

## SUMMARY

- This roadmap has been prepared to provide greater understanding and visibility on the landscape of existing green investment opportunities across Brazil's agribusiness sector and to support the creation of a pipeline of bankable projects for green bond issuance and other labelled debt instruments.

Sectors addressed in the roadmap were selected based on their representation on the Brazilian economy and also their alignment towards transitioning to a low carbon and resilient economy. In addition to sector-by-sector investment opportunities, local agricultural financial instruments that could receive a green label are also explored in the roadmap.

This is intended for a wide range of domestic and international stakeholders, including asset managers, intermediaries, securitization companies, potential issuers, as well as policy makers.

The Roadmap was developed through the analysis and research of current regulation and sectoral reports, and in consultation with government representatives, trade associations, industry and other stakeholders in the agriculture sector. It is a key outcome of the Brazil Green Finance Initiative (BGFI) Agriculture Subcommittee, which has been leading discussions on how to develop a green finance market in Brazil and scale investments for sustainable agriculture.

Globally, since 2014 there has been a paradigm shift in how the debt capital markets are seeking to align flows of capital and services with sustainable development objectives. This has been evident in the emergence of the global green bonds market. Standing at over USD 800 billion (BRL 3.4 trillion) of issuance to date, the green bond market has grown significantly since its early days in 2013.

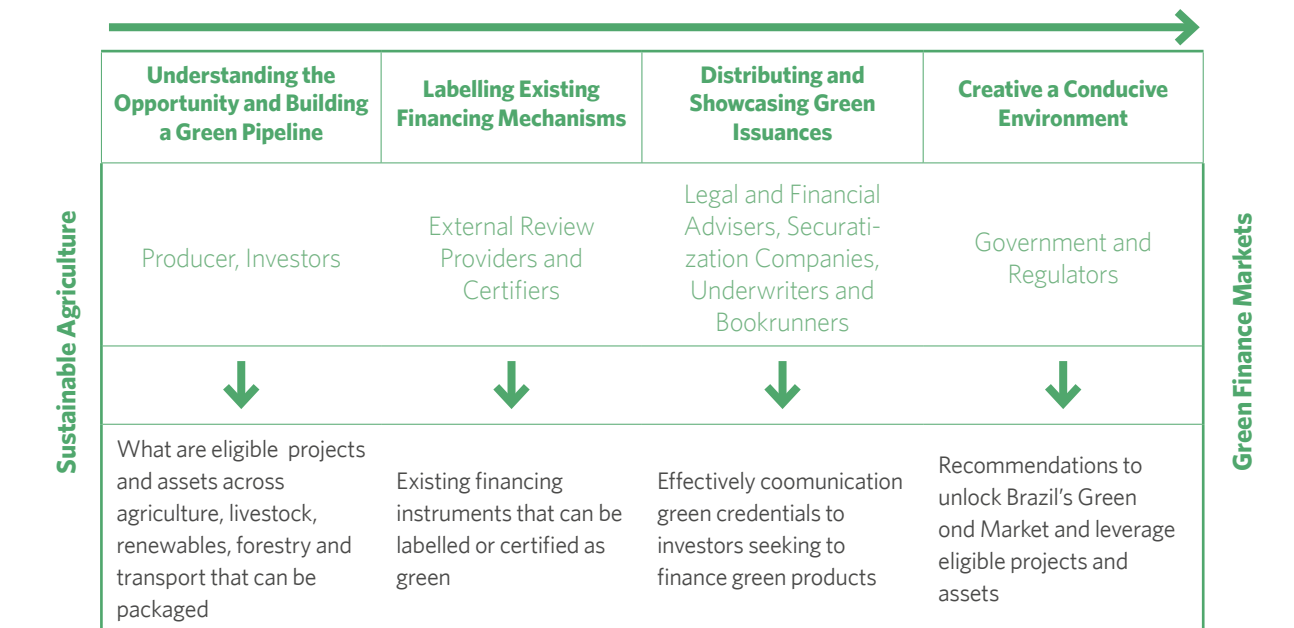
Brazil has been identified as one of the largest potential markets for green bond growth in the agriculture sector. The country is the largest exporter of beef, poultry, soy, coffee, orange juice, sugar, and the second-largest exporter of corn. Nonetheless, the use of green bonds has been limited to major export players on forestry, particularly pulp and paper companies. Numerous opportunities exist, but these need to be identified and further promoted, including what types of assets and projects qualify for green finance.

The number of green bond issuances on agriculture and forestry worldwide are relatively low. In 2018, both sectors accounted for 3% of the climate-aligned bond universe<sup>01</sup>, representing USD 37.3 (BRL 158) billion. The scarce number of issuances from the sector is partly due to the complexities of agriculture products and activities, as well as the lack of green bond criteria for agriculture and land use. The Agriculture Criteria, in development under the Climate Bonds Standard & Certification Scheme<sup>02</sup>, and to be launched by the end of 2020 will provide further

guidance for stakeholders in the sector on eligible assets and projects for green bonds.

To support the development of a green bond market for Brazil's agriculture sector, the Agriculture Subcommittee has developed this Roadmap to raise awareness of investment opportunities in Brazil and demonstrate how green bonds can finance sustainable agriculture in the country. The Roadmap is divided into seven sections, which address the main elements in developing a Green Bond Market for Brazil's Agriculture sector.

Figure 1. Roadmap to Develop Brazil's Agricultural Green Bond Market



**Note on Exchange Rates:** for comparability purposes, the values in this Roadmap are shown in US Dollar (USD) and Brazilian Real (BRL) equivalent. The exchange rate used is: BRL/USD 4.24 (average for the last twelve months April 2019 to April 2020).

01 Climate-aligned bonds are bonds which appear to finance (at least 95%) green projects and assets but that not necessarily have come to market labelling their deal as green. This means that such a transaction has not received a third-party verification or a second-party opinion by an independent service provider. In most cases, climate-aligned bonds are traded normally in the market, as the "green" label acts as a signal to investors regarding the use of proceeds and transparency features of that bond. The climate-aligned universe was defined by the Climate Bonds Initiative as an attempt to determine the potential of the green bond market considering existing transactions (both labelled and un-labelled).

02 A labelling scheme to guide investor and issuers on eligible green investments. The Climate Bonds Standards details management and reporting processes, while the Certification Scheme sets sector criteria that must be met to be eligible for certification.



## Green Bonds Market Development

Green bonds have the potential to mobilise substantial portions of the capital required to transform Brazil into a global leader in sustainable agriculture by promoting greater resource efficiency.

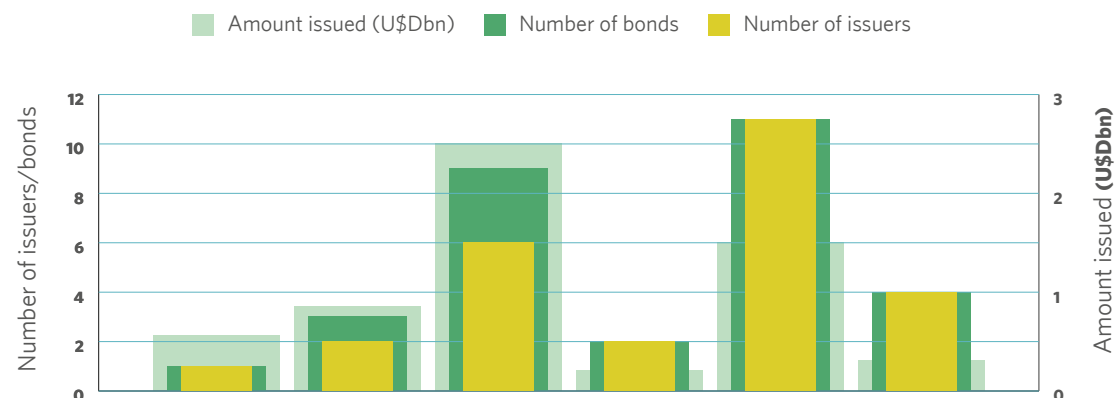
### SUMMARY

- Brazil is the second-largest green bond market in the Latam Region with USD 5.9 (BRL 25 billion).
- Non-financial corporates represent 84% of issuances and energy, land use and industry are the most funded categories.
- The Climate Bonds Standard's Agriculture Criteria will support agriculture issuances by providing high standards for sustainable agriculture production.
- Existing and widely used green labelled agriculture capital market instruments can source investments into sustainable practices.

The demand for green bonds is growing with speed. Oversubscription is the norm due to demand for green products. **Institutional investors are increasingly demanding financial products that will address the non-financial risks in their investment portfolios and Brazil is well placed to meet this demand by issuing green bonds or other types of green finance instruments across a wide range of sectors.** Globally, green bond issuance reached USD 167.7 (BRL 711) billion in 2018 and a record issuance of USD 258 billion (BRL 1 trillion) in 2019.<sup>001</sup>

**Brazil is the second largest Green Bond market in Latin America and the Caribbean. The country represents 30.5% of issuance in the region at USD 5.9 (BRL 25) billion<sup>002</sup>.** The country's first green bond was issued in June 2015 and since then the market has grown exponentially with 30<sup>03</sup> bonds issued until so far. More than half of this volume was issued during 2017. In 2018, issuances had a 92% drop due to political uncertainties, but this was picked up again in 2019 and have exceeded USD 1 (BRL 4) billion<sup>003</sup>.

Issuance in Brazil (2015-19)



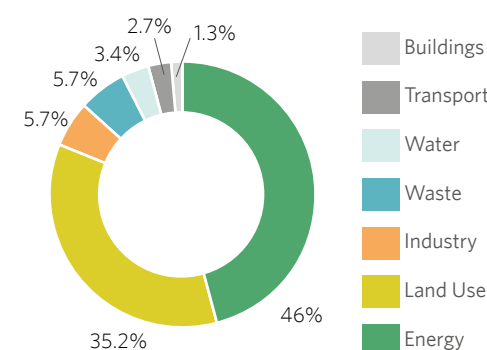
Datas as 30 May 2020

**Note:** the 'number of issues' above reflects those in a give year. Since three issuers cover two years, the total number of issuers is 13.

03 NB: For the purposes of this report, 'country' reflects the country of the issuing entity; in our global green bond database and statistics, 'country' reflects the country of risk, which may be different if the parent of the issuing entity is from another country.

Non-financial corporates are the leading issuers in Brazil. They accounted for 84% of the 30 bonds and for 73% of the total amount issued. Other issuers include the National Development Bank (BNDES), government-backed entities and ABS (CRAs). To date, local government have not issued bonds. Brazilian green bonds have on average 5 to 10 year tenors, particularly for larger deals. Around 99% of Brazil's green issuance volume and 28 of the 30 bond, fall into this range. Only four green bonds (two for pulp & paper and two for renewable energy) have come out with an original term exceeding 20 years.

Top 3 in Brazil: Energy, Land use and Industry



**Note:** after a record 2017, 2018 was a weak year for the Brazilian green bond market.

**Energy, land use and industry are the most funded categories in Brazil, with pulp and paper and wind and solar energy driving the market. Despite the potential for sustainable agriculture presented in this Roadmap, no dedicated issuances have been made to finance agriculture activities.** All land use allocation in Brazil are financing certified forestry products, mostly related to pulp and paper (e.g. Klabin, Suzano), with a smaller portion of this allocated to environmental conservation efforts by these paper producers. This use of proceeds is likely due to the ease of issuing this type of green bonds, given that pulp and paper companies are listed in stock exchange markets, are frequent international bonds issuers and are already producing sustainably and with international certification, such as FSC and PEFC.

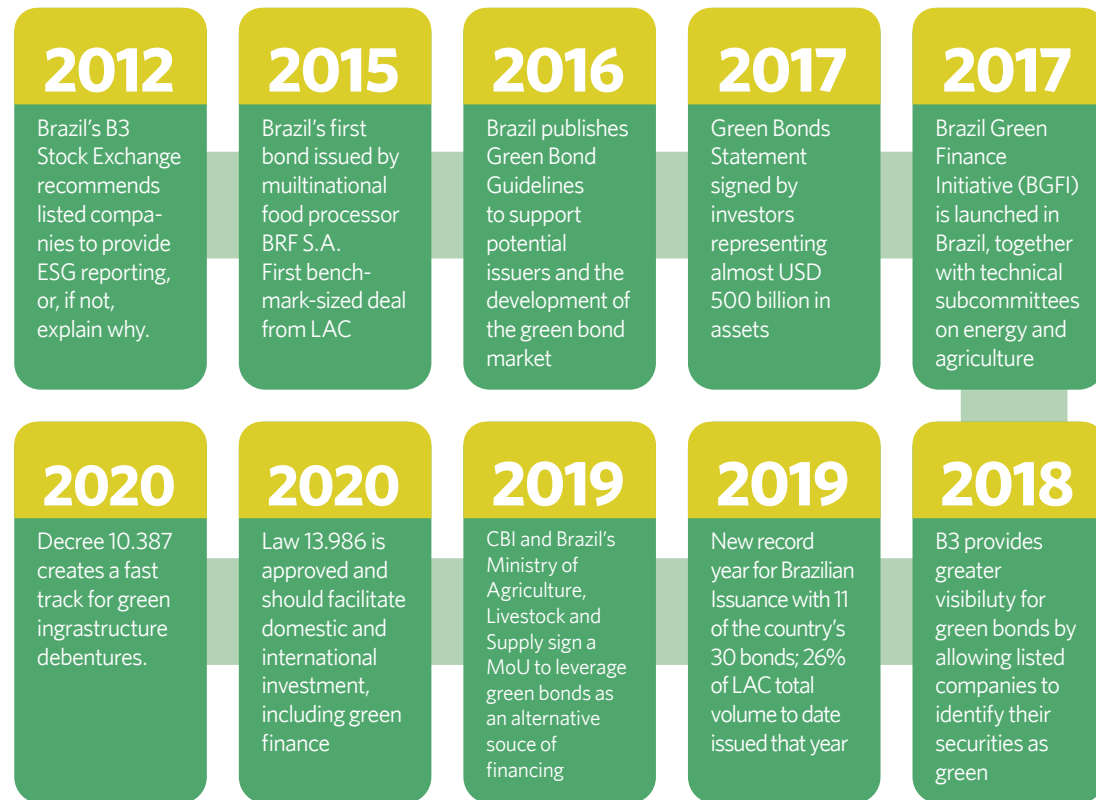
**Issuance directed towards sustainable agricultural production is more challenging, particularly due to the complexity of products and activities, the size constraints for issuance and the lack of criteria in the market towards the land use and agriculture sectors for labelling green financial products. CBI expects to release its Agriculture Criteria in 2020 to support market development and promote high standards for sustainable agriculture production.** CBI's Briefing Paper on the use of green bonds to finance Brazil's agriculture sector<sup>004</sup>, highlights opportunities within the Brazilian Nationally Determined Contribution (NDC) for land use, forestry and agriculture and sets out other areas that could contribute to climate mitigation and adaptation, including soil health technologies, sustainable production, certified crop management and forest management.

**Green bonds have the potential to shift and scale Brazil's agriculture towards sustainable production. Brazil has dedicated capital market instruments for agriculture (e.g. CRA, LCA and CDCA see Annex I on page 50) that can be labelled green and source investment into sustainable practices.** Financial instruments already known to investors such as debentures, bonds, CRAs and receivables-backed funds, such as the *Fundo de Investimento em Direitos Creditórios* (FIDCs), could also be labelled as Green. Brazil's financial and capital market instruments are ready to leverage existing opportunities and attract long term (private sector) capital for agriculture at a time when public sources are becoming increasingly scarce. Thus, the importance of developing a robust pipeline for sustainable investments in agriculture to meet local and international demands, and scale issuances, as well as develop a secondary market.

### Milestones in Brazil's Green Bond Market

Over the past nine years, the Brazilian Government and other key actors have developed several green finance initiatives - see figure below for a summary of these initiatives and policy developments, particularly for agriculture. Institutional investors have been engaged through the Brazilian Green Finance Initiative; under which two funds one by (BNDES in 2017 and another by BrasilPrev in 2019) have been launched and USD 1 billion (BRL 235 million) issued for refinancing renewable energy portfolios. In addition to this, BGFI and CBI, supported Green Bond Statement, signed by institutional investors, in 2017, representing USD 424 billion (BRL 1.8 trillion) in assets, to show their support for the green bond market.

Parallel to CBI's work the IADB is working with Brazil's Securities and Exchange Commission (CVM), under the Financial Innovation Laboratory (LAB) to identify the role they should be taking in developing the green bond market.



For more information on the Brazilian green bond market, please see the [Latin America and Caribbean Green Finance State of the Market<sub>005</sub>](#) report.



Note: data as of 30 May 2020.

## Brazil's Sustainable Agriculture Investment Potential

Brazil's technological advances, enhanced over the last decade, reflect its potential to continue to significantly increase productivity while preserving its natural capital.

### SUMMARY

- Technology and productivity have transformed Brazil's agricultural production together with solid public policy frameworks directed at environmental conservation and sustainable agriculture production.
- The country will continue to play an important role as a global food supplier, with commodity production increasing an average 18.4% by 2028.
- By 2030, Brazil would need at least USD 209.9 (BRL 890) to USD 224 (BRL 950) billion to achieve its climate targets. Agriculture, land use and forestry are major sectors towards achieving this.
- Brazilian government has taken action to increase private investment through law 13.986/2020.

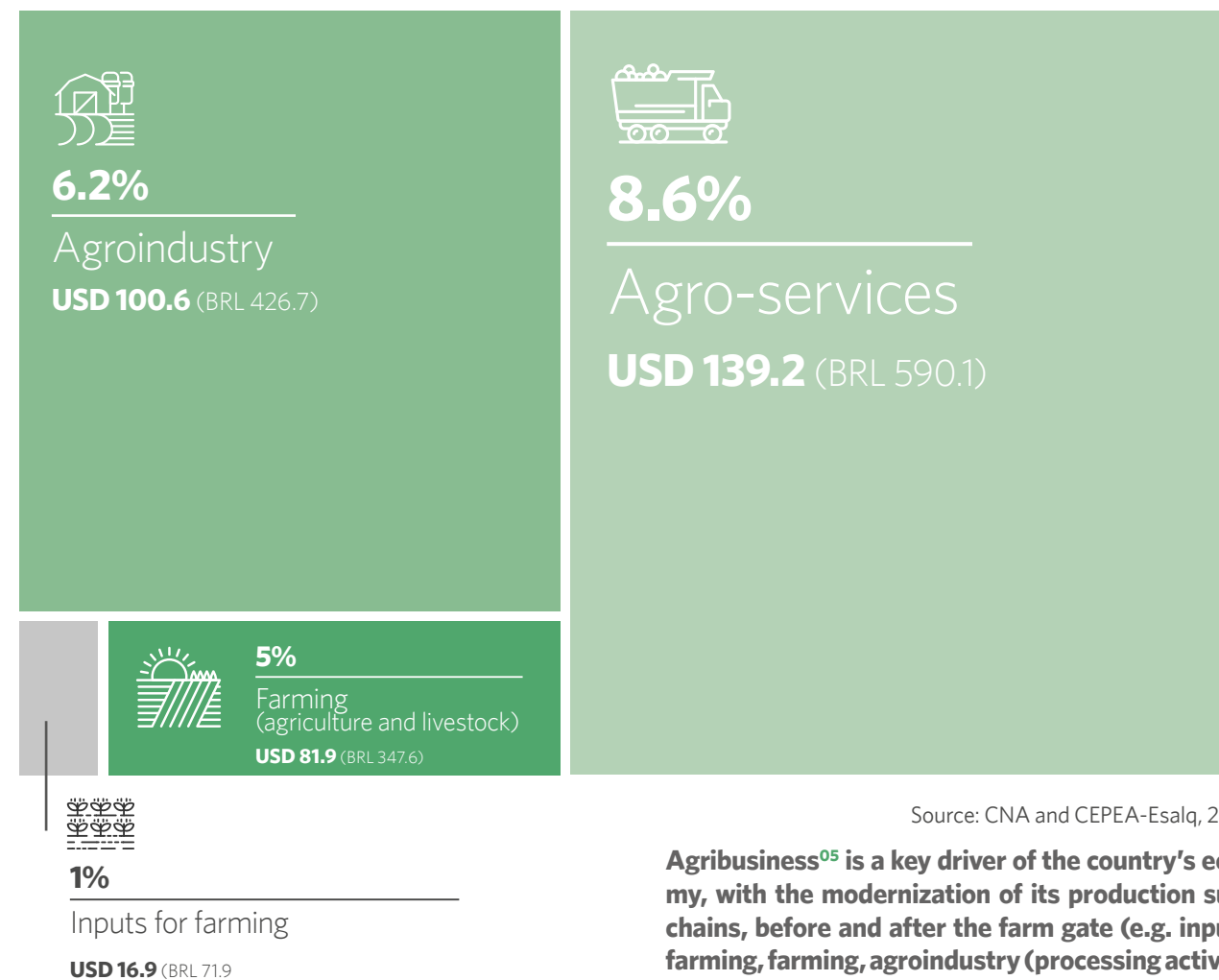
**Brazil is an agriculture powerhouse and a major global supplier of agricultural commodities. It is the largest exporter of beef, poultry, soy, coffee, orange juice, sugar, and the second-largest exporter of corn<sup>006</sup>.** The introduction of new technologies, dedicated policies, public investment and technical assistance contributed to Brazil's competitiveness. The constant development and application of new technologies, led mainly by the Brazilian Agricultural Research Corporation (Embrapa), enabled the efficient and sustainable use of vast natural resources by the agribusiness sector, placing the country in a leading position on productivity and quality across different segments, despite the many challenges it still faces.

Over the past forty years, the country transformed its agriculture increasing production mostly through productivity gains and without relevant expansion of the occupied area, which currently represents 7.8% of the Brazilian territory<sup>007</sup>. Between 1975 and 2015, technological advances were responsible for 59% of the growth of the gross value of agriculture production, while labour and land were respectively responsible for 25% and 15%<sup>008</sup>.

Projections from the Organisation for Economic Co-operation and Development (OECD) point that Brazil's trajectory as a major exporter will continue over the coming years<sup>009</sup> and estimates from the Food and Agriculture Organization of the United Nations (FAO) indicate that Brazil will play an important role in meeting the rising global demand for food and agricultural products, which is expected to increase by 50% by 2050<sup>010</sup>. But to be able to meet this demand over the long term will require the ability to produce more while using less.

Since the 1950s-1960s Brazil went from a food importer to a major food provider and will have an increasing role in the global food supply<sup>011</sup>. **By 2025 Brazil will have the largest food surplus in the world and South America and the world<sup>012</sup>. Crops such as corn, soy and sugar will have a relevant expansion, with an average increase of 22.2% between 2018 and 2028<sup>013</sup>. Meat production follows this same trend, with beef, pork, poultry and fish registering a 14.6% average increase<sup>014</sup>.** Besides food supply, Brazil is also a relevant bioenergy producer, with sugarcane and soy being the two main feedstock. Forecasts from the Energy Research Office (EPE) indicate that bioenergy production will increase an average 12.7% by 2028.

Figure 2. Share in Brazil's Gross Domestic Product<sup>04</sup>



Source: CNA and CEPEA-Esalq, 2019<sup>015</sup>.

**Agribusiness<sup>05</sup> is a key driver of the country's economy, with the modernization of its production supply chains, before and after the farm gate (e.g. input for farming, farming, agroindustry (processing activities) and agro-services), allowing for a greater participation in the Gross Domestic Product (GDP) – see figure 1.** In 2018, it contributed to 20.8%<sup>06</sup> of Brazilian GDP, when only considering primary activities, it represented 5% or USD 81.8 (BRL 347) billion. The agroindustry and services sectors respectively employed 4.12 million and 5.67 million people, with the agribusiness input sector employing 227.9 thousand people<sup>016</sup>.

04 The agribusiness GDP is understood as the sum of four segments' GDPs: inputs for farming, farming, agroindustry (processing activities) and agro-services. The analysis of each of these groups of segments is performed separately for agricultural-based or livestock-based activities (hereinafter referred to as the agricultural branch and livestock branch). When they are summed up, with the proper weighting, the agribusiness GDP analysis is obtained.

05 Agribusiness refers to the production, processing and distribution of agricultural products (before, in and after the farm gate).

06 According to figures from Cepea (Centre of Advanced Studies in Applied Economy) – Esalq/USP, in partnership with CNA (Brazilian Confederation of Agriculture and Livestock).



Also in 2018, agribusiness accounted for 42.4% of Brazilian exports, representing USD 101.2 (BRL 429) billion<sup>017</sup>. China, the European Union, the United States of America, Hong Kong and Japan were the main destination of these exports, but sales to emerging markets are growing rapidly, mostly to Asia and the Arab countries. Since the 1990s, agriculture has been responsible for the country's trade balance surplus, with a ten-fold increase up to 2017, when it reached USD 81.7 (BRL 346) billion<sup>018</sup>.

**There are vast mitigation and adaptation opportunities across agribusiness. Estimates indicate that Brazil would need at least USD 209.9 (BRL 890) to USD 224 (BRL 950) billion between now and 2030 to achieve the commitments and targets laid out in its Nationally Determined Contributions (NDCs)**<sup>019</sup>. Agriculture, land use and forestry are a major focus towards delivering the country's NDC by scaling the application of low carbon best practices and technologies.

There are opportunities to scale sustainable practices. Brazil's Low Carbon Agriculture (ABC) Programme is a central part of implementing low carbon technologies and increasing agricultural production following sustainable principles<sup>020</sup>. There are still opportunities to recover degraded, abandoned and underused areas, for example, using integrated crop-livestock-forest systems (ILCF)<sup>021</sup>. In addition, with a history of international pressure put on Brazil to conserve its forested land, Brazil has adopted several international standards and certification schemes across the agriculture supply chain that promote sustainability which could be used to leverage green finance in the sector.

**Brazil has developed a solid framework of public policies for the reconciliation of environmental conservation and sustainable agricultural production**<sup>022</sup>. Among other relevant agricultural players<sup>07</sup>, Brazil has the most stringent rules on private land (riparian buffer zones and other ecological buffers) and is the only country in the world that requires all private properties to set-aside land for conservation and biodiversity protection (known as Legal Forest Reserves) without any compensation.

While the compliance with local environmental legislation is a mandatory for the labelling of projects and assets as green, green finance can support the implementation and enforcement of the Forest Code, a state-of-the-art legislation, which governs the use and protection of public and private lands in Brazil.

Public funding plays a relevant role in financing the sector. Government provides a significant part of funding through official rural credit. For the 2019-2020 harvest, USD 53.2 (BRL 225.59) billion was made available<sup>025</sup>. Improvements in methodologies and statistics are needed to access more realistic figures, yet **as public funding becomes less available and is directed mainly towards small producers, capital markets emerge as an alternative to drive investments and scale sustainable agriculture production.**

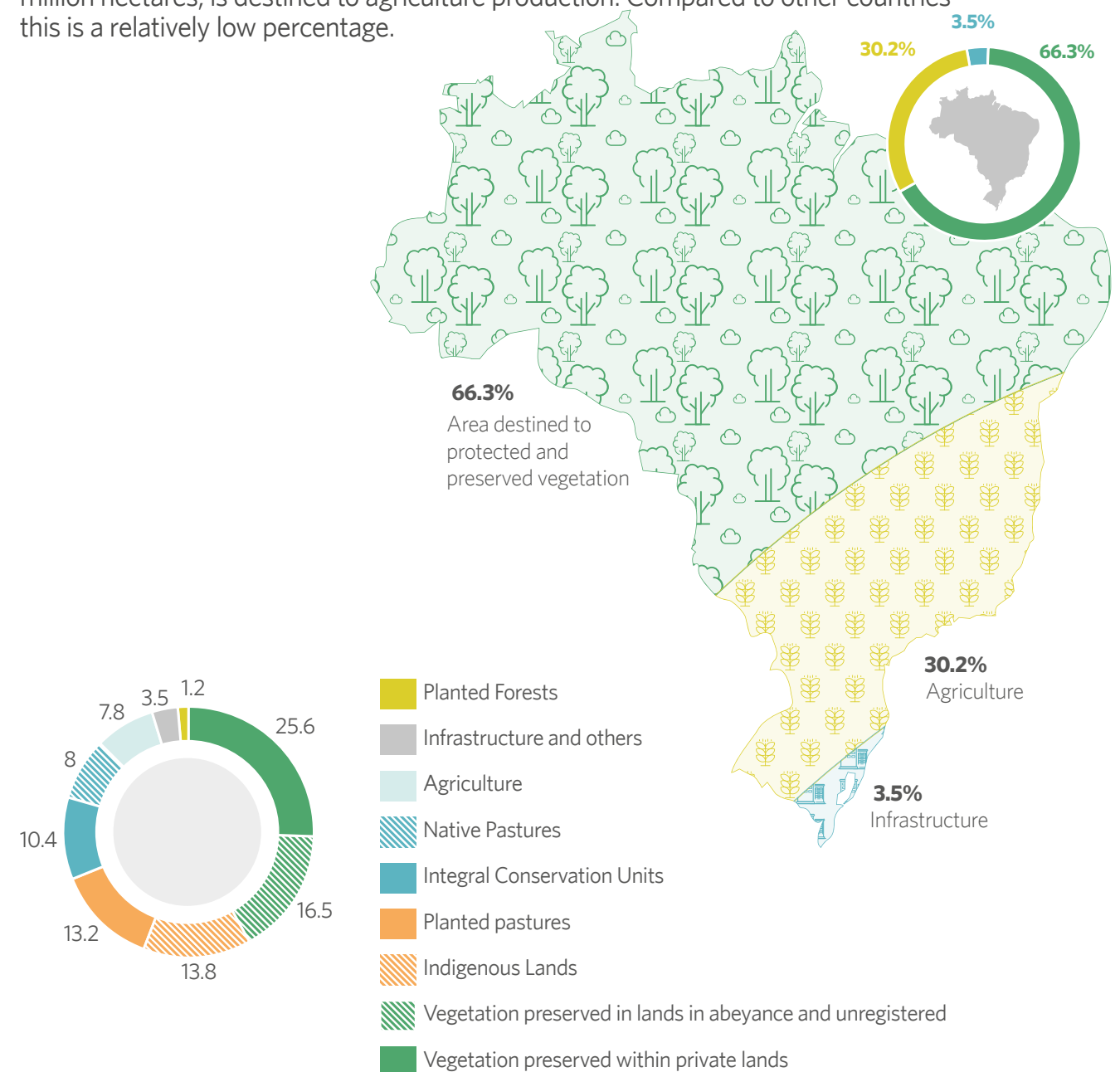
Increasing climate resilience will also be central. **Insurance for agriculture activities is important for sector. It provides coverage for producers against adverse climate effects, therefore reducing risk for investors willing to finance the sector, and reduce the use of public resources.**

The Brazilian government is also taking actions to attract domestic and international investments to finance green finance in the agribusiness sector through Law 13.986/2020<sup>026</sup>. The Brazilian Ministry of Agriculture, Livestock and Food Supply (MAPA) has emphasized the opportunity of using new instruments, as green and climate bonds to finance the sector<sup>027</sup>. Brazil has achieved significant progress on productivity and efficiency through sustainable practices and could scale these through green finance.

07 Argentina, Canada, China, France, Germany and The Unites States.

### Land Use in Brazil: Agriculture and Preservation of Native Vegetation

Brazil has preserved native vegetation in 66% of its territory. Two-thirds of the country are dedicated to protection, preservation and conservation areas, which is equivalent to 43 countries and five territories in Europe. 163 million ha of this preserved vegetation is within farmers' properties. Only 7.8% of the Brazilian territory, 66 million hectares, is destined to agriculture production. Compared to other countries this is a relatively low percentage.



Source: <https://www.embrapa.br/car/sintese>



## Sustainable Agriculture Policies

Brazil has set strong environmental legislation and an ambitious Low Carbon Agriculture Plan

### SUMMARY

- Brazil has preserved 66% of its native vegetation through the adoption of best agricultural practices and technology.
- The Forest Code and Low Carbon Agriculture Plan have been central to Brazilian sustainable agriculture. Approximately USD 78.9 (BRL 335) billion would be required to implement these two policies.
- There is potential for green products to fund forest conservation and recovery and low carbon agriculture technologies.
- Brazil has a pipeline of ongoing practices and technologies that can benefit from green investments.

Through the increase of agriculture productivity and adoption of best practices and technologies, Brazil was able to preserve 66% of its native vegetation<sup>028</sup>. A considerable potential compared to other large agriculture producers. While the country has conciliated safeguarding the remaining natural areas via comprehensive policies and incentives, there are several opportunities in recovering degraded, abandoned and underused areas, particularly through increases in yield and integrated systems (e.g. crop-livestock).

The Forest Code and the Low Carbon Agriculture Plan have encouraged sustainability efforts in the sector. Both initiatives encourage an increase in productivity and efficiency. The Brazilian Forest Code (Law No. 12.651/2012) is a federal law that requires rural landowners to designate and maintain a percentage of their property area, under forest cover – as a Legal Forest Reserve – to preserve remnants of native vegetation on rural lands and to conserve biodiversity. The designated percentage varies from 20% to 80% depending on the type of vegetation and the property's geographical location. Around 18 states have set some type of legislation for the PRA, without this, landowners cannot begin their compliance process. Significant investments

are required for the compliance of the PRA. An estimated USD 32.5 (BRL 138) billion in investment would be needed for the Programme's implementation. This figure considers 11 million hectares of Legal Reserves and 8 million hectares of Permanent Preservation Areas, with a respective cost of USD 4.717 (BRL 20.000/ha) and USD 1.650 (BRL 7.000/ha), a considerable cost for small and medium producers. Labelled agribusiness Receivable Certificates (CRA) with Rural Product Notes (CPRs) as collateral would be a way of financing these investments (see on page 22)<sup>029</sup>. In addition, the Brazilian Forest Code requires all landowners to restore deforested areas on their properties.

The Forest Code has two implementation instruments<sup>030</sup>. The first is the Rural Environmental Registry (CAR), that provides georeferenced data of rural properties, allowing for better monitoring and mapping of land use. The second is the Environmental Regularization Programme (PRA), an instrument designated for landowners that are not in compliance<sup>08</sup> with the Legal Forest Reserve and Permanent Preservation Areas (APP)<sup>031</sup> under the Forest Code. The implementation of the PRA<sup>09</sup> depends on state level regulation, requirements and operationalization structure.

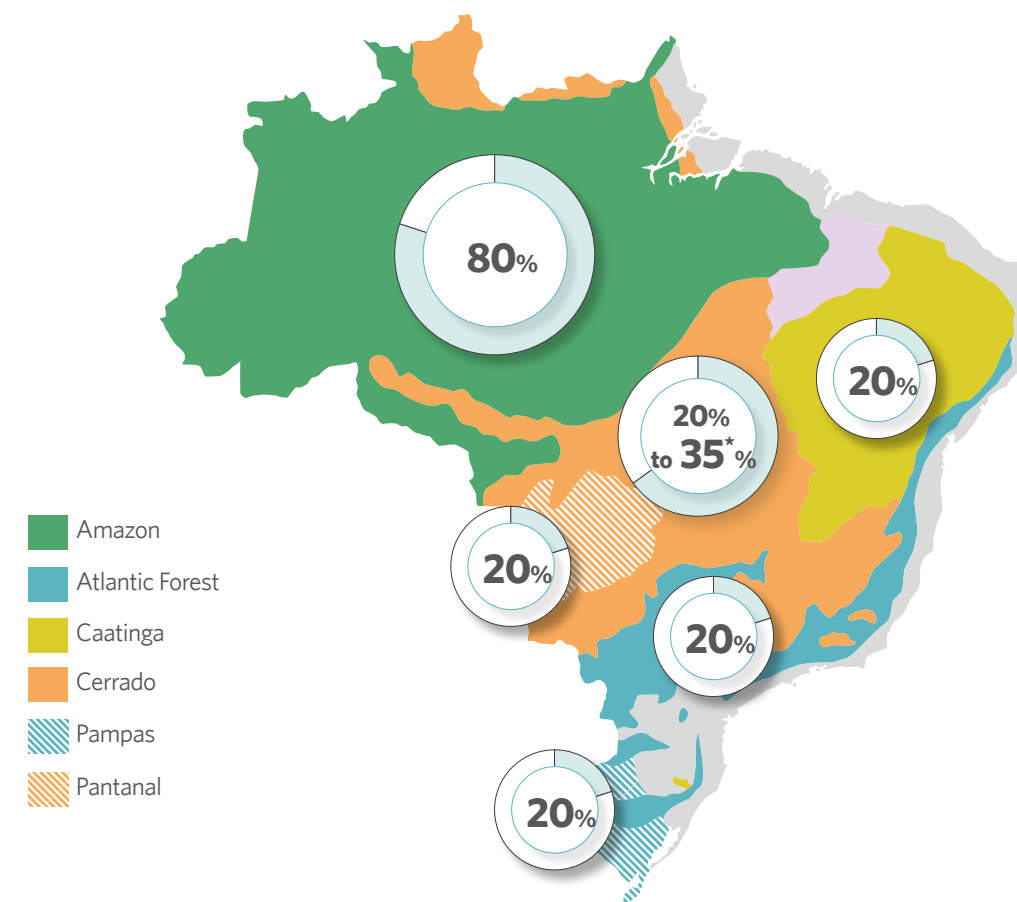
08 Reasons for non-compliance may vary. For instance, landowners may have cleared native vegetation after the 2008 cut-off date or purchased land with cleared vegetation after the 2008 cut-off date.

09 Each state is supposed to have PRA that includes technical details on recovery of APPs and LRs as well as criteria for compensating LRs from properties that have more LRs than those required by the Forest Code (Environmental Reserve Quota - Cotas de Reserva Ambiental (CRA)) (Duchrow and Alencar, 2015).

Around 18 states have set some type of legislation for the PRA<sup>032</sup>, without this, landowners cannot begin their compliance process. **Significant investments are required for the compliance of the PRA. An estimated USD 32.5 (BRL 138) billion<sup>033</sup> in investment would be needed for the Programme's implementation.** This figure considers 11 million hectares of Legal Reserves

and 8 million hectares of Permanent Preservation Areas, with a respective cost of USD 4.717 (BRL 20.000/ha) and USD 1.650 (BRL 7.000/ha), a considerable cost for small and medium producers<sup>034</sup>. Labelled agribusiness Receivable Certificates (CRA) with Rural Product Notes (CPRs) as collateral would be a way of financing these investments (see on page 20).

Figure 3. Legal Reserve % per Biome



\*Within the boundaries of the Amazon this percentage increases to 35%

Source: Planalto, 2012<sup>035</sup>

Brazil also set an ambitious Low Carbon Agriculture Plan (ABC Plan in Portuguese)<sup>036</sup> to promote low carbon technologies and innovation and a dedicated programme to fund these practices. The Plan is part of Brazil's first commitment made at the 15 Conference of the Parties (COP15), in 2009, which has since then become a public policy that supports the reduction of GHG emissions in the agricultural sector

through seven target areas; six addressing mitigation technologies and the last addressing adaptation. Each area sets out actions to enable the adoption of a portfolio of technologies and **the Plan has already avoided the emission of between -100.21 and 154.38 million MgCO<sub>2</sub>e from 2010 to 2018**<sup>037</sup>.

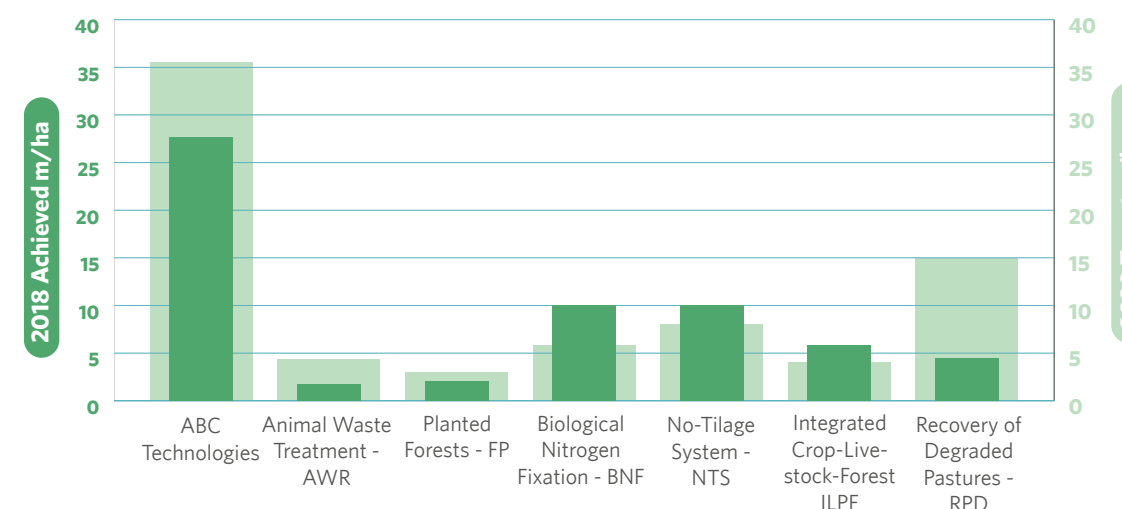
The ABC Programme, created in 2010, sets out credit lines to finance rural producers in the adoption of technologies under the ABC Plan. To fully implement the ABC targets by 2020, USD 46.4 (BRL 197) billion would be required<sup>038</sup>. However, up to the 2017/2018 harvest, only USD 6 (BRL 25.6) billion were made available, with USD 4 (BRL 17.2) billion disbursed<sup>039</sup>. While most of the targets within the ABC Plan are on track - Figure 4 - there is potential for investments in low carbon technologies, animal waste treatment, planted forests and recovery of degraded pastures that could be packaged for green bonds or other types of green products.

Table 1. Target Areas under the ABC Plan<sup>040</sup>

<p><b>1. Recovery of degraded pastures<sup>041</sup></b></p>	<p>Conversion of low productivity pastureland into high productivity cropland to reduce the pressure for new grasslands. The target is to recover 15 million hectares of degraded pasture - through proper management and fertilizing - by 2020.</p>
<p><b>2. Integrated Crop-Live-stock-Forest<sup>042</sup> (ICLF) and Agroforestry Systems (SAFs)</b></p>	<p>Integration of different production, agriculture, livestock and forestry systems in the same area (rotation, combination or succession). The goal is to increase the adoption of ICLF and SAFs by 4 million hectares by 2020.</p>
<p><b>3. No-Tillage System (NTS)<sup>043</sup></b></p>	<p>Production method where the soil is no longer ploughed or graded. This avoids evaporation of retained water and prevent the loss of fertilisers. The expected outcome is to apply NTS in 8 million hectares.</p>
<p><b>4. Biological Nitrogen Fixation (BNF)<sup>044</sup></b></p>	<p>Process carried out by microorganisms that carry a functional nitrogenase enzyme, used as a source of nitrogen (N) for plant nutrition. The target is to expand the use of BNF to 5.5 million hectares.</p>
<p><b>5. Cultivated Commercial Forests<sup>045</sup></b></p>	<p>Cultivation and management of commercial forests for wood, pulp, paper and charcoal production to increase the reforestation area in 3 million hectares.</p>
<p><b>6. Animal Waste Treatment<sup>046</sup></b></p>	<p>Development and implementation of animal waste treatment technologies for power generation (gas) and organic compounds. The target is to increase the use of waste treatment technologies by 4.4 million m3 by 2020.</p>
<p><b>7. Climate Change Adaptation</b></p>	<p>Focus on increasing agriculture efficiency, including the diversification of systems and the sustainable use of biodiversity and water resources. Expected results include the identification of vulnerable areas, the development of climate resilient technologies and adaptation of practices to reduce climate variation.</p>

Source: Ministry of Agriculture<sup>047</sup>

Figure 4. ABC Plan - Targets and Achievements, 2018



Source: Ministry of Agriculture<sup>048</sup>

**Brazil's international climate commitments provide further opportunities.** The country's Nationally Determined Contribution (NDC)<sup>049</sup> set targets to reduce carbon emissions by 37% compared to 2005 levels by 2025 and to achieve a 43% reduction by 2030. To meet this reduction in the agriculture sector Brazil intends to:

- Increase sustainable bioenergy's share in the Brazilian energy mix to 18%;
- Strengthen compliance with the Forest Code;
- Restore 12 million hectares of forests;
- Achieve zero illegal deforestation in the Brazilian Amazon;

There are numerous opportunities for sustainable investments in Brazilian agriculture, most of ongoing practices and technologies applied in the sector are already green. The challenge has been packaging these opportunities into investments that will be attractive to investors, particularly international investors. **Green finance can help drive investment towards these opportunities.**

## Agriculture Financing in Brazil

Existing financial mechanisms can be labelled green and facilitate access to capital markets.

### SUMMARY

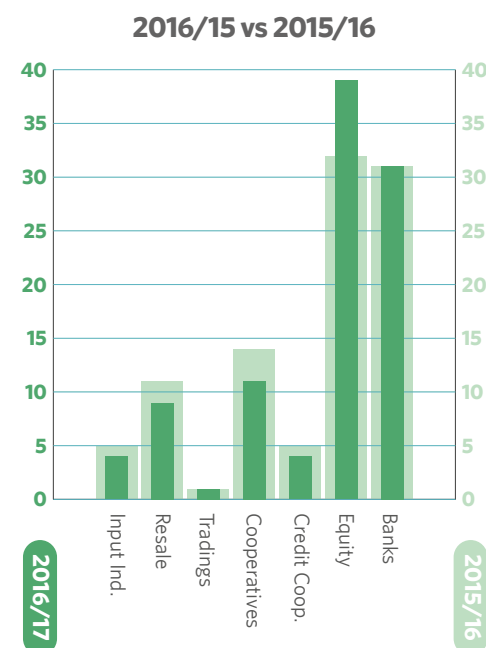
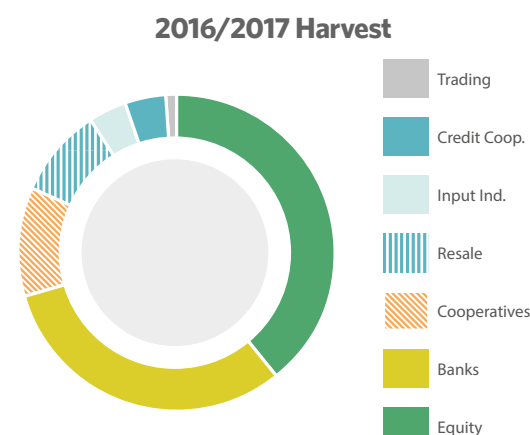
- Public credit has been an essential source of funding for Brazilian agriculture. For 2019/2020, USD 53.2 (BRL 225.59) billion were allocated for rural credit, rural insurance and commercialization support.
- Agriculture production has been financed mainly through equity and banks.
- Market instruments as CRAs, LCA, FIDCs and Debentures provide an alternative source of funding.
- Access to international markets will be facilitated through Law 13.986/2020.

**Public credit lines have been an essential part of financing agriculture. Given the relevance of agribusiness in the Brazilian economy, its strategic value and importance in the global context, its financing is part of economic policy priorities.** The annual Agricultural Plan (Plano Agrícola e Pecuário - PAP)<sup>050</sup> is the main instrument and outlines programmes designed for the sector, using credit lines with differentiated interest rates between smallholders, medium, and large farmers. The Agricultural Plan establishes the official rural credit given by government, which represented 9.9%<sup>051</sup> of the total credit operations in the National Financial System (SFN)<sup>052</sup>, equivalent to USD 73.3 (BRL 310.8) billion by January 2020<sup>053</sup>.

Historically, federal credit lines and programmes have been an essential part of financing sources for farmers. The National Financial System (SFN) has become particularly relevant to agribusiness financing, connecting investors and borrowers through financial institutions and the financial market. The 2019/2020 PAP, allocated USD 53.2 (BRL 225.59) billion for the sector<sup>054</sup>. Of the total, USD 52.5 (BRL 222.74) billion have been put aside for rural credit (inputs, commercialisation, industrialisation and investments), USD 235 million (BRL 1 billion) for the Rural Insurance Premium Subsidy Programme (PSR) and USD 436 million (BRL 1.85 billion) for commercialisation support. Within rural credit, USD 39.9 (BRL 169.33) billion have been allocated for costing, commercialisation and industrialisation, USD 12.6 (BRL 53.42) billion for investment, with interest rates varying between 3% and 10.5% a year<sup>055</sup>.

While there is no official breakdown of the volume of the different sources of financing for agricultural producers, a 2017 market survey from FIESB and

OCB - Brazilian Cooperative Organization System<sup>056</sup> indicate how producers have finance their agricultural production. With equity and banks being the two main sources of financing:



Source: FIESP OCB Market Survey - Agricultural Operation Funding (2017)

**Disclosing official data on financing sources would be a relevant step in developing the market,** as understanding finance hubs for each agricultural activity is an important step in defining a green project pipeline for the agriculture sector. The main players financing each crop include banks, cooperatives, capital equity, industry, suppliers, traders and distributors.

Given that this investment roadmap aims at fostering the green bond market for Brazil's agriculture, an initial analysis was carried out to map the possible financing hubs for different agricultural activities, excluding banks, which could drive sustainable practices across the chain - Table 2. The findings are indicative and based on interviews and research with companies, banks, policy makers, trade associations and members of Agriculture Subcommittee.

Table 2. Main Financing Sources, excluding banks

	Suppliers	Distributors	Equity	Cooperatives	Traders	Industry
Soy / Maize	\$\$\$	\$\$\$	\$\$	\$\$	\$\$	\$
Sugarcane	\$	\$	\$\$	\$\$	\$	\$\$\$
Beef and Livestock	\$	\$	\$\$	\$	\$	\$\$\$
Coffee	\$\$	\$	\$\$	\$\$	\$\$	\$
Cotton	\$\$	\$	\$\$	\$\$	\$\$\$	\$
Chicken and Swine	\$	\$	\$\$	\$\$\$	\$	\$\$\$

Source: author based on interviews and market research

Cooperatives, industry, suppliers and traders are the main sources of funding for most of the assessed activities and best stakeholders to induce changes to behaviour and in the adoption of new practices. Therefore, it is important to approach them to leverage green investment opportunities and alternative financing mechanisms.



Given the current macroeconomic trend in Brazil with considerable government budget constraints, it is likely that the PAP will prioritize credit lines focused on smallholder farmers and rural insurances. **The decline of interest rates in Brazil, combined with the enhancement of regulation as established by Law 13.986/2020 (see page 22), makes the use of market instruments to finance Brazilian farmers an attractive alternative.**

The first finance instrument dedicated to agribusiness, the Rural Product Note (CPR) / Financial Rural Product Note (CPR-F), was introduced by Law 8.929/1994, to foster private funding for agricultural activity<sup>057</sup>. The CPR establishes a promise of delivery of rural products and by-products – as well as its financial settlement (CPR-F) – and is issued exclusively by rural producers, their associations and coop-

eratives. The CPR, as the Agribusiness Credit Rights Certificate (CDCA), Agricultural Deposit Certificate and Agricultural Warrant (CDA/WA), Agribusiness Letter of Credit (LCA) and Agribusiness Receivables Certificate (CRA), may be used as agribusiness financing instruments. These instruments, introduced by Law 11.076/2004, allowed the creation of viable financial structures for agribusiness funding, within the broader concept of 'agroindustrial chain', from production until final consumption (e.g. agriculture production, livestock, aquiculture and forestry, storage, distribution, commercialization, overall input industry, such as fertilizers, pesticides and machinery) through 'credit rights', allowing for several links of the chain to be integrated with the same financing framework.

Table 3. Summary of Agribusiness Finance Instruments<sup>058,059</sup>

Instrument	Collateral	Issuers
<b>CPR/CPR-F</b>	Future agricultural production/ mortgages or fiduciary title of real estate/ assignment of receivables from barter operations	Rural producers, natural and legal individuals, their associations and Cooperatives
<b>LCA</b>	Loans backed by agribusiness credit rights between financial institutions and rural producers /cooperatives <sup>10</sup> .	Banks Financial Institutions and Credit Cooperatives
<b>CDCA</b>	Agribusiness receivables, such as the CPR, Promissory Notes, duplicates, and receivables from the negotiation of agricultural products.	Agribusinesses and Cooperatives Rural producers and other individuals engaged in commercialization, processing and industrialization activities: agricultural products; agricultural inputs; or machinery and implements used in agricultural activities.
<b>CRA</b>	Receivables linked to CPRs, CDCAs, CDA/WA, Duplicates and CDCAs. These can be related to Promissory Notes from the commercialization of agricultural production, trading, processing, industrialization of products, machinery or equipment.	Securitization Companies
<b>CDA/WA</b>	Products Stored Goods in Warehouses	Storage/Warehouses

**The most used security instruments on public issuances to finance agribusiness are the CRA and LCA, together with other general purpose instruments, such as Credit Rights Investment Funds (FIDCs) and Bonds (Debentures).**

10 Law 13.986/2020 (see page 22) expands the collateral for LCS for rural credit allow the use of CPRs from rural producers, CDCA/CRA directly benefiting rural producers and CDA/WA in favor of rural producers as collateral.



**The CRA**

The CRA is a credit security which represents the promise of a future cash payment and is issued exclusively by agribusiness securitization companies. It is backed by agribusiness credit rights which arise from transactions between farmers, or their cooperatives and third parties, including financing or loans, related to the production, commercialisation, processing or industrialisation of: (i) agricultural and livestock products; (ii) agricultural and livestock inputs; or (iii) machinery and implements used in agricultural and livestock activity. The CRA can either be corporative or pulverized (linked to a large number of rural producers).

As a fixed income product, the CRA gives the investor the right to be paid remuneration (fixed or floating interest) and to receive back the amount invested (principal). The monetary update of the bond is also allowed. For 'individual' investors, the CRA's yield is exempt from income tax, in accordance to article 3, items IV and V, of Law 11.033. In addition, investors may trade them in the secondary market through the B3 (Bolsa, Brasil, Balcão) platform. These two features make CRA very attractive to investors, as it offers tax breaks and liquidity. In 2019, the net worth of CRA reached USD 10.1 (42.68) billion, with a total USD 2.9 (12.3) billion in issuance; a 78.5% increase compared to 2018<sup>060</sup>. **The CRA has comparative advantages over other agribusiness financing instruments and can assist producers in financing productive investments (technological innovations, production intensification, recovery of degraded areas, restoration of native forests and low-carbon farming practices).**



**The LCA**

The LCA is a freely tradable registered credit bill issued exclusively by financial institutions (public or private) or credit cooperatives, representing a promise of payment and is exempt from personal income tax. LCAs are guaranteed by the Credit Guarantee Fund (FGC), established to manage protection mechanisms and provide insurance for financial institutions. **In addition to the financial hubs identified above, there is significant opportunity in encouraging banks to issue bonds or green LCAs, backed by rural credit financing operations (such as ABC loan backing, for example).**



**FIDCs**

FIDCs represent the combination of several investors who, with the same goal, pool their resources in an investment in which at least 50% of the net worth should be allocated to investments in Credit Rights. Credit Rights are credits that companies receive, such as duplicates, promissory note, CPRs, trade bills or product commercialization contracts. These debts are negotiable securities that are assigned to the Fund to compose its assets. Like the CRA, it is a form of securitisation, but via a fund.

The FIDCs' versatility is the instrument's biggest differential. FIDCs are flexible enough to hold receivables from various economic segments, representing one of the most efficient securitisation tools in the Brazilian capital market. The statement is also valid for segments that rely on other well disseminated securitisation tools, like real estate. In 2019, the net worth of agribusiness FIDCs reached USD 3.5 (BRL 14.8) billion and USD 3.1 (BRL 13.2) billion<sup>061</sup>. **Looking at the potential for agribusiness specifically, it is clear that there is a significant untapped potential in the use of FIDCs for securitisation of agribusiness receivables**





### Infrastructure debentures

Infrastructure debentures present another opportunity for the agribusiness sector to access capital markets. Law N° 12.431, from 24 June 2011, later amended by Law No. 12.715/12, allows the adoption of the same tax benefits for individual investors as described in the CRA, for investment in certain priority sectors (including bioenergy). Infrastructure debentures are issued by Brazilian corporations through the creation of a special purpose company aimed at implementing priority projects.

**The allocation of funds raised via incentivized debentures according to the regulation that provides tax breaks for investors must be allocated to priority infrastructure projects defined the federal government.** On 17 June 2019<sup>062</sup>, The Ministry of Mines and Energy, included biofuel storage and production as eligible projects for infrastructure debentures, aiming to atincentivized new investments for sugar and ethanol production. Additionally, all investments made in energy efficiency, as well as on-site solar energy generation, are also eligible for the issuance of these debentures.



### New legislation

**Through Law 13.986/2020, important changes were introduced and attract international investments to the country's agriculture sector. One of the major innovations that facilitates access to capital markets is the possibility of directly issuing CRAs in the offshore market.** Under this financing structure, the CRAs can be issued in foreign currency, they do not need to be deposited in local exchanges and may be registered or deposited in offshore exchanges allowing foreign investors to access CRAs without the need to open local investment accounts. **This recent development could foster and facilitate Green Bonds to medium size producers, cooperatives and other companies pertaining to the agribusiness sector.**

In addition to offshore issuance, Law 13.986/2020, introduced other important elements which may benefit foreign investors. The first is the fiduciary Lien over Rural Land. Rural land is now allowed to be granted as collateral to foreign lenders, which reduces the risk in investing in Brazil's agribusiness sector. The second is the possibility of segregating rural assets as collaterals for Rural Product Notes (CPR) or the newly created Rural Real Estate Notes (CIRs), bringing further legal protection for foreign investment in Brazil. The last is the broadening of who may issue Rural Product Notes (CPRs)/ Financial Rural Product Notes (CPRs-F), as well as collaterals for CPRs (e.g. segregated rural lands) and the possibility of issuing CPRs/CPRs-F<sup>11</sup> in foreign currency adjustment.

<sup>11</sup> May now be issued by rural producer's cooperatives and associations, as well as individuals or legal entities with no agribusiness exclusivity in its legal purpose or by individuals or legal entities of any natures for forest-related CPRs (public forest concession programme and other forest activities determined by the Executive Power as environmentally sustainable).



## STEP BY STEP GUIDE ON HOW TO ISSUE A GREEN BOND

### Who can issue green bonds?

Producers, cooperatives, companies, suppliers, traders, distributors have a wide range of options to choose from when seeking to finance green agriculture projects or assets. Suitable green assets include conservation, sustainable agriculture and livestock, renewable energy, forestry, low carbon infrastructure, as well as climate change adaptation measures. The financing structure will depend on the issuer and project-specific elements, including regulation and market conditions. While, each financing structure involves specific procedures, the following steps intend to provide a high-level guidance when raising capital for green agriculture projects.

### STEP 1 - DEVELOP A GREEN BOND FRAMEWORK

The first step to finance a green project is to develop a green framework laying out the selection process and eligibility criteria for identifying the projects/assets to be financed. The framework should also include the tracking and reporting of allocated and unallocated funds.

- A. Setting eligibility criteria,
- B. Asset / project screening,
- C. Management of proceeds
- D. Post-issuance reporting.

<b>Available Guidelines &amp; Standards:</b>	Principles (GLP), Climate Bonds Taxonomy and Climate Bonds Standard
<b>International:</b>	
Green Bonds Principles (GBP), Green Loan	<b>Country-Specific:</b> Brazil

### STEP 2 - DEFINING FINANCING SOURCES

Once projects/assets have been identified, the next step is to determine the most suitable way to obtain funding. Depending on the issuer, financing can be obtained through:

- **Direct investment:** equity, corporate debt or project finance
- **Semi-direct investments:** pooled vehicles, securitisations, covered bonds
- **Indirect investments:** corporate bonds, participation in debt financing

### STEP 3 - DEAL STRUCTURING

Depending on the issuing entity, project/asset characteristics and macroeconomic factors different sources of financing may be combined. During this phase, the issuer may seek the support of financial service providers, such as banks, securitization companies, guarantee providers and specialized facilities to identify the best avenue to pursue. Once the funding instruments has been chosen, the issuer will have to prepare any documentation required by relevant regulations or by entities providing any credit enhancement mechanisms, such as due diligence reports, cash flow projections and/or valuation, financial accounts or environmental report.

## STEP 4 - DEBT ORIGATION AND ISSUANCE

This involves all parties that support the issuer in structuring and executing the transaction.

**External Reviewer:** it is best practice to arrange an external review to assess the deal's green credentials. Existing formats, include:

- Assurance Report - an external party confirmation of compliance with Green Bond Principles/ Green Loan Principles.
- Second Party Opinion - an external assessment of the issuer's green bond framework, confirming compliance with the Green Bond Principles, and the eligible asset categories.
- Green rating: an evaluation of the green bond and framework against a third-party rating methodology, which considers the environmental aspects of the investments. In Brazil, these include products developed by international rating agencies as S&P and Moody's.
- Verification Report for Certified Green Bonds: third party verification (pre and post issuance) to confirm the use of proceeds adhere to the Climate Bonds Standard and Sector Criteria and the Paris agreement to keep global warming to 2C and achieve full decarbonisation by 2050.

**Arranger:** structures the deal with issuer. Treasury teams within the issuing entity can provide extensive insights of local capital markets to support the process. The arranger advises on the most appropriate financing approach and structure and coordinate the transaction execution and the parties involved. The issuer can appoint the arranger as the "green structuring agent to advise on the green elements of the deal such as the green bond framework and/or arranging an external review.

**Legal advisor:** prepares the bond prospectus and all transaction documentation, provides legal structuring advice and delivers a legal opinion.

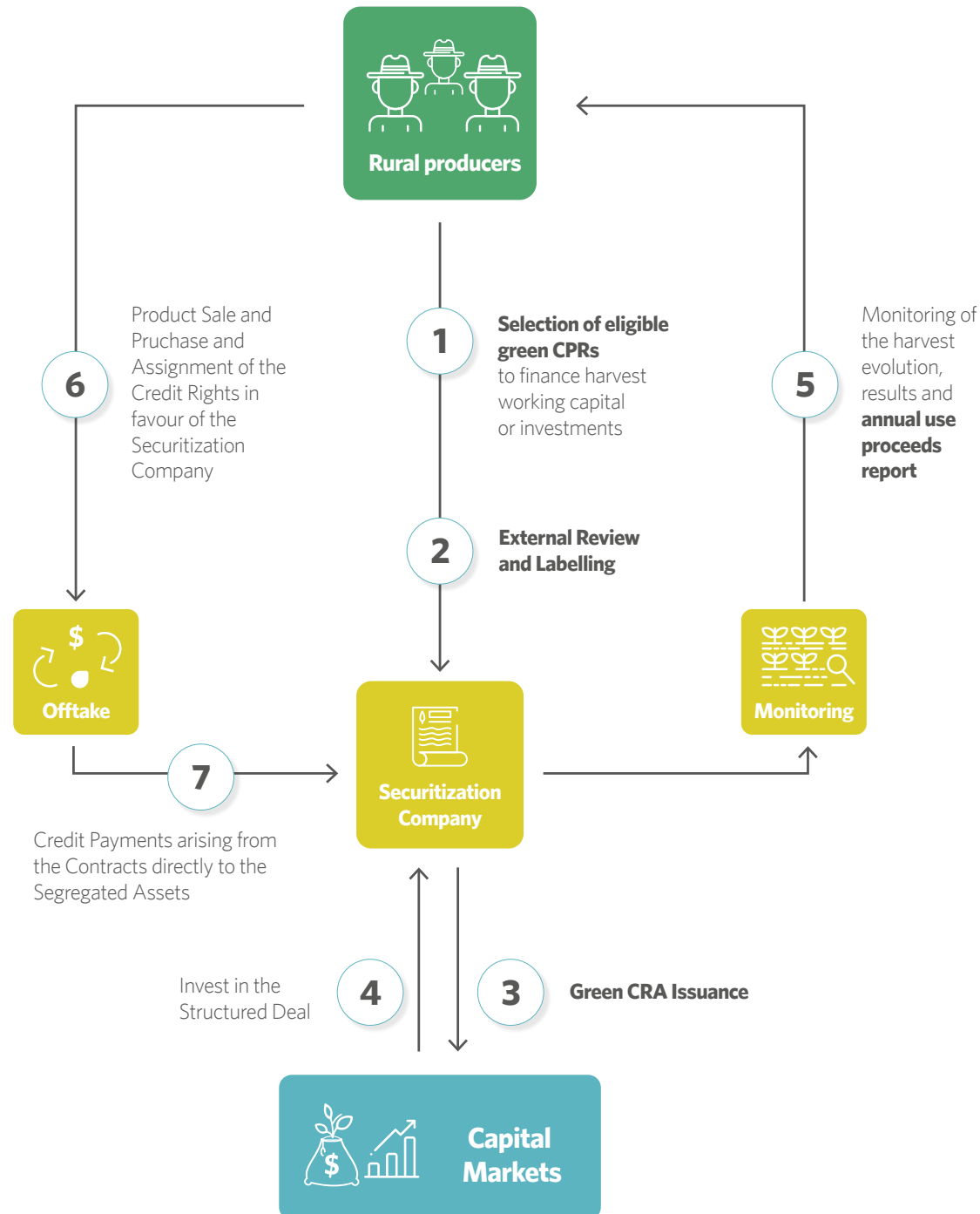
**Auditor:** prepares the audit report and signs off on financial disclosure in the bond prospectus/ loan syndication pack.

**Underwriter/lead manager/bookrunner:** underwrites the deal and manages the process of selling the bond to investors.

### STEP 5 - POST-ISSUANCE REPORTING

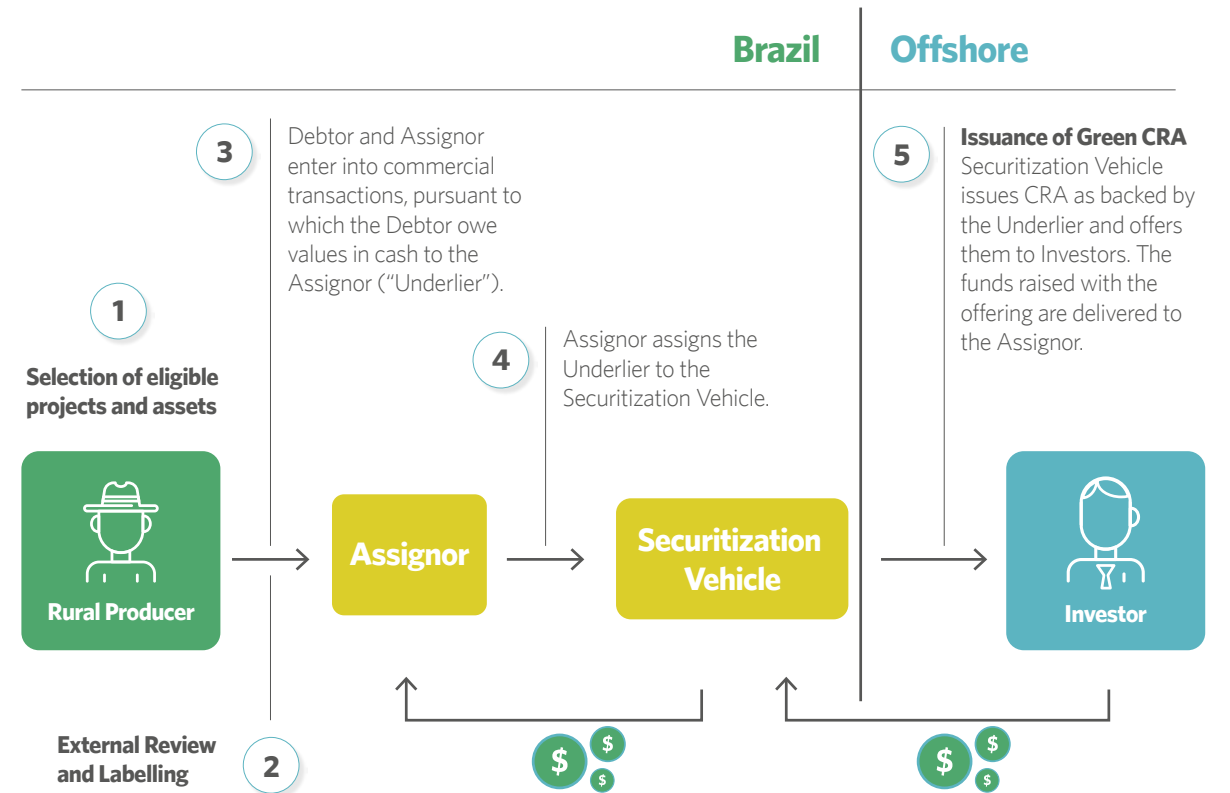
After a green bond/loan is issued, issuers must annually publish a public report on proceed allocations, detailing the financed projects and management of unallocated proceeds. As best market practice, issuers should also disclose the environmental impacts of the financed projects using appropriate metrics and benchmarks.

What this means in Practice?  
Green CRA backed by CPR



Source: Ecoagro/Pinheiro Neto Advogados

What this means in Practice?  
Green Offshore CRA



**Note:** This transaction can also be implemented by a direct debt transaction between the Securitization Vehicle and the Debtor. In this case, the flow of funds goes from the Investor, to the Securitization Vehicle and to the Debtor.

Source: Ecoagro/Pinheiro Neto Advogados



## Green Financial Products for Sustainable Agriculture

This section was developed in partnership with the Agriculture Subcommittee's Legal Team<sup>12</sup>

### SUMMARY

- Improve regulation of agriculture market instruments, allowing investment for input distributors and the use of agriculture receivables for the issuance of covered bonds.
- Facilitate the registration of green asset origination and simplify sustainable financing lines.
- Improve credit condition for environmental compliant producers and expand and incentivize agriculture climate risk zoning.

Despite the huge potential, Brazilian green bond market is still underdeveloped. To date USD 5.9 (BRL 25) billion<sup>063</sup> have been issued in the domestic and international market. This market status is partly due to the lack of clarity on the existing opportunities and a clear project pipeline, which may be financed by green instruments and the lack of domestic investor demand for assets of this nature. The country's green bond market could be leveraged through improvements to regulation.

It is important to highlight that all of these are adjustments to existing regulation, or infra-legal measures which can help to leverage the market, they are not new pieces of legislation that would need to be drafted and submitted to Congress, for example. The aim here is to use existing instruments to leverage the green bond market.

Suggestions to reduce the gap between agribusiness issuers and investors include:

- **Creation of an Agribusiness Specific Investment Fund:** focused towards investment in agribusiness assets (CRAs, LCAs, Debentures and other agribusiness receivables, including securities convertible into equity interest) to provide

product segmentation and clarity for investors. Today, many investors buy structured products without being able to analyse the associated risks. Stimulating the fund industry to add professional managers to the process is beneficial to the capital market ecosystem, allowing them to better analyse and build portfolios. This would increase the ability of attracting domestic institutional investors and creating specific green funds. The agriculture sector could then follow the same logic used by Real Estate and Infrastructure funds, where shareholders are exempt from tax, but are only eligible for the tax break at the fund level when investing in agribusiness assets. **It is important to allow the purchase of convertible securities as this provides more assurance to creditors that they can finance projects (agribusiness project finance) and convert debt into equity if they deem needed.**

- **Expansion of the REITs for Agriculture Real Estate Properties:** Expand sources of ABLs for agribusiness and encourage the use of Real Estates funds on agriculture properties.

- **Evolution in Agriculture Instrument Regulation - Distributors:** changes to Law 11.076/2014 on expressly providing input distributors may benefit from Agribusiness Credit Rights Certificates (CDCA) and Agribusiness Receivable Certificates (CRA) structures, opening the possibility of a major players in the Brazilian agricultural sector having access to credit. **Evolution in CRA Regulation. Issuance Abroad:** Currently, the issuance of bonds abroad by Brazilian companies is subject to taxed interest flows, which means that as an additional responsibility, companies must withhold tax from interest. One way to encourage fund raising abroad would be to provide a **tax exemption to interest from bonds issued abroad, which aim to finance agribusiness, extending the current benefits offered to CRAs and LCAs to bonds abroad** (including CRAs issued directly abroad as per new Law 13.986/2020), as long as their collateral follows the same logic. This change is along the same lines as what is currently being discussed by the Ministry of Economy, to amend Law 12.431 for infrastructure debentures.
- **FIDCs Rules: Enhance FIDCs rules by considering the possibility of funds with no maturity date to be 'Non-Standardised' (FIDC-NP).** Thus, evergreen funds could reinvest their flow and have liquidity through the trading of shares on the stock exchange, being an alternative to attract long term capital for agribusiness. Another option would be to create an FIDC class that allows investments by any type of investor.
- **Debureaucratisation and Increase of Green Asset Origination: Facilitate the registration of CPRs in the Notary Office (RGIs in Portuguese) and other registration systems authorized by the Central Bank,** including standardization costs, as registration values vary from state to state. After January 1<sup>st</sup>, 2021, the registration of CPRs in registration systems approved by the Central Bank will be mandatory, bringing additional bureaucracy and costs to rural producers, with no clear benefit. Such registrations should be optional and not a legal requirement for producers.
- **Improvement of credit conditions for producers complying with environmental legislation:** Adjust rule that defines credit conditions for producers so that **those in compliance with the Forest Code have better credit conditions than non-compliant producers.**
- **Simplify sustainable financing lines:** Simplify lines focusing on expanding and promoting sustainable practices.
- **Rural insurance and weather derivatives: Expand and create incentives for the adoption of the Agriculture Climate Risk Zoning (ZARC, in Portuguese) system,** in order to create a solid data base related to weather and associated risks, in order to allow for an increase of well-priced rural insurance and weather derivatives.
- **Agricultural Covered Bonds:** Amend the current Brazilian legislation for covered bonds or create a new and similar legislation to allow the issuance of Covered Bonds with pool of assets composed by agribusiness receivables.

<sup>12</sup> Freitas Leite, Mattos Filho and Pinheiro Neto.



## Sustainable Agriculture Investment Pipeline

There is a vast landscape of green investment opportunities in Brazil's agricultural sector that are ready to come to market.

Sectors such as renewable energy are more obvious and have investment figures available, while others such as climate smart agriculture and forestry, energy efficiency, transportation and waste are yet to be featured in the market partly due to the substantial data gaps for these sectors <sup>064</sup>. Nevertheless, this Investment Roadmap identifies and brings examples of potential green assets to create a robust pipeline of bankable projects for green financing. **The subsectors listed in this Roadmap were selected based on their alignment towards transitioning to a low carbon and resilient economy** - Brazil's climate commitments and environmental legislation - as well as in local consultation with stakeholders.

The evaluation methodology applied for this mapping included:

- The review of sector-specific reports and country analysis to identify opportunities throughout the agriculture supply chain.
- Meetings with Brazilian experts (e.g. policy makers, trade associations, cooperatives, law firms, securitization companies, banks) to understand the potential and type of these opportunities.
- Discussions within the CBI Agriculture Subcommittee to review the main opportunities.
- Estimate market sizing through secondary research, including government plans, regulatory agencies forecasts, industry reports and trade information.

**The opportunities presented in this Roadmap totals up to USD 163.3 (BRL 692.4) billion and are not exhaustive.** The initial focus is on the most obvious opportunities in Brazil's agriculture sector and its supply chain. For instance, the Low Carbon Agriculture Plan (ABC Plan) is an immediate investment pipeline to be considered. The potential pipelines mapped below aims to raise awareness amongst Brazil's agribusinesses and investors, both domestic and abroad, on where the green opportunities are and consequently leverage the development of a green bond agricultural market in Brazil.

**Brazil has the potential to serve as a global example of how the rising demand for green products can successfully drive sustainable agriculture production.** Table 4 summarizes the opportunities identified within this Investment Roadmap. These sectors are further explored in the following section, which not only provide country-specific context, but funding and investment options.

Table 4. Opportunities Across Brazil's Agriculture Supply Chain for Green<sup>13</sup>

Sector	Assets	Metric	Horizon	Projected Investment BRL	Projected Investment USD
Environmental Legislation Compliance	Environmental Regularization Programme - PRA <sup>065</sup>	11 million ha/ Legal Reserve	2030	138 billion	32.5 billion
		8 million ha/ Permanent Preservation Areas (APPs)			
Agriculture	Biopesticides <sup>066</sup>	-	2025	806 million	190 million
	Biofertilizers	-	2025	6 billion	1.4 billion
Livestock	Recovery of Degraded Pastures	60 million ha	-	265 billion	62.5 billion
	Recovery of Degraded Pastures (ABC Plan) <sup>067</sup>	15 million ha	2020	26 billion	6.1 billion
	Animal Waste Treatment (ABC Plan)	2.7 million m3	2020	2 billion	471.6 million
	ILPF (ABC Plan) <sup>068</sup>	4 million	2020	17 billion	4.2 billion
	IPF (Forestry and Livestock) <sup>069</sup>	5 million	2030	21.9 billion	5.1 billion
Renewable Energy <sup>070/071</sup>	Solar Energy	1.3 GW*	2029	4.5 billion	1.1 billion
	Ethanol Production Expansion (Total)			64.9 billion	
	- Sugar Cane Crops	1.5 million hectares		29 billion	15.3 billion
	- Sugar Cane 1G industry greenfield/brownfield	46 billion litres	2029	27 billion	6.8 billion
	- Sugar Cane 2G industry greenfield	722 million litres		4.2 billion	6.4 billion
	- Corn or Flex industry greenfield	4 billion litres		4.7 billion	990 million
	- Corn or Flex industry greenfield				1.1 billion
	Co-generation	5GW	2029	12.5 billion	2.9 billion
Biogas <sup>072</sup>	7.2 billion nm3	2030	19 billion	4.5 billion	
Forestry	Biodiesel	13.7 million litres	2029	4.6 billion	1 billion
	- National Plantation Forestry Programme <sup>073</sup>	2 million ha	2030	18 billion	4.2 billion
	- Plantation Forestry (ABC Plan)	2 million ha			
Pulp and Paper/ Wood Panels	63 million tons/ 1.020 thousand m3	2023	32.6 billion	7.7 billion	
Transport	Railroads	15.485 km	2030+	55.6 billion	13.1 billion
	Ethanol (pipelines) <sup>074</sup>	1.054 km	2029	4 billion	943 million

\*Estimates were made with figures from the Ten-Year Energy Expansion Plan (PDE 2029) with the projected increase of DG in Brazil 8.4GW and the share of agriculture properties (15%).

<sup>13</sup> The table above illustrates potential green investments in Brazil and is an estimate based on the methodology explained above. This figure is likely an underestimate as there are data gaps in important sectors.



## Environmental Legislation

The Forest Code may be used a proxy for green credentials. Other opportunity arises under the Forest Code through the restoration of environmental liabilities in Legal Reserve Areas and Permanent Preservation Areas, as well as environmental conservation in Private Properties.

### Sector Overview

The Forest Code is designed to support sustainable agriculture and can be used as a proxy for green bond issuance. The Forest Code is a legislation that requires the recovery of environmental liabilities in rural properties. To comply with the Forest Code all rural properties must submit a Rural Environmental Registry (CAR) and if they do not meet legal requirements in setting land aside for Legal Reserves and Permanent Preservation Areas (APPs) they are allowed to take part in the Environmental Regularisation Programme (PRA) - see page 14 for further information of Brazil's environmental policies.

The Legal Reserve varies from 20% to 80% of properties, depending on its location and biome, and must be covered by native vegetation. The APPs may or not be covered by native vegetation. It varies on size and must be located around water sources, hilltops or other sensitive areas. Estimates indicate a deficit of 19 million hectares under the forest code - 11 million in Legal Reserves and another 8 million in APPs - which will require PRAs.

Different arrangements are allowed under the PRA, such as the compensation of the total or partial area of the legal reserve, recovery of native vegetation in the property through natural regeneration or plantation of native species (this can be alternative with exotic species if they do not exceed 50% of the total area). Once producers adhere to the PRA Programme, through the signing of a Term of Agreement, they have up to 20 years to develop and implement a Project for the Recovery of Degraded and Altered Areas (PRADA, in Portuguese). To

implement PRA USD 32.5 (BRL 138) billion<sup>075</sup> in investments will be required. This also sets opportunities to drive the adoption of best practices, innovative techniques and systems that increase efficiency and productivity.

Although the compliance to local environmental legislation is a given condition for a green label, green bonds may contribute to the implementation and enforcement of the Forest Code. An alternative are transition bonds, a new category within the sustainable finance universe, which aims in reducing exposure to brown assets and move these towards greener business models, although the main output might still be more carbon-intensive overall (e.g. livestock production). Transition bonds may deliver impact for producers that wish to become compliant, yet are not at this stage. This would allow them to direct resources for restoration and reforestation, linked to the adoption of low carbon and sustainable agricultural practices.

### Funding options and investment pathways

Funding for PRA could be done through green or sustainable bonds, loans or funds. Securitization mechanisms such as CRA, FIDCs and covered bonds would be a way to access funds for investments with financial and economic feasibility. For cases with socioenvironmental targets, structures such as social bonds and sustainable bonds would be more suitable.

### Potential Green Sample Pipeline

This list includes examples of eligible projects and assets that could receive green funding:

Activity	Projects and Assets	Category	Criteria
Restoration Methods	Restoration of marginal strips protecting water courses, springs, lakes and ponds	Conservation/ Production	Water/Agriculture
	Restoration	Conservation/ Production	Forestry/Agriculture
	Reforestation	Conservation/ Production	Forestry/Agriculture





## Agriculture

Agricultural best practices for crop production. This includes capital and operational expenditure, as well as measures to increase on-farm and off-farm resilience.

### Sector Overview

Brazil is a major agriculture player and the fourth largest exporter in the world. It is a leading producer of soybeans, grains (e.g. corn, wheat), beef, poultry, cotton, sugarcane products, and coffee. Projections from the OECD-FAO point to an increase in agricultural production across all crops by 2028. Soy production will increase from 114.3 to ~151.9 million, corn production from 95.3 million to ~114.5 million, cotton production from 2.7 million tons to ~3.2 million, sugarcane production from 620 million tons to ~786 million tons, and coffee production from 51 million sacks to ~64 million sacks.<sup>076</sup>

**Productivity will continue to be central to this growth. For instance, Brazil has achieved significant results in optimizing land use and increasing production through the adoption of double-cropping systems<sup>14</sup>, as well as the adoption of sustainable technologies and mechanization.**

### Soil and Land Use Management

Throughout the past four decades, **Brazil has implemented several sustainable agriculture practices such as no-tillage, integrated crop - livestock - forestry (ICLF) and biological nitrogen fixation.** For instance, no-tillage has been adopted in soy and corn production, improving soil fertility and decreasing the use of chemical fertilizers. The Low Carbon Agriculture Plan (ABC Plan) has accelerated the adoption of such technologies. **An assessment of the ABC Plan shows that low carbon technologies have been implemented in 59 million hectares, around 25% of the area used for agriculture and livestock (see page 38) activities<sup>077</sup>.** The expansion of these technologies and other agricultural practices will increase productivity and efficiency, and consequently new investment opportunities.

The use of low-productivity pastures for crop production is also another alternative to increase productivity and efficiency. A study on soy production in the Cerrado indicates that the use of pasturelands for crop expansion has lower costs and lead to higher yields<sup>078</sup>. *More than 18.5 million hectares were mapped in the Cerrado as suitable for soy production; more than twice the land needed for soy expansion over the next ten years.* Another study by the Climate Policy Initiative indicates that the use of pastures for crop production can increase agricultural output in around 105% without the need of converting new areas. *This highlights the potential of expanding production within existing agricultural areas.*

<sup>14</sup> Use of the same land for two crops in one season – in Brazil soy and corn.

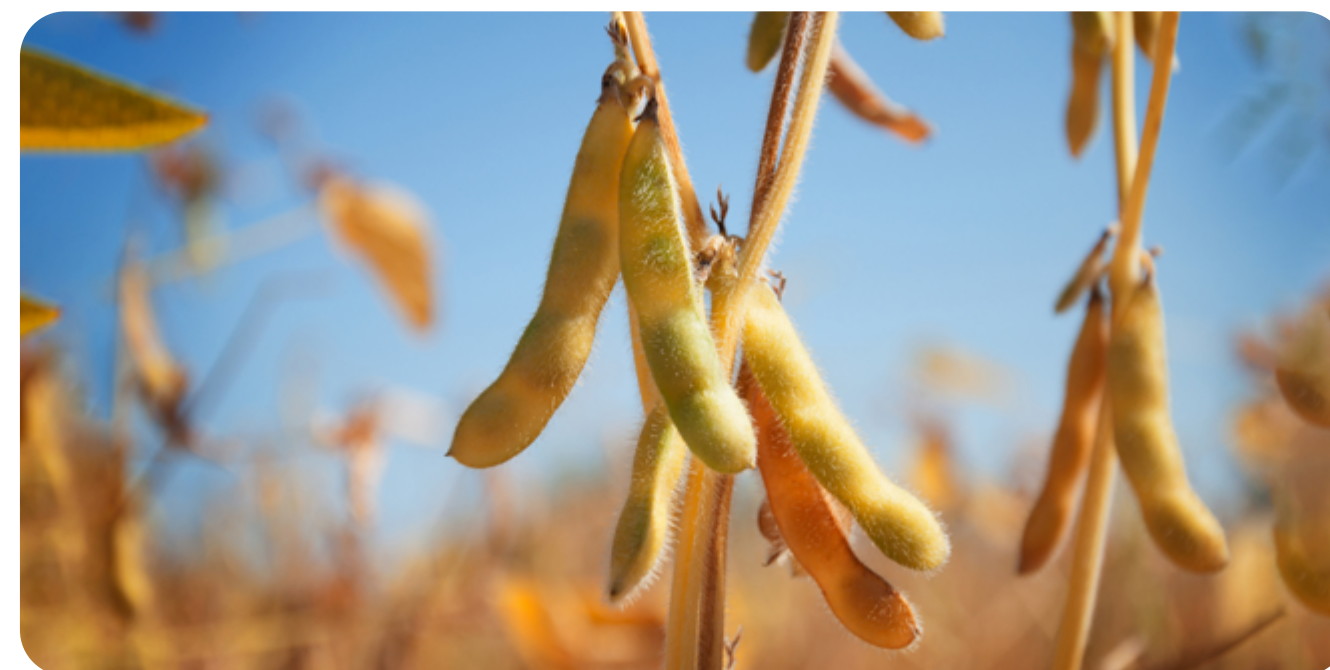
### Fertilizer Use

**Other best practices and techniques to increase efficiency and productivity are biofertilizers and biopesticides.** Biofertilizers have been used to improve plant development through the use of micro-organisms. By 2025, the global biofertilizer market is projected to reach USD 3.1 (BRL 13.3) billion<sup>079</sup>. Considering Brazil's position as the world's fourth largest fertilizer consumer (nearly 6% of global consumption), biofertilizers could represent an annual USD 190 (BRL 806) million market in the country by 2025. Biopesticides, which also use micro-organisms, are growing as an alternative solution for pest control and will increasingly replace chemical pesticides in the coming years. The global biopesticides market was worth USD 3 (BRL 12.7) billion in 2017 and by 2025 should reach USD 10 (BRL 42.4) billion<sup>080</sup>. In Brazil, the production of biopesticides is increasing. In 2018, the market had a 77% increase, going from USD 61.8 (BRL 262) million in 2017 to USD 109.4 (BRL 464) million<sup>081</sup>. Considering global projections and Brazil's share in the market, this could represent USD 1.4 (BRL 6) billion/year by 2025.

### Funding options and investment pathways

Funding for agriculture crops is done via public rural credit or private credit. Federal Programs and Credit Lines are made available through banks and cooperatives. While private credit is made available through input distributors, traders and exporters, that can include banks, cooperatives and barterers.

In addition to the hubs identified above, **there is significant opportunity in encouraging banks to issue bonds or green LCAs, backed by rural credit financing operations** (such as ABC loan backing, for example). As an example, Banco do Brasil has a relevant ABC credit portfolio (estimated at USD 1.9/BRL 8 billion), aligned with green taxonomies and that could serve as collateral for the issuance of **Green LCAs** or a **green bond**.



**Potential Green Sample Pipeline**

This list includes examples of eligible projects and assets that could receive green funding:

Activity	Projects and Assets	Category	Criteria
<b>Fertilizer Use</b>	Biological Pest Control	Production/ Industry	Agriculture
	Biofertilizers and Biodefensives	Production/ Industry	Agriculture
	Biological Nitrogen Fixation*	Production	Agriculture
<b>Soil/ Land Management</b>	No-tillage planting *	Production	Agriculture
	Soil conservation practices	Production	Agriculture
	Integrated Crop - Livestock - Forestry (ICLF); recovery of degraded pasture land through crop expansion *	Production	Agriculture
	Certified Production (e.g. RTRS, Soja Plus, Proterra) / Acquisition of Certified Crops (e.g. soy, corn, coffee, cotton)	Industry	Agriculture
	Native Forest Restoration	Production	Forestry
<b>Energy</b>	Boiler Exchange (Energy Efficiency) and other energy efficiency measures	Industry	Agriculture
<b>Water and Waste Systems</b>	Irrigation / Water Reuse Systems	Production	Water
	Wastewater Treatment Station (ETE)	Industry	Water
<b>ICT</b>	Monitoring Systems Biological Pest Control	Production/ Industry	Agriculture
	Biofertilizers and Biodefensives Precision Agriculture	Production/ Industry	Agriculture

Activity	Projects and Assets	Category	Criteria
<b>Supporting Services and Infrastructure</b>	Harvest Mechanization	Production/ Industry	Agriculture
	Purchase of machinery, implements and equipment	Production/ Industry	Agriculture
	Georeferencing of Rural Properties, Including Technical and Administrative Expenses Related to the process of environmental regularization	Production/ Industry	Agriculture
	Purchase, transportation, application and incorporation of agriculture correctives (limestone and others)	Production	Agriculture
	Purchase of machinery, implements inputs and equipment payment of implementation and maintenance services	Production/ Industry	Agriculture
	Purchase of inputs (e.g. seeds, seedlings, semen, embryos, etc.)	Production	Agriculture
	Services for conversion to certified and/or low carbon agriculture protocols	Production/ Industry	Agriculture
	Technical assistance during the project maturation phase	Production/ Industry	Agriculture

**\*Notes:** These practices are included under the ABC Programme as eligible technologies which reflect the importance of the existing pipeline under that programme.



## Livestock

Best practices to increase the efficiency, resilience and productivity of livestock production. This includes physical assets, such as equipment and storage, and the recovery of degraded land.

### Sector Overview

Brazil is an important beef producer and exporter. In 2018, the country was the world's largest beef exporter, with a 20% share of the global market<sup>082</sup>. Projections indicate a continuous growth trajectory over the next decade driven by global demand. Production is estimated to reach 12 million tons in 2025 and 13.5 million tons in 2035<sup>083</sup>. **Since the 1990s, Brazil managed to increase the productivity of its beef production from 24.24kg/ha/year to 67.5kg/ha/year, largely due to the use of technological improvements (e.g. intensification, genetics, sustainability practices)**<sup>084</sup>. **Continuous advances in productivity and efficiency will be central for Brazil to grow its production without the need for new pasture lands.** Currently, 162.19 million hectares are used for beef production<sup>085</sup>. Out of this total 4.2 million are in advanced stages of agricultural and biological deterioration and another 9.7 million require recovery<sup>086</sup>. The adoption of low carbon practices (e.g. intensification of livestock production, ICLF), combined with the recovery of degraded areas not only allows for scaling more sustainable production, but for other land uses, such as crop production and planted forests.

### Soil and Land Use Management

Embrapa is leading different low carbon initiatives for beef production, such as the Carbon Neutral Brazilian Beef (CNBB) and ICLF Network. The Carbon Neutral Brazilian Beef was developed in 2015 and is a certification for beef produced under integrated systems, with a mandatory forest component, for example livestock-forestry or crop-livestock-forestry (ICLF). The CNBB, aims to not only reduce carbon emissions, but optimize the use of inputs and other production factors. The ICLF Network was created in 2012, between Embrapa, industry and private banks to speed the adoption of ICLF and scale sustainable agricultural practices. ICLF is a well-established technology in Brazil and focuses on land use, particularly the recovery of degraded pastures.

### Recovery of Degraded Pastures

Over the past decade, integrated systems have been applied to 11.5 million hectares in Brazil<sup>087</sup> through a combination of livestock, forestry and agriculture. The majority of systems are of agriculture-livestock (83%), followed by ICLF (9%), livestock-forestry (7%) and agriculture-forestry (1%)<sup>088</sup>. **These systems benefit soil recovery and fertility, reduce the emission of N2O**<sup>089</sup>, **capture carbon and intensify sustainable land use, reducing the expansion of new areas for crop and pasture, and resulting in higher yields.** The recovery of degraded pastures is the most significant opportunity under the ABC. Including agriculture and livestock, there is an estimated 60 to 100 million hectares of degraded land in Brazil. To recover this through integrated systems (ICLF) approximately **USD 62.5 to USD 104 (BRL 265 to BRL 442) billion** would be required<sup>15 090</sup>.

### Livestock Management

Besides beef, Brazil is the largest exporter of poultry and fourth largest exporter of pork. In 2018, the country produced 13.3 million tons of poultry and 3.7 million tons of pork, respectively exporting 28% and 19.5% of its production<sup>091</sup>. Poultry and Pork exports are expected to increase in 2020, particularly to China. Low carbon pork production is included in the Low Carbon Agriculture Plan (ABC Plan) and efforts are directed toward the rational use of water, animal feeding and waste treatment technologies (e.g. composting, biodigestion, biofertilizers). Similar to pork production, opportunities for poultry are also in inputs (feeding, energy, water), waste treatment and composting. Animal waste treatment is also included in the ABC Plan, with a 4.4 million m3 target, representing USD 471.6 million (BRL 2 billion) in investments. Green bonds can direct investments towards building more sustainable and resilient production systems.

15 Considering an average cost of USD 1,043/ha (BRL 4,422.74/ha).

### Funding options and investment pathways

Livestock has been traditionally funded by a mix of public and private finance, through government programmes and credit lines, cooperatives, private banks loans and equity capital. However, there is a great opportunity in the expansion of capital markets' participation in funding the sector, specially via green finance, and potentially leveraging foreign investments.

**Green bonds could potentially fund livestock production, mixed farming and projects, products and services supporting climate adaptation and resilience.** Many structures are available for those who wish to issue a green bond. Smaller projects and producers could make use of green loans and aggregation structures such as CRAs, FIDCs and LCAs through financial and securitization institutions and impact funds. As in agriculture, banks could also support financing for ABC practices.

### Potential Green Sample Pipeline

This list includes examples of eligible projects and assets that could receive green funding:

Activity	Projects and Assets	Category	Criteria
Soil / Land Management	Recovery of Degraded Pastures*	Production	Agriculture
	Recovery of Degraded Pastures *	Production	Agriculture
	Crop - Livestock - Forest Integration (ICLF)*	Production	Agriculture
	Native Forest Restoration	Production	Forestry/ Agriculture
Biomass Management	Reduction of inputs	Production/ Industry	Agriculture
	Pasture restoration/ pasture management	Production	Agriculture
Animal Management	Cattle Feedlots	Production/ Industry	Agriculture
	Confinement	Production/ Industry	Agriculture
	Intensification	Production	Agriculture
	Genetic Improvements	Industry	Agriculture
	Organic Production of Poultry and Pork	Production	Agriculture
	Purchase of carbon neutral / D-Free and Pork organic beef / leather	Industry	Agriculture
Manure Management	Certified Beef Production/ Low Carbon Protocols (e.g. Carbon Neutral, Carbon Reduced, Alianza Del Pastizal, Organic Beef)	Production/ Industry	Agriculture
	Composting	Production/Industry	Waste/ Agriculture
Energy	Boiler Exchange (Energy Efficiency) and other energy efficiency measures	Industry	Agriculture
Water and Waste Systems	Irrigation and water reuse	Production/ Industry	Water
	Wastewater Treatment Station (ETE)	Industry	Water
Supply Chain	Purchase of certified soy	Industry/ Production	Agriculture
ICT	Monitoring Systems	Production/Industry	Agriculture

\*Notes: These practices are included under the ABC Programme as eligible technologies which reflect the importance of the existing pipeline under that programme.

## Renewable Energy

On-site renewable energy generation, generation from agriculture and livestock residue/waste, bioenergy production and co-generation. This includes solar energy, biomass, biogas, biofuels and supporting facilities and infrastructure.

### Sector Overview

Renewables represent 48% of Brazil's energy mix (86% of renewables in its electricity supply), including hydro, biomass, bioenergy, wind and solar<sup>092</sup>. In 2019, hydro represented 12% of the energy mix (64% of the electricity mix), with other renewables representing another 12%, biomass 7%, and bioenergy 17%<sup>093</sup>. **Diversification is a central pillar of Brazil's energy policy, as well as of the country's climate commitment of expanding the use of non-hydro sources in the total energy mix** between 28% and 33%, the share of sustainable biofuels in the energy mix to 18%, and the use of non-hydro electricity supply to at least 23% by 2030<sup>094</sup>. The increase in renewable supply will be met mainly through wind, solar and biomass. Projections for 2029 point that these sources will represent 35% of the energy mix and 25% of the electricity mix<sup>095</sup>, while biofuels will represent 19%<sup>096</sup>.

### Solar

Currently, solar accounts for 1% of the electricity mix, but based on projections of Government's Ten-Year Expansion Plan (PDE 2029) it will increase over the next decade; particularly centralized systems<sup>097</sup>. A study from the Brazilian Energy Research Office (EPE) assessed suitable areas for photovoltaic systems and of the 960 thousand kilometres available, 46% include land for agriculture and livestock<sup>098</sup>. Distributed generation also will play an increasing role in solar energy expansion. According to figures from the Brazilian Solar Association (ABSOLAR), there are 2.3GW of distributed solar generation installed in the country – approximately 200 thousand systems. Rural properties represent only 8.7% of this total –16,000 systems – with residential consumers being responsible for over 70%, and commercial, industrial and pub-

lic sector consumers for the remainder. Investments in these solar systems in rural properties total USD 283 million (BRL 1.2 billion)<sup>099</sup>. **There is potential to implement this more widely in rural properties (e.g. self-consumption, electricity, machinery, irrigation, milking, pumping)**. Opportunities in expanding distributed solar generation will require **USD 1.1 (BRL 4.5) billion** in investment.

### Biomass

Another promising source of renewable energy in Brazil is biomass. There is currently 13.3GW of installed capacity and over the next decade, an additional 2.5GW should come online<sup>100</sup>. The main feedstock is sugarcane bagasse and by 2029 it will continue to account for more than half of biomass generation, with wood chips and biogas gaining an increasing participation. **Waste from agriculture, livestock and forestry can be used for energy generation. A study from EPE mapped the potential of residues from crops with a significant production volume – soy, corn, rice, wheat, cotton and beans – and 40% of the total residue produced can be used**<sup>101</sup>. EPE also assessed the use of waste from confined livestock – poultry, pork and dairy cattle – and sustainable forest management residue and highlighted their potential for energy generation. A more recent study from EPE, from 2017, found that 521 million tons of agriculture residue and 183 million tons of livestock waste could be used for energy generation (either 160 TWh of electricity or 77 billion m3 of biomethane)<sup>102</sup>.

### Biogas

According to the Brazilian Biogas Industry Association (ABiogás), the country has a significant potential for biogas production, with 84.6 billion Nm<sup>3</sup>/year<sup>16</sup><sup>103</sup>. Approximately 45% of sugarcane waste and 48% of agroindustrial waste could be used as feedstock – see page 40. It is projected that this potential – combined with sanitation – is capable of supplying almost 40% of the national electricity demand or replace

70% of Brazil's diesel consumption<sup>104</sup>. These projections are aligned to governments 10-Year Expansion Plan (PDE 2029), which highlight the potential of Brazil's sugarcane sector. Considering that all resulting stillage and filter cake is allocated to biodigestion, the potential for sugarcane biogas represents 7.2 billion Nm<sup>3</sup> in 2030, representing an additional **USD 4.5 (BRL 19) billion** in CAPEX<sup>105</sup>.

### Bioenergy

Since the 1970s, Brazil has developed one of the world's most successful bioenergy programmes. Currently the country has mandatory blending mandates for gasoline (with 27% ethanol<sup>106</sup>) and biodiesel (10%) and production capacity is projected to increase by 2029. Sugarcane ethanol production is expected to reach 46 billion litres, corn ethanol production

4 billion litres<sup>107</sup> and biodiesel production 13.6 billion litres<sup>108</sup>. Indirect land use change (iLUC) is also not an issue for Brazilian biofuels, as the country has managed to continually increase crop and livestock productivity alongside biofuel production<sup>109</sup>. The launch of the new National Policy for Biofuels, *RenovaBio*<sup>110</sup>, will support the expansion of biofuels – see box 1.

**Box 1 - RenovaBio:** recognises the capacity of each type of biofuels to reduce emissions, per production unit. The main instruments under the programme are: i) Establishing of national emission reduction targets for the fuel mix, set for a 10-year period; and ii) Biofuel production certification by private inspection firms, assigning different grades to each production unit (producers who produce a larger amount of net energy, with lower CO<sub>2</sub>e emissions in the life cycle, gets a higher grade). The grade will reflect precisely the individual contribution of each production agent, vis-à-vis the mitigation of a specific amount of greenhouse gas, in relation to its fossil substitute (in terms of tonnes of CO<sub>2</sub>e). The certification process for biofuel production under *RenovaBio* will be under the responsibility of ANP (National Agency of Petroleum). These instruments will be combined with the creation of the Biofuel Decarbonisation Credit (CBIO), a financial product backed by CO<sub>2</sub> emissions, traded on the stock exchange and issued by the biofuel producer, based on the commercialisation of their production (after the issuing of the invoice). Fuel distributors will meet the target by demonstrating the required amount of CBIOs on their property. Other agents (individuals and companies) will be able to buy and sell CBIOs on the stock exchange, as a way of bringing more liquidity to this market or a green bond abroad.

**There are investment opportunities in feedstock production and expansion of new and existing units.** For sugarcane ethanol production, **USD 6.4 (BRL 27) billion** will be needed for the construction (**USD 4/BRL 17 billion**) and expansion (**USD 2.4/BRL 10 billion**) of ethanol plants and another **USD 6.8 (BRL 29) billion** in investments will be needed for sugarcane plantation (new and existing areas), an additional **USD 990.5 million (BRL 4.2**

**billion)** on new 2G ethanol production plants and for sugarcane cogeneration; over **USD 2.9 (BRL 12.5) billion** will be needed in CAPEX<sup>111</sup>. While investments for new corn ethanol production plants, are projected at **USD 1.1 (BRL 4.7) billion** and investments for the expansion of biodiesel production capacity at **USD 1 (BRL 4.6) billion**<sup>112</sup>.

16 Nm<sup>3</sup> refers to normal cubic meters (standard pressure and temperature).



**Funding options and investment pathways**

BNDES is the largest funder of renewable energy projects in Brazil, financing nearly 70% of the country's existing portfolio. While the bank remains as an important funder in the sector, together with other regional public banks such as Banco do Nordeste (BNB), greater private sector participation is also encouraged.

The Brazilian Solar Association database lists 70 existing financing lines for solar energy projects in Brazil from both public and private institutions. For rural producers, funding is available through banks such as BNDES, Banco do Brasil, Caixa Economica, Banco da Amazônia, Sicredi and Santander, who have sustainability and renewable energy credit lines. Biomass projects are also funded mainly through the same banks, particularly BNDES and Banco do Brasil, who have lines for renewable energy sources for agriculture producers.

Bioenergy is funded through a mix of public and institutional resources, including debt capital markets and project finance structures. Development banks, such as BNDES, BNB and BDMG, offer credit lines for renewable energy and complements public funding for bioenergy generation. There are many opportunities for

investments in low carbon and climate resilient assets and projects, including facilities producing biofuel/biomass cogeneration and energy generation facilities and dedicated supporting infrastructure. Green bonds can be great source of funding for the sector.

Infrastructure debentures are suited for large solar, biomass and biofuel projects, including project bonds, corporate bonds or ABS. Aggregation of smaller projects can be done through securitization of green loans and refinancing in the green bond market. **Green bonds are adequate for financing and refinancing renewable assets and projects, and can be structured as an ABS, project bond, corporate bond or covered bond.** The aggregation of smaller deals can be done through green CRA's or LCA's, or even by banks through green loans. There are available criteria for solar energy assets and projects under the Climate Bonds Standards and Certification Scheme and more recently the Bioenergy Criteria (covering biofuel production and co-generation). Green bonds issued in the solar energy sector include AES Tiete's USD 208 (BRL 881.9) million bond to fund two solar photovoltaic power plants.<sup>113</sup> So far, in Brazil no issuances have been completed for bioenergy and biomass.

**Potential Green Sample Pipeline**

This list includes examples of eligible projects and assets that could receive green funding:

Activity	Projects and Assets	Category	Criteria
<b>Renewable energy generation-production facilities</b>	Solar generating facilities	Industry/ Production	Solar
	Power Generation Facilities (power, heat and cooling)	Industry	Bioenergy
	Co-generation	Industry	Bioenergy
	Waste to Energy Technologies	Industry	Waste
<b>Bioenergy production facilities</b>	Biodiesel Production and Certification	Industry	Bioenergy
	Bioenergy producing facilities (biofuel, biogas, gaseous biomass)	Industry	Bioenergy
	Biodigesters/ Biogas	Industry	Waste
	Renovabio Certified Plants	Industry	Bioenergy
	Purchase of certified sugarcane (Bonsucro, Proterra, Organic)	Industry	Bioenergy
<b>Supporting Infrastructure</b>	Solar infrastructure (dedicated transmission infrastructure, inverters, transformers, energy storage systems and control systems)	Industry/ Production	Solar
	Solar supply chain facilities	Industry/ Production	Solar
	Dedicated transmission lines from an eligible bioenergy facility to the main grid	Industry / Production	Bioenergy





## Forestry

Sustainable forestry use, conservation and restoration. This includes sustainable forestry management, commercial plantation forest, and non-timber forest products, and industrial activity (i.e. pulp and paper)

### Sector overview

**Brazil has the second largest forest coverage in the world, with nearly 500 million hectares. Around 98% of this is composed of native forests and the other 2% of planted forests** (mainly Eucalyptus and Pinus genera)<sup>114</sup>. The Brazilian forest sector contributes with 1.3% of the country's GDP and with 6.9% of the industrial GDP<sup>115</sup>. In 2018, the total export value reached USD 12.5 (BRL 53) billion, placing Brazil as the ninth largest exporter of forestry products globally<sup>116</sup>.

In Brazil, forest tracts can be publicly or privately owned. Public lands with native forests are subject to forest management, which can be carried out by private companies or local communities. One of the main modalities of public forest management are forest concessions (Law 11.284/2006), which allow federal, state and municipal government to grant the management of public forests to private entities. There are currently more than 1 million hectares<sup>117</sup> under federal concession.

Planted commercial forests are generally used for the production of pulp and paper. In 2018, Brazil had 7.83 million hectares of planted forests, with 5.7 million hectares of Eucalyptus plantations, 1.6 million hectares of Pine and another 590 thousand hectares of other species (e.g. rubber, acacia, teak and paricá)<sup>118</sup>. The productivity of Brazil's forestry sector is a world reference, with Eucalyptus plantations producing 36 m<sup>3</sup>/ha year and Pine plantations 30.1 m<sup>3</sup>/ha year<sup>119</sup>. The Brazilian Wood Association expects **USD 7.7 (BRL 32.6) billion**<sup>120</sup> to be invested in the planted forest sector over the next three years, particularly pulp and paper and wood panels.

The pulp and paper industry are responsible for 36% of the volume of planted forests in Brazil, followed by independent owners, steel industry, timber industry management organizations and wood product manufacturers<sup>121</sup>. Brazil is the second largest producer of pulp in the world, with 21.1 million tons produced in 2018, and the eight largest paper producers, with 10.4 million tons<sup>122</sup>. Nearly half of this production is exported.

Forestry and chain of custody certification is significant in Brazil. The two existing forest certification systems in the country are the Brazilian Program for Forest Certification (Cerflor), part of the Endorsement of Forest Certification Scheme Programme (PEFC), and the Forest Stewardship Council (FSC). In 2018, 3 million hectares were certified by Cerflor and 6 million hectares by FSC<sup>123</sup>.

Considering the implementation of the National Plan for the Development of Planted Forests and the ABC Plan targets for planted forests, (accounting for 2 million ha each), **USD 4.7 (BRL 20) billion**<sup>17</sup> in investments will be required.

### Funding options and investment pathways

Public credit lines provide a considerable part of funding for the Brazil's forest sector. Credit lines for small producers are made available through Pronaf lines (e.g. Pronaf Florestas, Pronaf Eco, Pronaf Custeio, Pronaf Produtivo Orientado) and other available lines come from BNDES, the ABC Programme, and Constitutional Funds – see Annex II on page 53. Eligible sectors for funding include conservation, degraded native vegetation, restoration of native vegetation, sustainable production, sustainable forest management, conservation, agroforestry, non-timber projects among others.

17 Considering an average cost of USD 1,179(BRL 5,000/ha).

**Green bonds could also be used to fund Brazil's Forestry sector. In Brazil's green finance market, land use is the second largest use of proceeds category, led by issuances of pulp and paper companies.** In 2016, Brazilian pulp and paper producer, Suzano Papel e Celulose, issued a green USD 235 million (BRL 1 billion CRA – Agribusiness Receivables Certificate) ABS to finance forestry projects. Other major pulp and paper companies such as Klabin and Fibria (now acquired by Suzano) also issued green bonds. In 2019, Klabin was the first Brazilian company to issue a 30-year bond.

**The use of proceeds has been directed towards forestry, management of water resources, energy efficiency, renewable energy generation, solid waste management, transportation, reforestation of native forests, biodiversity conservation and climate change adaptation.** Certification for Forestry assets and projects are available under the Climate Bonds Standards and Certification Scheme. Commercial plantation forestry, sustainable forest management, non-timber forest products, forest conservation and restoration are a few of the eligible assets under the Forestry Criteria. Further information is available in the Climate Bonds Standard and Certification Scheme website.

### Potential Green Sample Pipeline

This list includes examples of eligible projects and assets that could receive green funding:

Activity	Projects and Assets	Category	Criteria
Forest Cultivation/ Systems	Plantation Forest*	Production/ Industry	Forestry
	Agroforestry Systems	Production	Agriculture
	Non-timber Forest Products	Production/Industry	Forestry
Forest Management	Sustainable Forest Management	Production	Forestry
	Watershed management	Production	Water
Forest Conservation	Conservation and Restoration Forestry	Production	Forestry
	Conservation and Restoration Non-Forested Land	Production	Forestry
Supporting infrastructure and Supply Chain	Supporting and supply chain infrastructure (e.g. equipment, upgrade/maintenance forest roads, warning systems, information management systems, plant nurseries)	Industry	Forestry
	Low Carbon Transport (e.g. rail)	Industry	Transport
	Forestry Supply Chain	Industry	Forestry
ICT	GIS analysis, satellite data collection and data analysis	Production/ Industry	Forestry

\*Notes: These practices are included under the ABC Programme as eligible technologies which reflect the importance of the existing pipeline under that programme.

## Transport

Low carbon transport modes and ancillary infrastructure and ICT systems that improve transport systems or networks.

### Sector overview

Although Brazil is the third largest agriculture exporter, infrastructure and logistics remains a challenge. **Infrastructure has a central role for agricultural productivity as it facilitates access to domestic and international markets. It also impacts agriculture competitiveness, as it can increase costs and GHG emissions.** A study by the Climate Policy Initiative on transport and agriculture productivity highlights that the cost of transporting soy in Brazil can be three times more expensive than transporting soy in the United States.<sup>124</sup> Therefore, by addressing inefficiencies across infrastructure can consequently improve agriculture productivity.

In 2018, the volume of investments on transport infrastructure including roads, rail, waterborne modals and ports was equivalent to 0.18% of the country's GDP.<sup>125</sup> Infrastructure investment overall declined over the past two decades, reaching only 2% of GDP. To close the current infrastructure gap, this figure should be between 4% and 6%.<sup>126</sup> **Brazil requires around USD 80.6 (BRL 342) billion by 2025<sup>127</sup> for new and existing infrastructure.** This includes investments on roads (USD 73.3/BRL 310.9 billion), new rail projects (USD 3.8/ BRL 16.4 billion) and waterborne modes (USD 3.5/BRL 14.7 billion)<sup>128</sup>.

Roads are still the main transportation mode in Brazil, accounting for 61.1% of freight. Rail and waterborne (maritime and inland waterways), respectively represent 20.7% and 13.6%.<sup>129</sup> Therefore, there is an opportunity to expand low carbon transport and increase the use of biodiesel in trucks and lorries as a key to reduce carbon intensity on road transportation. Infrastructure is a priority and the government expect to raise USD 11.8 (BRL 50) billion in 2020 through the Investments Partnership Programme (PPI) to fund infrastructure and logistics.<sup>130</sup>

The PPI portfolio includes energy, rail, waterways, and ports. There are numerous opportunities for assets and projects, such as bioenergy, renewables and rail if eligible under green taxonomies and criteria,<sup>131</sup> which could be issued with a green label - see box 2. Official forecasts on investments for railroads to total **USD 13.1 (BRL 55.6) billion** - 29% in new concessions - and for biofuel pipelines **USD 943 million (BRL 4 billion)**.<sup>132</sup>

### Box 2 - Transport Eligibility Criteria

The Climate Bonds Standard Transport Criteria sets out strict thresholds that projects and assets must meet to be eligible for certification. These thresholds are consistent with a 2-degree scenario and define GHG reductions required to stimulate a transition toward a low (net-zero) carbon scenario. To be eligible under the Transport Criteria, rail infrastructure projects must demonstrate (i) emissions are below 25gCO<sub>2</sub> per t-km/2020<sup>18</sup>, (ii) GHG emissions are lower compared to an alternative scenario (modal shift from road to rail) and (iii) the amount of fossil fuel transported is below 50% per t-km<sup>19</sup>. This is also aligned with the EU Green Taxonomy for Freight Rail Transport. In addition to the Transport Criteria, to address other environmental concerns it is encouraged that transport infrastructure projects apply the Climate Resilience Principles, also under the Climate Bonds Standard<sup>20</sup>. These not only assess climate risk and vulnerability, but may include impact performance indicators to demonstrate the project and asset does no significant harm to the ecosystem, thus supporting conservation efforts across influence zone. Impact reporting is increasingly being demanded by investor, thus it is important to quantify environmental impacts resulting from the project.

18 This becomes more stringent over time going down to 21 gCO<sub>2</sub> per t-km/2030 and 18 gCO<sub>2</sub> per t-km/2050.

19 Rail and rolling stock infrastructure built with the sole objective of transporting fossil fuels do not qualify for certification.

20 Voluntary principles published by CBI in 2018.

### Funding options and investment pathways

The Brazilian government is increasingly seeking private sector participation and the use of capital market instruments to fund infrastructure. In 2018, BNDES funding for infrastructure accounted for around 1% of the country's GDP, whereas the between 2008 and 2017, this percentage was equivalent to 5%.<sup>133</sup>

Since 2016, Public Private Partnerships have been the main structure used for long-term infrastructure funding. While infrastructure debentures are the most common financing instrument via capital markets, many other structures can be used, such as project bonds, financial bills, real state funds, promissory notes and loans.

**Low carbon logistics and infrastructure opportunities in Brazil may include rail freight systems, cargo ships and smart, multi-modal or intermodal freight systems and facilities. Such assets could be financed or refinanced via green debt instruments.** The 'green' label is a sign of transparency and good management of proceeds to investors and could not only bring attractive credit and liquidity,<sup>134</sup> but also improve long-term portfolio risk management for them.

### Potential Green Sample Pipeline

This list includes examples of eligible projects and assets that could receive green funding:

Activity	Projects and Assets	Category	Criteria
Freight*	Trains and Rolling Stock	Industry	Transport
	Rail Infrastructure	Industry	Transport
	Intermodal freight facilities	Industry	Transport
ICT	ICT Systems to improve transport systems or network	Industry	Transport
Logistics	Smart freight logistics	Industry	Transport
	Multi-modal logistics hubs	Industry	Transport

\*Notes: If GHG and Adaptation Criteria are met, as well as additional environmental indicators. See box on Transport Criteria and Thresholds.

## Recommendations for Scaling Sustainable Agriculture in Brazil

Brazil can scale sustainable agriculture assets and projects and green finance instruments, including green bonds, through key policy and institutional changes.

### SUMMARY

- Promote sustainable agriculture achievements and improve communication.
- Adjust regulatory requirements to facilitate access to capital markets.
- Build a green investment pipeline and prioritize green financial instruments.

These recommendations can raise Brazil's profile as a sustainable agriculture leader, set a pipeline of investment opportunities across agribusiness and facilitate access to new sources of funding. Key recommendations are:

- **Promote sustainable agriculture achievements:** while the Ministry of Agriculture published "Guidelines for the Sustainable Development of Brazilian Agriculture"<sup>135</sup> in early 2020 and sustainability is a pillar of its Agribusiness Market Access and Image Programme (PAM-Agro), this value still is not fully captured domestically or internationally. **Priority actions and achievements, including progress towards the country's climate commitments in agriculture, should be communicated widely to inform investors and send a strong signal to the market.**
- **Improve access to data and transparency:** use existing platforms such as the Agriculture Observatory to disclose information on public credit lines that encourage good agricultural practices, environmental legislation, preservation figures (e.g. satellite monitoring system) and progress achieved through productivity and efficiency gains. These figures are either spread out in different organisations, unavailable or outdated. **This would improve access to data and provide a better visibility of Brazil's green credentials.**
- **Expand the Low Carbon Agriculture Plan and Programme:** the ABC Plan and Programme are valid up to 2020 and proved to be important instruments for the adoption of low carbon agriculture practices. **A new and improved phase could include new asset categories to increase on-farm mitigation and resilience** (e.g. new technologies to increase productivity, machinery, storage, inputs), as well as enable further implementation of existing practices.
- **Adjust regulatory requirements:** to improve business environment and to facilitate producer access to capital markets.
- **Build a green investment pipeline to help investors to understand that there is a sufficiently large pool of financially attractive investments** that are also green and that could scale-up sustainable practices. This would provide a clearer vision of investment opportunities across Brazilian agribusiness.
- **Incorporate climate risk within the PAP (credit and insurance): crop insurance should be expanded and have a wider coverage from insurance companies.** New products that consider climate and agriculture resilience patterns should also be encouraged.

- **Prioritize green financial instruments:** there are a wide range of financial structures to fund Brazil's agribusiness which could be labelled as green. **Incentives such as fast tracks for green bonds (Law No. 12.431/2011), tax credit or tax exemption could encourage issuances** in the agriculture sector.
- **Provide credit enhancement mechanisms through state-owned Banks:** Structures such as subordinated tranches/quotas, insurances and first losses mechanisms could be applied on CRAs, FIDCs and Bonds (Debentures), leveraging state capital to attract private investors.
- **Reduce reserve requirements on green loans:** this would allow banks to be more active on green/sustainable projects.
- **Issue sovereign bond to finance sustainable agriculture:** this allows government to directly access capital markets to finance priority assets and projects.
- **Enable dialogues with investors and asset managers:** to develop a green finance market for the agriculture sector. These stakeholders are an integral part of driving demand for investments with greater returns and sustainability.
- **Champion the green finance and sustainability agenda:** this could attract much needed private investment to expand agriculture production and supply chain.





## Annex I: Agriculture Debt Instruments

Debt instruments	Use of proceeds	Rating	Instrument available in Brazil	Examples
<b>General obligation corporate green bond</b>	Proceeds are allocated on nominated projects and assets.	The bonds are backed by balance sheet assets (Corporate Risk), the bond will carry the credit rating of the issuing entity that may be enhanced by additional warranties.	LCA (Agribusiness Notes) which are backed on loans and financing made by financial institutions on the agribusiness. Incentivized Infrastructure CRA (Agribusiness Credit Receivables Certificates), backed by corporative debt securities, such as Debentures, Promissory Notes and CDCA. Debentures laid down by Law 12.431/2010. and regulated by CVM 400* or CVM 476**	BNDES issued a USD 1 (BRL 4.2) billion sub-sovereign green bond to finance sustainable projects.
<b>Green structured finance</b>	Proceeds are allocated on nominated projects and assets.	Debt securities backed by a pool of underlying assets; an independent credit rating is issued by a rating agency.	FIDCs with mezzanine, senior and junior quotas. CRA with different levels, e.g. Senior, Mezzanine or Junior Quota	Uruguayan Atlas Renewable Energy used an A/B bond structure including a senior and subordinated note tranche with IDB Invest as the lender of record. The deal was privately placed with bond investors and IDB Invest. The USD 114.4 (BRL 485) million deal financed solar energy projects. No green structured finance issued yet from Brazil.
<b>Green project bond</b>	Proceeds are allocated on nominated projects and assets.	Credit rating is based on the project (Project Finance) and may be enhanced by additional collaterals.	Incentivized Infrastructure Debentures laid down by Law 12.431/2010. and issuances regulated by CVM 400* or CVM 476**	US-based Invenergy has issued two project finance private placements (USD201/BRL 852 million in total) for solar and wind projects in Uruguay. It also used an A/B bond structure. No green project bond issued yet from Brazil.

Debt instruments	Use of proceeds	Rating	Instrument available in Brazil	Examples
<b>Green securitization or green tranches in ABS and MBS deals</b>	Proceeds are allocated on nominated projects and assets.	Debt securities backed by a pool of underlying assets; an independent credit rating is issued by a rating agency.	CRA (Agribusiness Credit Receivables Certificates)	Suzano Papel e Celulose S.A. has issued a Green CRA in the amount of BRL 1 billion (USD 235.8 million) for investing in reforestation, expansion of certified forests and renewable energy.
<b>Green loans, syndicated loans and credit lines</b>	Provides lending to encourage market development in climate aligned sectors in line with the Climate Bonds Taxonomy and in compliance with the Green Loan Principles.	Interest rates are based on borrower credit scores or an ESG score assigned by an ESG rating agency.	Green Funds, FIDCs (CVM 356), Private Funds (CVM 555) and FI-Infra (CVM 600)	Honduran company Ormat Technologies Inc. obtained a non-recourse project loan (of up to USD 124.7/BRL 528.7 million) to finance a 35MW geothermal power plant. The Finance Agreement was signed with the US development finance institution Overseas Private Investment Corporation (OPIC). BNDES launched the BRL 500 million (USD 117 million) Sustainable Energy Fund, structured towards the acquisition of renewable energy debentures carrying a green label.
<b>Mezzanine and subordinated debt</b>	Proceeds are allocated on nominated projects and assets.	Hybrid capital investments, from development banks seeking to support private investment in the senior debt or from investors with a higher risk appetite.	FIDCs, CRAs and Debentures (structured with subordinated quotas/tranches), Mezzanine Financing, Subordinated Debt and Perpetual Senior Securities.	No green mezzanine or subordinated debt issued yet from Brazil.

Debt instruments	Use of proceeds	Rating	Instrument available in Brazil	Examples
Environmental impact bonds / pay-for - results green bonds	Proceeds allocated to nominated green projects/ assets. The payments to investors are conditional on the project achieving an expected outcome after a third-party evaluation has been conducted.	Part of the project's risk is transferred from the issuer to investors.	No specific Brazilian mechanism used yet for this structure.	In 2016, District of Columbia Water and Sewer Authority, a US Muni, issued a USD 25 (BRL 106) million private placement to finance the construction of green infrastructure to absorb and slow surges of storm water during periods of heavy rainfall. The structure of the bond included the conditional tied to the outcome of the project: if the project does not meet expectations, DC Water will make an outcome payment to investors; if it does, no contingent payment will be due to investors; and if it exceeds expectations, investors will make a Risk Payment Share of USD 3.3 (BRL 13.9) million to DC Water.  No specific environmental impact/pay-for - result bonds issued from Brazil yet.
* CVM Instruction 400 – Public Offer				
** CVM Instruction 476 – Restricted offer which only up to 50 qualified investors can participate.				
***Federal states and municipalities are currently unable to sustainably access capital markets. According to local legislation federal states and municipalities can only issue debt with a sovereign guarantee, which have not been granted due to fiscal and payment capacity constraints				

## Annex II: Financing platforms/initiatives in Brazil

This is not an exhaustive list, but a compilation of vehicles where there was enough information publicly available, hence the emphasis given to government programmes / credit lines.

Type	Programme	Authorized Operating Entities	Beneficiaries	Definition
<b>Government Programmes [4]</b>	PRONAMP – National Support Program for Medium Rural Producers	BNDES, Caixa Econômica Federal (CEF), Banco do Brasil	Medium producers	The government programme aims to finance investments and costing of medium Rural producers, which have at least 80% of operating revenue or annual income originated by agriculture or forestry management activities.
	PRONAF – National Program for Strengthening Family Farming	BNDES, CEF, Banco do Brasil, Banco do Nordeste(BNB), Banco Amazônia, Credit union cooperative and Civil Society Organization for Public Interest (OSCIP)	Medium and Small producers, family farming	The sub programmes under PRONAF umbrella aim to finance costing and investments in agriculture, livestock forestry activities; industrialization; agro-industries implementation, expansion, recovery or modernization; and in services in rural facilities or communities. Among the programmes there are: Pronaf Costing, Pronaf Women, Pronaf More Food, Pronaf Agro-industry, Pronaf Youth, Pronaf ECO and Pronaf Forestry. 2019/2010 Safra Plan benefited around 15 credit lines/programmes, which are distributed among all the authorized operating entities.
	ABC Programme	BNDES and its authorized network [1]	Rural producers (individual or companies) and cooperatives (including for transfer of resources)	The Program to Reduce Greenhouse Gas Emissions in Agriculture aims to finance investments that mitigate emissions and the effects of climate change. It is sub-categorized within six different credit lines, supporting projects that minimize environmental impacts caused by agriculture and livestock activities.
	Fundo Clima	BNDES and its authorized network [1]	Rural producers and cooperatives (under the sub-programme against desertification) and companies.	The programme is part of the Climate Change National Plan and directs resources from the National Climate Fund to support projects, technological development m monitoring and machinery acquisition related to mitigation and adaptation to climate effects. The Fund is subdivided into sub-programmes that aim at tackling sustainable development in sectors such as Forestry and Waste Management.

Type	Programme	Authorized Operating Entities	Beneficiaries	Definition
Government Programmes/ BNDES Resources	Moderfrota	BNDES and its authorized network [1]	Rural producers (individual or companies) and cooperatives	The programme originated by BNDES /FINAME resources, aims to finance the acquisition of machinery for agriculture production, such as tractors, harvesters and cutting decks.
	Moderagro	BNDES and its authorized network [1]	Rural producers (individual or companies) and cooperatives (including for transfer of resources)	Implemented with BNDES resources, the credit lines aim to finance projects of expansion and modernization of agriculture and livestock productions, as well as initiatives in defence of animals and in favour of soil remediation.
	Moderinfra	BNDES and its authorized network [1]	Rural producers (individual or companies) and cooperatives	The programme, implemented with BNDES resources, aims to incentivize irrigated sustainable agriculture and livestock, and installing of protected farming.
	PCA – Warehouse Construction Program	BNDES and its authorized network [1]	Rural producers (individual or companies) and cooperatives	The programme, implemented with BNDES resources, support investments in the expansion, renovation and modernization of rural producers and cooperatives storage capacity.
	Prodecoop – Cooperative Development Programme	BNDES and its authorized network [1]	Cooperatives or their associates, federations and confederations	The programme, implemented with BNDES resources, aims to generate value for agriculture and livestock production, increasing competitiveness among cooperatives and though providing financing for the modernization of their production and trading systems.
	Inovagro	BNDES and its authorized network [1]	Rural producers (individual or companies) and cooperatives	The Program for Technological Innovation Incentive in Agriculture Production – Inovagro, implemented with BNDES resources, supports production increase and management improvement, through financing technological innovation of rural properties.
	Procap-Agro	BNDES and its authorized network [1]	Cooperatives or their associates, federations and confederations	The Capitalization Program for Agriculture Cooperatives, implemented with BNDES resources, supports asset recovery and restructuring of cooperatives, through financing advanced payments for working capital and complementing quotas.
	BNDES Agro	BNDES and its authorized network [1]	Local companies, individual rural producers and cooperatives	The programme aims to support the expansion of storage capacity of agro-industries and the acquisition of air sprayers by rural producer for agriculture, livestock and forestry productions

Type	Programme	Authorized Operating Entities	Beneficiaries	Definition
Government Programmes/ BNDES Resources	BNDES Prorenova	BNDES and its authorized network [1]	Sugar cane rural producers (individual or companies), ethanol and sugar producers and related cooperatives	The programme finances the renovation and implementation of new sugar cane fields.
	BNDES Rural Credit	BNDES and its authorized network [1]	Rural producers (individual and companies) and cooperatives	The programme supports agriculture and livestock activities, such as forestry and aquaculture, through financing projects and acquisition of machinery and equipment.
	BNDES Finem – Agropecuária	BNDES and its authorized network [1]	Companies, associations, cooperatives, foundations and public entities	The credit line aims to finance agro-forestry activities, food and animal production and also storage, processing and production of agriculture, aquaculture and livestock products.
	BNDES Finem – Meio Ambiente – Conservation and Recovery of Ecosystems and Biodiversity	BNDES and its authorized network [1]	Companies, associations, cooperatives, foundations and public entities	The credit line aims to finance activities of recovery and conservation of ecosystems and biodiversity.
	BNDES Finem – Energy Efficiency	BNDES and its authorized network [1]	Companies, associations, cooperatives, foundations and public entities	The credit line supports the national energy efficiency and electricity consumption reduction. Among the projects that can be financed, there are: cogeneration and capture and reuse of waste gases.
	BNDES Finem – Meio Ambiente – Recovery of environmental liability	BNDES and its authorized network [1]	Companies, associations, cooperatives, foundations and public entities	The credit line aims to finance projects of degraded, mined or contaminated areas.
	BNDES Finem – Meio Ambiente – Sustainable Products and Processes	BNDES and its authorized network [1]	Companies, associations, cooperatives, foundations and public entities	The credit line supports investments in products and processes that make use of inputs which are renewable or generate little social and environmental impact. It can finance, for instance, the production of organic fertilizer.
	BNDES Finem – Meio Ambiente – Planning and Management	BNDES and its authorized network [1]	Companies, associations, cooperatives, foundations and public entities	The credit line aims to support the capacity increase of companies to mitigate environmental risks. It can finance, for instance, environmental and integrated management systems, capacity building initiatives and environmental impact studies.



Type	Programme	Authorized Operating Entities	Beneficiaries	Definition
<b>Constitutional Funds [2]</b>	FCO Rural	Banco do Brasil	Small individual entrepreneurs, Companies, associations, cooperatives	Within the framework of the Constitutional Fund for Financing the Midwest, the Rural programme aims to incentivize the sector and green credential, offering financing options for agriculture and livestock productions, forestry assets management systems, storage infrastructure, technological innovation, acquisition of inputs and machinery, irrigation, waste treatment and conservation of watersheds.
	FNE Rural – Northeast Rural Development Support Program	Banco do Nordeste (BNB)	Small individual entrepreneurs, Companies, associations, cooperatives	Within the framework of the Constitutional Fund for Financing the Northeast, the Rural programme finances costing, investments, modernization, expansion projects in the agriculture, livestock and forestry sectors.
	FNE Verde – Financing Program for Environmental Sustainability (Multisector)	Banco do Nordeste (BNB)	Small individual entrepreneurs, Companies, associations, cooperatives	The programme aims to promote ventures and economic activities that have environmental benefits. Among the rural activities financed, there are: sustainable use of forestry assets; environmental recovery and coexistence with the semiarid region; and control and prevention of pollution and environment degradation.
	FNE Irrigação – Financing Program for Irrigated Agriculture	Banco do Nordeste (BNB)	Small individual entrepreneurs, Companies, associations, cooperatives	The programme aims to support sustainable practices through financing the implementation, expansion, recovery and modernization of irrigation projects.
	FNE Agrin – Support Program for the Development of the Agro – industry in the Northeast	Banco do Nordeste (BNB)	Small individual entrepreneurs, Companies, associations, cooperatives	The programme offers financing options for implementation, expansion, reallocation, modernization and renovation of projects in the agro-industrial sector. It also finances environmental studies and investments necessary for the compliance with environmental licences.
	FNE Proinfra – Financing Program for Complementary Infrastructure in the Northeast Region	Banco do Nordeste (BNB)	Small individual entrepreneurs, Companies, associations, cooperatives	The programme finances infrastructure projects that supports production activities in the region. For instance, it offers financing options for infrastructure and logistics (waterborne, railway transportation included) and energy generation and transmission projects.

Type	Programme	Authorized Operating Entities	Beneficiaries	Definition
<b>International initiatives [4]</b>	Brazil Country Program for the Green Climate Fund	CEF, Funbio, BNDES and other international approved entities [3]	Projects and programmes submitted to the Fund's screening process.	The global programme incentivizes low carbon development and mitigation, resilience and adaptation of climate impacts. In Brazil, it operates financings in forest economy and sustainable management of forest assets; conservation, restoration and reforestation; low carbon agriculture and adaptation in the production sector; low emission transport; and advanced biofuels and bioenergy technologies.
	Responsible Commodities Facility (RCF)	RCF	Farms that fit into the Programme's green criteria	The programme supports the sustainable production of crops through a green bonds issuance scheme. The initiative aims to finance soy and corn farming in degraded or cleared existing land, so the expansion of land use in the Cerrado Biome is avoided.
<b>Trading Credit Lines</b>	FEPM & FEE	Banco do Brasil, CEF, BNB, and other entities.	Rural producers (individual or companies) and cooperatives	Aiming to support agriculture and livestock trading through financing stocking activities, there are two credit lines available: FEPM – Financing for Stocking of Integrating Products, which finances activities within the Minimum Price Guarantee Policy (PGPM); and the FEE – Special Financing for Storage of Agricultural Products Not Part of PGPM.
	FGPP – Financing for Guaranteeing Prices for the Producers	Banco do Brasil, CEF, BNB, and other entities.	Cooperatives and industries that industrializes (or benefit from it) products within the PGPM	The credit line aims to finance agriculture industries and guarantee that the price paid for rural inputs is no less than the minimum stipulated amount.

[1] which includes public and private banks and Credit Union cooperatives. // Source: BNDES, 2020. Accredited Financial Institutions, [2] No credit line related to the agriculture sector was found within FNO (Constitutional Fund for Financing the North) programme, which is operated by Banco da Amazônia (BANA), [3] List of approved entities: <https://www.greenclimate.fund/about/partners/ae>, [4] Other International and public funds such as REDD+, Climate Investment Funds, Amazon Fund and National Environment Fund (FNMA) were not included in this annex given that their resources are allocated and managed by development or multilateral institutions, or only applicable for financing public entities. The National Fund for Forest Development (FNDF) was not included as well, given that there has not been a public call since 2013.

Other financing initiatives that may assist agribusinesses are: • BNDES Revitalização de Ativos – Crédito Revitalização de Ativos Direto; • BNDES Finame BK Aquisição e Comercialização; • BNDES Automático; • BB Investe Agro; • BNDES Finame – Energia Renovável; • BNDES Microcrédito; • BNDES Crédito Pequenas Empresas; • Cartão BNDES; • BNDES Crédito Diretor Médias Empresas; • Empresas Energias Renováveis – Caixa Econômica Federal; • BNDES Finem – Capacidade produtiva e outros investimentos; • BNDES Finem – Production capacity and other investments; • BNDES Exim – Crédito Exportação Pré-Embarque; • BNDES Finame Máquinas 4.0; • BNDES Finem – Crédito Inovação Direto; • BNDES Procapcred; • FCO Empresarial; • FNE Profrota Pesqueira; • FNE Aquipesca; • FNE Inovação; • FNE MPE; and • Storage Support for Family Farming by the National Supply Company (CONAB).

## Annex III: Existing Sustainability Protocols in Brazil

This table below provides a list of existing national and international agriculture production certification schemes. These can be used to demonstrate the implementation of sustainable practices that are aligned to green taxonomies and the Climate Bonds Standards and Certification Scheme.

Green Standard	Description	Sector(s)	Applicability
<b>Algodão Brasileiro Responsável (ABR)</b>	The ABR certification is given by ABRAPA to cotton producers who are part of the ABR programme and comply with its sustainable guidelines. Among its social, environmental and economic credentials are the maintenance of workers' integrity, environment preservation and profitability. The certification complies with Better Cotton Initiative guidelines, therefore, the producer with ABR is automatically eligible for a BCI international certification.	Cotton	Is used by 74% of cotton producers in Brazil's main producing states – Bahia, Goiás, Maranhão, Minas Gerais, Mato Grosso do Sul, Mato Grosso and Piauí. [1]
<b>Better Cotton Initiative</b>	The BCI certification is applied in Brazil through ABRAPA. The Better Cotton Standard and System follow a set of comprehensive components that vary from principles and criteria to monitoring mechanisms, and which are endorsed by three pillars of environmental, social and economic sustainability.	Cotton	Used by 270 cotton producers.[2]
<b>Forest Stewardship Council</b>	The FSC certification system establishes an international framework that can be applied to timber and non-timber products originated from good forestry management. There are FSC standards for forestry management and chain of custody certification and certified products can receive three types of labels based on the type of wood used: FSC 100% (100% certified wood), FSC Recycled (recycled wood or paper), or FSC Mix (wood and paper originated by a mix of FSC-certified forests).	Forestry	Total FSC Certified Area: 7.3 m ha, with 137 Forest Management Certifications and 1,070 Chain of Custody Certifications (verification for business, which identifies FSC-certified material from non-certified). [3]
<b>Brazilian Program for Forest Certification</b>	CERFLOR is the Brazilian Forest Certification Program, designed by the Brazilian Technical Standards Association (ABNT) and stakeholders. CERFLOR principles and criteria aim to improve quality and sustainability good practices for forestry management by promoting the traceability/origin of timber.	Forestry	Total CERFLOR certified area: 3.6 m ha [4]

Green Standard	Description	Sector(s)	Applicability
<b>Bonsucro</b>	Bonsucro is a global initiative that defines standards and criteria for sugarcane sustainable production and custody chain. Centred on social, economic and environmental aspects, the certification establishes administrative and technical criteria in compliance with European Union standards.	Sugarcane	Total of 61 certified mills
<b>2BSvs</b>	The French 2BSvs voluntary scheme for sustainable production of Biomass is in compliance with European Union Directives. The certification scheme contains a series of quantitative and qualitative sustainable requirements for the production biomass (raw material and biofuels) and for biogas and bioliquids processed from biomass. The whole biomass custody chain is evaluated, and the certification is given to producers embedded in their logistical sites.	Biomass	There are currently 3 valid certificates from Amaggi, Bunge Alimentos and Cargill Agrícola S.A.[5]
<b>ISCC</b>	The ISCC is a global certification system aiming to address sustainability in all feedstock and markets, such as biomass from agriculture and forestry, circular materials and renewables. It is a deforestation free standard, based on ecological and social sustainability, good management practices, compliance with laws and treaties and monitoring of GHG emissions.	Biofuels	Brazil currently has 10 valid certificates. [6]
<b>Roundtable for Sustainable Soy – RTRS</b>	The RTRS global initiative aiming to promote responsible soy production through environmental, social and economic indicators. It has established a certification scheme for production and chain of custody.	Soy	There are 104 certified producers. [7]
<b>Soja Plus</b>	The Soja Plus is a label for soy producers with 182 economic, social and environmental indicators. It was established in 2011 by the Brazilian Association of Vegetable Oils (ABIOVE) and has five main target areas: life quality, best production practices, economic feasibility, product quality and social responsibility.	Soy	The Soja Plus Programme is voluntary and provides training and technical assistance to participating producers. To date the programme has provided assistance to 2.147 farms in leading soy-producing states – 8% of Brazil's production.
<b>CNBB</b>	The Carbon Neutral Brazilian Beef was developed by Embrapa in 2015. It is a label given for producers that neutralize GHG emission through silvopastoral (forestry-livestock) or agrosilvopastoral (crop-livestock-forestry) systems. They must comply with production systems, origin, quality and indication of use parameters.	Beef	Can be used for fresh, frozen or processed beef.

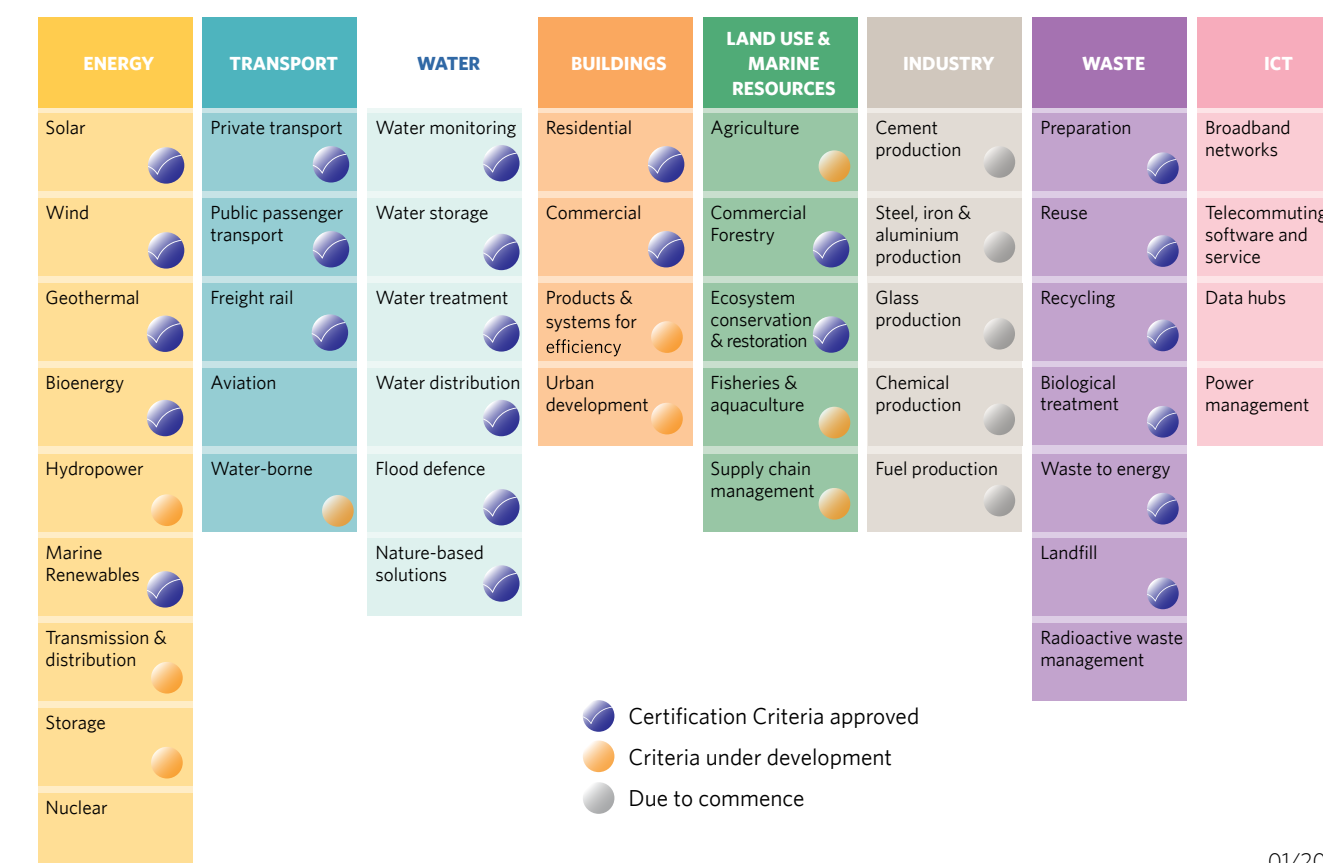
Green Standard	Description	Sector(s)	Applicability
<b>CBC</b>	The Low Carbon Brazilian Beef Protocol was developed by Embrapa in 2018 for producers that neutralize or reduce methane emissions from livestock through pasture management.	Beef	Being tested by Marfrig and Grupo Roncador.
<b>Carnes del Pastizal</b>	The Carnes del Pastizal Protocol was established by Alianza del Pastizal. It a certification scheme that rewards farmers for raising grass-fed cattle and managing farmland that conserves natural grassland and biodiversity.	Beef	Complete beef production cycle.
<b>Neutral and Regenerative Livestock</b>	The Neutral Meat Certification is provided to producers who demonstrate the neutralization of enteric methane.	Beef	Piloted by Triqueda Farm, Real Farm, Ecofarm and Pashto Company in the State of Mato Grosso.
<b>UTZ</b>	The UTZ is a certification programme for sustainable farming, which covers better management, farming practices, working conditions and environment. In 2018, it merged with the Rainforest Alliance.	Coffee	Coffee producers and supply chain. In Brazil, 390 coffee producers and 204 supply chain actors have UTZ certification.
<b>Global Coffee Platform</b>	The Brazilian Sustainable Coffee Curriculum was launched in 2015 and contains 18 indicators for coffee producers. It covers economic (e.g. productivity, soil analysis), environmental (e.g. soil conservation, climate change, legal preservation areas), and social (e.g. health and safety, training) aspects.	Coffee	Coffee producers
<b>Rainforest Alliance</b>	The Rainforest Alliance certification addresses economic, social and environmental standards. The Sustainable Agriculture Certification considers indicators such as biodiversity conservation, improved livelihood, natural resource conservation, effective planning and farm management system, while the Forestry certification includes forest conservation, forest reserves and compliance with the FSC guidelines.	Sustainable Agriculture and Forestry	Farms and forestlands.

[1] Data from 2018. Source: Relatório de Conclusão da Safra de Algodão 2016/2017 - ABR e BCI/ [2] Data from BCI 2017-18 season Source: BCI/ [3] December 2019 - Source: FSC Historical data/ [4] Data as of 2018 -Source: Certificacao florestal - Cerflor/ [5] 2bsvs/certificats-valides/ [6] ISCC, certificates/valid-certificates/ [7] RTRS, mercado, volumenes-y-productores-certificados.

### Climate Bonds Taxonomy

The Climate Bonds Taxonomy features eight climate-aligned sectors. The purpose of the Taxonomy is to encourage common broad 'green' definitions across global markets in a way that supports the growth of a cohesive green bond market. The Climate Bonds Standard and Certification Scheme is used to provide a labelling scheme for bonds and other debt instruments.

The Sector Criteria for the Climate Bonds Standard and Certification Scheme provide eligibility conditions or thresholds which must be met for assets to be in line with a rapid trajectory towards a 2050 zero-carbon future. The criteria are developed based on climate science by technical expert groups with input from industry.





## Endnotes

001 CBI, 2020. Data as of 31 December 2019.

002 CBI, 2020. Data as of 31 March 2019.

003 CBI, 2019. Latin America State of the Market. Available at: <<https://www.climatebonds.net/resources/reports/latin-america-caribbean-green-finance-state-market-2019>>

004 CBI, 2018. Can green bonds finance Brazil's agriculture? Available at: <[https://www.climatebonds.net/files/reports/brazil\\_agri\\_finance\\_briefing\\_cbi\\_sitawi\\_final\\_eng-web.pdf](https://www.climatebonds.net/files/reports/brazil_agri_finance_briefing_cbi_sitawi_final_eng-web.pdf)>

005 CBI, 2019. Latin America & Caribbean: Green Finance State of the Market. Available at: <[https://www.climatebonds.net/files/reports/cbi\\_lac\\_sotm\\_19\\_web\\_02.pdf](https://www.climatebonds.net/files/reports/cbi_lac_sotm_19_web_02.pdf)>

006 OEC, 2017. Brazil, Products. Available at: <[oec.world/en/profile/country/bra/](http://oec.world/en/profile/country/bra/)>

007 Embrapa Territorial, 2019. CAR: Síntese. Available at: <<https://www.embrapa.br/car/sintese>>

008 GASQUES, J. G. Sources of growth in Brazilian agriculture: total factor productivity. EuroChoices, v. 16, n. 1, p. 24-25, 2017. DOI: 10.1111/1746-692X.12146.

009 <http://www.oecd.org/agriculture/oecd-fao-agricultural-outlook-2019/>

010 FAO, 2018. The future alternative pathway to 2050 of food and Agriculture – FAO. Available at: <<http://www.fao.org/3/I8429EN/i8429en.pdf>>

011 Embrapa, 2018. Visão 2030: o futuro da agricultura brasileira. – Brasília, DF. Available at: <<http://www.embrapa.br/documents/10180/9543845/Visão+2030+-+o+fu-turo+da+agricultura+brasileira/2a9a0f27-0ead-991a-8cbf-a8e89d62829>>

012 CBI, 2018. Can green bonds finance Brazil's agriculture? Available at: <[https://www.climatebonds.net/files/reports/brazil\\_agri\\_finance\\_briefing\\_cbi\\_sitawi\\_final\\_eng-web.pdf](https://www.climatebonds.net/files/reports/brazil_agri_finance_briefing_cbi_sitawi_final_eng-web.pdf)>

013 OECD-FAO, 2019. OECD-FAO Agricultural Outlook 2019-2028. Available at: <[https://www.oecd-ilibrary.org/agriculture-and-food/oecd-fao-agricultural-outlook-2019-2028\\_agr\\_outlook-2019-en](https://www.oecd-ilibrary.org/agriculture-and-food/oecd-fao-agricultural-outlook-2019-2028_agr_outlook-2019-en)>

014 OECD-FAO, 2019. OECD-FAO Agricultural Outlook 2019-2028. Available at: <[https://www.oecd-ilibrary.org/agriculture-and-food/oecd-fao-agricultural-outlook-2019-2028\\_agr\\_outlook-2019-en](https://www.oecd-ilibrary.org/agriculture-and-food/oecd-fao-agricultural-outlook-2019-2028_agr_outlook-2019-en)>

015 CNA and CEPEA-Esalq, 2020. Brazilian Agribusiness GDP. Available at: <<https://cepea.esalq.usp.br/en/brazilian-agri-business-gdp.aspx>>

016 Embrapa, 2018. Visão 2030: o futuro da agricultura brasileira. – Brasília, DF. Available at: <<http://www.embrapa.br/documents/10180/9543845/Visão+2030+-+o+fu-turo+da+agricultura+brasileira/2a9a0f27-0ead-991a-8cbf-a8e89d62829>>

017 MAPA, 2020. Agrostat – Estatísticas de Comércio Exterior do Agronegócio Brasileiro. Available at: <<http://indicadores.agricultura.gov.br/index.htm>>

018 Embrapa, 2018. Visão 2030: O Futuro da Agricultura Brasileira. Available at: <<http://www.embrapa.br/documents/10180/9543845/Visão+2030+-+o+fu-turo+da+agricultura+brasileira/2a9a0f27-0ead-991a-8cbf-a8e89d62829>>

019 CEBDS, 2017. Oportunidades e Desafios das Metas da NDC Brasileira para o Setor Empresarial. Available at: <<https://biblioteca.cebds.org/oportunidades-desafios-metasndc>>

020 CPI, 2019. Financial Challenges and Proposals for Sustainable Production in Brazil. Available at: <<https://climatepolicyinitiative.org/wp-content/uploads/2019/02/Financial-Challenges-and-Proposals-EN.pdf>>

021 Embrapa, 2020. Integrated Crop-Livestock-Forest Systems – ICLFS. Available at: <<https://www.embrapa.br/en/tema-integracao-lavoura-pecuaria-floresta-ilpf/nota-tecnica>>

022 MAPA, 2019. Guidelines for the Sustainable Development of Brazilian Agriculture. Available at: <<https://www.gov.br/agricultura/pt-br/assuntos/noticias/semana-verde-na-alemanha/Agendaestrategicaingls2.pdf>>

023 Brasil, 2012. Law No. 12.651/2012. Forest Code. Available at: <[http://www.planalto.gov.br/ccivil\\_03/\\_ato2011-2014/2012/lei/112651.htm](http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2012/lei/112651.htm)>

024 CPI, 2017. Forest and land use policies on private lands: an international comparison. Available at: <<https://climatepolicyinitiative.org/publication/forest-land-use-policies-private-lands-international-comparison/>>

025 MAPA, 2019. Plano Safra. [online] Available at: <<https://www.gov.br/agricultura/pt-br/plano-safra>>

026 DOU: Seção 1. Lei 13.986/2020. Available at: <<http://www.in.gov.br/en/web/dou/-/lei-n-13.986-de-7-de-abril-de-2020-251562807>>

027 MAPA, 2019. Guidelines for the Sustainable Development of Brazilian Agriculture. Available at: <<https://www.gov.br/agricultura/pt-br/assuntos/noticias/semana-verde-na-alemanha/Agendaestrategicaingls2.pdf>>

028 Embrapa Territorial, 2019. CAR: Síntese. Available at: <<https://www.embrapa.br/car/sintese>>

029 Planalto, 2012. Lei 12.651, de 25 de maio de 2012. Available at: <[http://www.planalto.gov.br/ccivil\\_03/\\_Ato2011-2014/2012/Lei/L12651.htm](http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2012/Lei/L12651.htm)>

030 Brasil, 2012. Law No. 12.651/2012. Forest Code. Available at: <[http://www.planalto.gov.br/ccivil\\_03/\\_ato2011-2014/2012/lei/112651.htm](http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2012/lei/112651.htm)>

031 Jung, S., Rasmussen, L.V., Watkins, C., Newton, P. and Agrawal, A., 2017. Brazil's national environmental registry of rural properties: implications for livelihoods. Ecological Economics, 136, pp.53-61.

032 Observatório do Código Florestal. 2020. Portal Do Código Florestal. [online] Available at: <<http://www.portaldocodigoflorestal.org/en/normas/distrito-federal/>> [Accessed 24 April 2020].

033 GVces, 2018. Financiamento Da Recomposição Florestal Com Exploração Econômica Da Reserva Legal. [online] Available at: <<http://www.gvces.com.br/financiament>

to-da-recomposicao-florestal-com-exploracao-economica-da-reserva-legal?locale=pt-br> [Accessed 24 April 2020].

034 GVces, 2018. Financiamento Da Recomposição Florestal Com Exploração Econômica Da Reserva Legal. [online] Available at: <<http://www.gvces.com.br/financiamento-da-recomposicao-florestal-com-exploracao-economica-da-reserva-legal?locale=pt-br>> [Accessed 24 April 2020].

035 Planalto, 2012. Lei 12.651, de 25 de maio de 2012. Available at: <[http://www.planalto.gov.br/ccivil\\_03/\\_Ato2011-2014/2012/Lei/L12651.htm](http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2012/Lei/L12651.htm)>

036 MAPA, 2016. Plano ABC – Agricultura De Baixa Emissão De Carbono. [online] Available at: <<https://www.gov.br/agricultura/pt-br/assuntos/sustentabilidade/plano-abc/plano-abc-agricultura-de-baixa-emissao-de-carbono>> [Accessed 24 April 2020].

037 MAPA, 2019. Plano ABC em Números. [online] Available at: <<https://www.gov.br/agricultura/pt-br/assuntos/sustentabilidade/plano-abc/plano-abc-em-numeros/arquivos/Resumodaadooemitigaodegasesdeefeitosestufapelas-tecnologiasdoPlanoABCPerodo2010a2018nov.pdf>> [Accessed 24 April 2020].

038 Observatório ABC, 2019. Análise dos Recursos do Programa ABC – Safras 2017/18 e 2018/19. [online] Available at: <[http://observatorioabc.com.br/wp-content/uploads/2019/11/Sumario\\_2019-FINAL-Grafica-1.pdf](http://observatorioabc.com.br/wp-content/uploads/2019/11/Sumario_2019-FINAL-Grafica-1.pdf)> [Accessed 06 April 2020].

039 Observatório ABC, 2019. Análise dos Recursos do Programa ABC – Safras 2017/18 e 2018/19. [online] Available at: <[http://observatorioabc.com.br/wp-content/uploads/2019/11/Sumario\\_2019-FINAL-Grafica-1.pdf](http://observatorioabc.com.br/wp-content/uploads/2019/11/Sumario_2019-FINAL-Grafica-1.pdf)> [Accessed 06 April 2020].

040 MAPA, 2012. Plano setorial de mitigação e de adaptação às mudanças climáticas para a consolidação de uma economia de baixa emissão de carbono na agricultura: plano ABC (Agricultura de Baixa Emissão de Carbono) / Ministério da Agricultura, Pecuária e Abastecimento, Ministério do Desenvolvimento Agrário, coordenação da Casa Civil da Presidência da República. – Brasília: MAPA/ACS, 2012. [online] Available at: <<https://www.gov.br/agricultura/pt-br/assuntos/sustentabilidade/plano-abc/arquivo-publicacoes-plano-abc/download.pdf>>

041 ZIMMER, A.H., MACEDO, M.C.M., KICHEL, A.N. and de ALMEIDA, R.G., 2012. Degradação, recuperação e renovação de pastagens. Embrapa Gado de Corte-Documents (INFO-TECA-E) [online] Available at: <<https://www.embrapa.br/busca-de-publicacoes/-/publicacao/951322/degradacao-recuperacao-e-renovacao-de-pastagens>>

042 Embrapa, 2020. Rede ILPF. Available at: <<https://www.embrapa.br/web/rede-ilpf/o-que-e>>

043 Denardin, J.E. Desafio do Plantio Direto. Available at: <<https://www.embrapa.br/busca-de-noticias/-/noticia/9697114/artigo---desafio-do-plantio-direto>>

044 Embrapa, 2020. Biological nitrogen fixation. Available at: <<https://www.embrapa.br/tema-fixacao-biologica-de-nitrogenio/nota-tecnica>>

045 MAPA, 2018. Plano Nacional de Desenvolvimento de Florestas Plantadas (PlantarFlorestas) Available at: <<https://www.embrapa.br/documents/10180/0/Plano+Nacion>

al+de+Desenvolvimento+de+Florestas+Plantadas/90e38846-d556-da1d-0213-dda16a75088e>

046 Rodrigues, R., da CONCEIÇÃO, M.C.G., BIDONE, E., MATOS, E.D.S., CORDEIRO, R. and SELVA, G., 2019. The actions of the Brazilian agricultural sector in the context of climate change negotiations. [online] Available at: <<https://ainfo.cnptia.embrapa.br/digital/bitstream/item/204643/1/The-actions-of-the-Brazilian-agricultural-sector-in-the-context-of-climate-change-negotiations-2019.pdf>>

047 MAPA, 2019. Resumo da adoção e mitigação de gases de efeito estufa pelas tecnologias do Plano ABC – Período 2010 a 2018. Available at: <<https://www.gov.br/agricultura/pt-br/assuntos/sustentabilidade/plano-abc/plano-abc-em-numeros/arquivos/Resumodaadooemitigaodegasesdeefeitosestufapelas-tecnologiasdoPlanoABCPerodo2010a2018nov.pdf>>

048 MAPA, 2019. Resumo da adoção e mitigação de gases de efeito estufa pelas tecnologias do Plano ABC – Período 2010 a 2018. Available at: <<https://www.gov.br/agricultura/pt-br/assuntos/sustentabilidade/plano-abc/plano-abc-em-numeros/arquivos/Resumodaadooemitigaodegasesdeefeitosestufapelas-tecnologiasdoPlanoABCPerodo2010a2018nov.pdf>>

049 Brasil, 2015. República Federativa do Brasil: Pretendida Contribuição Nacionalmente Determinada para Consecução do Objetivo da Convenção Quadro das Nações Unidas sobre Mudança do Clima. [online] Available at: <<https://www.mma.gov.br/images/arquivo/80108/BRASIL%20iNDC%20portugues%20FINAL.pdf>>

050 MAPA, 2019. Plano Safra. [online] Available at: <<https://www.gov.br/agricultura/pt-br/plano-safra>>

051 BCB, 2019. Boletim Derop – novembro 2019. [online] Available at: <<https://www.bcb.gov.br/publicacoes/boletim-derop/01112019>>

052 BCB, 2020. The National Financial System. <https://www.bcb.gov.br/en/financialstability/nationalfinancialsystem>

053 BCB, 2020. Crédito Rural. [online] Available at: <<https://www.bcb.gov.br/estabilidadefinanceira/creditorural>>

054 MAPA, 2019. Plano Safra. [online] Available at: <<https://www.gov.br/agricultura/pt-br/plano-safra>>

055 MAPA, 2019. Plano Safra. [online] Available at: <<https://www.gov.br/agricultura/pt-br/plano-safra>>

056 FIESP, 2017. Sondagem de Mercado. Available at: <[http://icagro.fiesp.com.br/resources/download/1t17/20170124\\_in-dice-de-Confianca-do-Agro-4T2016-VERSAO-APENAS-SONDAGEM-DE-MERCADO.pdf](http://icagro.fiesp.com.br/resources/download/1t17/20170124_in-dice-de-Confianca-do-Agro-4T2016-VERSAO-APENAS-SONDAGEM-DE-MERCADO.pdf)>

057 CNA, Ecoagro Securitizadora, Vaz, Buranello, Shingaki e Oioli, Pinheiro Neto, 2018. Guia dos Títulos do Agronegócio. Available at: <<https://www.cnabrazil.org.br/documentos-tecnicos/guia-dos-titulos-do-agronegocio>>

058 IMF, 2017. Brazil Market Portfolio. Available at: <<https://www.imf.org/en/Publications/WP/Issues/2017/03/10/Brazilian-Market-Portfolio-44738>>

059 B3, 2017. Ativos e Lastros do Agronegócio. Manual do Produto. Available at: <http://www.b3.com.br/data/>

files/85/24/7B/30/0D331610D1820216790D8AA8/Manual-do-Produto-Titulos-do-Agronegocio.pdf

060 UQBAR, 2020. Uqbar CRA Yearbook. Available at: <<https://www.uqbar.com.br/anuarios-2020-area-de-down-load/>>

061 UQBAR, 2020. FIDC Uqbar Yearbook. [online] Available at: <<https://www.uqbar.com.br/anuarios-2020-area-de-down-load/>>

062 MME, 2019. Ministro Assina Portaria que Autoriza Utilização de Debentures Incentivadas Pelo Setor de Petróleo, Gás e Biocombustíveis. [online] Available at: <[http://www.mme.gov.br/web/guest/todas-as-noticias/-/asset\\_publisher/pdAS9lcdBICN/content/ministro-assina-portaria-que-autoriza-utilizacao-de-debentures-incentivadas-pelo-setor-de-petroleo-gas-e-biocombustiv-1?inheritRedirect=false&redirect=http%3A%2F%2Fwww.mme.gov.br%2Fweb%2Fguest%2Ftodas-as-noticias%3Fp\\_id%3D101\\_INSTANCE\\_pdAS9lcdBICN%26p\\_p\\_lifecycle%3D0%26p\\_p\\_state%3Dnormal%26p\\_p\\_mode%3Dview%26p\\_p\\_col\\_id%3Dcolumn-1%26p\\_p\\_col\\_count%3D1%26\\_101\\_INSTANCE\\_pdAS9lcdBICN\\_cur%3D8%26\\_101\\_INSTANCE\\_pdAS9lcdBICN\\_keywords%3D%26\\_101\\_INSTANCE\\_pdAS9lcdBICN\\_advancedSearch%3Dfalse%26\\_101\\_INSTANCE\\_pdAS9lcdBICN\\_delta%3D30%26p\\_r\\_p\\_564233524\\_resetCur%3Dfalse%26\\_101\\_INSTANCE\\_pdAS9lcdBICN\\_andOperator%3Dtrue](http://www.mme.gov.br/web/guest/todas-as-noticias/-/asset_publisher/pdAS9lcdBICN/content/ministro-assina-portaria-que-autoriza-utilizacao-de-debentures-incentivadas-pelo-setor-de-petroleo-gas-e-biocombustiv-1?inheritRedirect=false&redirect=http%3A%2F%2Fwww.mme.gov.br%2Fweb%2Fguest%2Ftodas-as-noticias%3Fp_id%3D101_INSTANCE_pdAS9lcdBICN%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-1%26p_p_col_count%3D1%26_101_INSTANCE_pdAS9lcdBICN_cur%3D8%26_101_INSTANCE_pdAS9lcdBICN_keywords%3D%26_101_INSTANCE_pdAS9lcdBICN_advancedSearch%3Dfalse%26_101_INSTANCE_pdAS9lcdBICN_delta%3D30%26p_r_p_564233524_resetCur%3Dfalse%26_101_INSTANCE_pdAS9lcdBICN_andOperator%3Dtrue)>

063 CBI, 2020. Data as of 31 Dezember 2019.

064 IFC, 2016. Climate Investment Opportunities in Emerging Markets: An IFC Analysis [online] Available at: <[https://www.ifc.org/wps/wcm/connect/59260145-ec2e-40de-97e6-3aa78b82b3c9/3503-IFC-Climat\\_Investment\\_Opportunity-Report-Dec-FINAL.pdf?MOD=AJPERES&CVID=IBLd6Xq](https://www.ifc.org/wps/wcm/connect/59260145-ec2e-40de-97e6-3aa78b82b3c9/3503-IFC-Climat_Investment_Opportunity-Report-Dec-FINAL.pdf?MOD=AJPERES&CVID=IBLd6Xq)>

065 GVces, 2018. Financiamento Da Recomposição Florestal Com Exploração Econômica Da Reserva Legal. [online] Available at: <<http://www.gvces.com.br/financiamento-da-recomposicao-florestal-com-exploracao-economica-da-reserva-legal?locale=pt-br>> [Accessed 24 April 2020].

066 <https://www.mordorintelligence.com/industry-reports/latin-america-biopesticide-market>

067 Observatorio ABC, 2017. Impactos econômicos e ambientais do Plano ABC. [online] Available at: <<http://observatorioabc.com.br/wp-content/uploads/2017/09/Relatorio5-Completo.pdf>>

068 Observatorio ABC, 2017. Impactos econômicos e ambientais do Plano ABC. [online] Available at: <<http://observatorioabc.com.br/wp-content/uploads/2017/09/Relatorio5-Completo.pdf>>

069 COPPE, 2016. Emissão de Gases de Efeito Estufa-2050: Implicações Econômicas e Sociais do Cenário de Plano Governamental. [online] Available at: <[http://www.centroclima.coppe.ufrj.br/images/documentos/ies-brasil-2050/2\\_-\\_Cenario\\_de\\_Emiss%C3%B5es\\_de\\_GEE\\_-\\_Setor\\_de\\_Agricultura\\_Floresta\\_e\\_Outros\\_Usos\\_da\\_Terra\\_-\\_IES\\_Brasil\\_2050.pdf](http://www.centroclima.coppe.ufrj.br/images/documentos/ies-brasil-2050/2_-_Cenario_de_Emiss%C3%B5es_de_GEE_-_Setor_de_Agricultura_Floresta_e_Outros_Usos_da_Terra_-_IES_Brasil_2050.pdf)>

070 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at:

<<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

071 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

072 EPE, 2018. Investimentos e Custos Operacionais e de Manutenção no Setor de Biocombustíveis: 2018-2020. [online] Available at: <[http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-343/topico-449/Investimentos\\_Custos\\_O\\_e\\_M\\_Bios\\_2018-2030.pdf](http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-343/topico-449/Investimentos_Custos_O_e_M_Bios_2018-2030.pdf)>

073 <https://www.gov.br/agricultura/pt-br/assuntos/politica-agricola/outras-publicacoes/plano-nacional-de-desenvolvimento-de-florestas-plantadas.pdf/view>

074 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

075 <http://www.gvces.com.br/financiamento-da-recomposicao-florestal-com-exploracao-economica-da-reserva-legal?locale=pt-br>

076 OECD-FAO, 2019. OECD-FAO Agricultural Outlook 2019-2028. [online] Available at [https://www.oecd-ilibrary.org/agriculture-and-food/oecd-fao-agricultural-outlook-2019-2028\\_agr\\_outlook-2019-en](https://www.oecd-ilibrary.org/agriculture-and-food/oecd-fao-agricultural-outlook-2019-2028_agr_outlook-2019-en)

077 MAPA, 2019. Apresentação Retrospectiva 2019 -MAPA. Available at: <<https://www.gov.br/agricultura/pt-br/assuntos/noticias/ministra-viajara-a-india-em-janeiro-para-tratar-de-parcerias-no-setor-de-etanol/apresentacaoretrospectiva2019.pdfversofinal1.pdf/view>>

078 TNC, Agroicone, 2019. Incentives for Sustainable Soy in the Cerrado. Available at: <<http://www.agroicone.com.br/portfolio/e-possivel-cultivar-a-soja-sem-desmatar-o-cerrado/>>

079 Business Wire, Global Biofertilizers Market Analysis, Trends, And Forecasts 2020-2025 - Researchandmarkets. Com. [online] Businesswire.com. Available at: <<https://www.businesswire.com/news/home/20200128005546/en/Global-Biofertilizers-Market-Analysis-Trends-Forecasts-2020-2025>> [Accessed 24 April 2020]

080 Fortune Business Insights, 2019. Biopesticides Market Size Analysis, Global Trend Forecast 2025. [online] Available at: <<https://www.fortunebusinessinsights.com/industry-reports/biopesticides-market-100073>> [Accessed 09 April 2020].

081 Embrapa, 2019. Biological control in Brazil has potential to grow 20% a year. [online] Available at: <<https://www.embrapa.br/busca-de-noticias/-/noticia/45574867/controlo-biologico-no-brasil-tem-potencial-de-crescer-20-ao-ano>>

082 ABIEC, 2019. Beef Report. Brazilian Livestock Profile. Available at: <http://www.brazilianbeef.org.br/download/sumarioingles2019.pdf>

083 INPUT, 2016. Visão de longo prazo para a pecuária brasileira. Available at: <https://www.inputbrasil.org/wp-content/>

<http://www.brazilianbeef.org.br/download/sumarioingles2019.pdf>

084 ABIEC, 2019. Beef Report. Brazilian Livestock Profile. Available at <http://www.brazilianbeef.org.br/download/sumarioingles2019.pdf>

085 ABIEC, 2019. Beef Report. Brazilian Livestock Profile. Available at <http://www.brazilianbeef.org.br/download/sumarioingles2019.pdf>

086 ABIEC, 2019. Beef Report. Brazilian Livestock Profile. Available at <http://www.brazilianbeef.org.br/download/sumarioingles2019.pdf>

087 ILPF, 2016. ILPF em Números. Available at <https://www.embrapa.br/documents/1354377/2540596/ILPF+em+N%C3%BAmoros/e69a817a-fdc9-c105-3f81-4dc209509a5b>

088 ILPF, 2016. ILPF em Números. Available at <https://www.embrapa.br/documents/1354377/2540596/ILPF+em+N%C3%BAmoros/e69a817a-fdc9-c105-3f81-4dc209509a5b>

089 Embrapa, 2019. Estudo revela por que sistemas de Integração Lavoura-Pecuária emitem menos óxido nítrico. Available at: <<https://www.embrapa.br/busca-de-noticias/-/noticia/45216327/estudo-revela-por-que-sistemas-de-integracao-lavoura-pecuaria-emitem-menos-oxido-nitroso?link=agencia>>

090 EMBRAPA, 2010. Custo da implantação de sistemas de produção silvipastoris em São Carlos. Available at: <<https://ainfo.cnptia.embrapa.br/digital/bitstream/item/102883/1/PROCI-2010.00297.pdf>>

091 USDA 2019. Brazil Reports. Available at: <<http://www.usdbrazil.org.br/pt-br/relatorios/>>

092 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

093 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

094 Brasil, 2015. República Federativa do Brasil: Pretendida Contribuição Nacionalmente Determinada para Consecução do Objetivo da Convenção Quadro das Nações Unidas sobre Mudança do Clima. [online] Available at: <<https://www.mma.gov.br/images/arquivo/80108/BRASIL%20iNDC%20portugues%20FINAL.pdf>>

095 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

096 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at:

<<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

097 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

098 EPE, 2017. Recursos Energeticos 2050. Available at: <[http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-227/topico-416/NT04%20PR\\_RecursosEnergeticos%202050.pdf](http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-227/topico-416/NT04%20PR_RecursosEnergeticos%202050.pdf)>

099 Absolar, 2020. Energia Fotovoltaica no Setor Rural. Available at: <<http://www.absolar.org.br/noticia/noticias-externas/energia-fotovoltaica-no-setor-rural.html>>

100 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

101 EPE, 2014. Inventário Resíduos Rurais. Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-251/topico-308/DEA%2015%20-%2014%20-%20%20Invent%C3%A1rio%20Energ%C3%A9tico%20de%20Res%C3%ADduos%20Rurais%5B1%5D.pdf>>

102 EPE, 2017. Recursos Energeticos 2050. [http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-227/topico-416/NT04%20PR\\_RecursosEnergeticos%202050.pdf](http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-227/topico-416/NT04%20PR_RecursosEnergeticos%202050.pdf)

103 Abiogás, 2020. Sobre nos. Available at: <<https://abiogas.org.br/sobre-nos/>>

104 Abiogás, 2020. Sobre nos. Available at: <<https://abiogas.org.br/sobre-nos/>>

105 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

106 Brasil, 1999. Ethanol Blending Mandate. Law 8.723 of 28 October 1993. Available at: <[http://www.planalto.gov.br/ccivil\\_03/LEIS/L8723.htm](http://www.planalto.gov.br/ccivil_03/LEIS/L8723.htm)>

107 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

108 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>.

109 FAPESP, 2013. Plano de Voo para Biocombustíveis de Aviação no Brasil: Plano de Ação. Available at: <<http://www.fapesp.br/publicacoes/plano-de-voo-biocombustiveis-brasil-pt.pdf>>



- 110 MME, 2019. Renovabio. Available at: <<http://www.mme.gov.br/web/guest/secretarias/petroleo-gas-natural-e-biocombustiveis/acoas-e-programas/programas/renovabio>>
- 111 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>
- 112 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>
- 113 CBI, 2020. Certified Bonds. Available at: <<https://www.climatebonds.net/certification/certified-bonds>>
- 114 SFB, 2019. Brazilian Forests at Glance. Available at: <<http://www.florestal.gov.br/documentos/publicacoes/4262-brazilian-forests-at-a-glance-2019/file>>
- 115 IBA, 2019. Annual Report 2019. Available at: <<https://iba.org/datafiles/publicacoes/relatorios/iba-relatorioanual2019.pdf>>
- 116 IBA, 2019. Annual Report 2019. Available at: <<https://iba.org/datafiles/publicacoes/relatorios/iba-relatorioanual2019.pdf>>
- 117 SFB, 2019. Brazilian Forests at Glance. Available at: <<http://www.florestal.gov.br/documentos/publicacoes/4262-brazilian-forests-at-a-glance-2019/file>>
- 118 IBA, 2019. Annual Report 2019. Available at: <<https://iba.org/datafiles/publicacoes/relatorios/iba-relatorioanual2019.pdf>>
- 119 IBA, 2019. Annual Report 2019. Available at: <<https://iba.org/datafiles/publicacoes/relatorios/iba-relatorioanual2019.pdf>>
- 120 IBA, 2019. Setor Florestal Investe R\$32,6 bilhões até 2023. Available at: <<https://iba.org/setor-florestal-investe-r-32-6-bilhoes-ate-2023>>
- 121 IBA, 2019. Annual Report 2019. Available at: <<https://iba.org/datafiles/publicacoes/relatorios/iba-relatorioanual2019.pdf>>
- 122 IBA, 2019. Annual Report 2019. Available at: <<https://iba.org/datafiles/publicacoes/relatorios/iba-relatorioanual2019.pdf>>
- 123 SFB, 2019. Brazilian Forests at Glance. Available at: <<http://www.florestal.gov.br/documentos/publicacoes/4262-brazilian-forests-at-a-glance-2019/file>>
- 124 CPI, 2016. Available at [https://www.inputbrasil.org/wp-content/uploads/2016/07/PAPER\\_Infraestrutura\\_CPI\\_Final.pdf](https://www.inputbrasil.org/wp-content/uploads/2016/07/PAPER_Infraestrutura_CPI_Final.pdf)
- 125 MInfra, 2018. Caderno de Transportes. Available at: <[https://www.infraestrutura.gov.br/images/BIT\\_TESTE/Publica%C3%A7oes/Transportes\\_2018.pdf](https://www.infraestrutura.gov.br/images/BIT_TESTE/Publica%C3%A7oes/Transportes_2018.pdf)>
- 126 CNI, 2016. O Financiamento Do Investimento Em Infraestrutura No Brasil: Uma Agenda Para Sua Expansão Sustentada. Available at: <[http://arquivos.portaldaindustria.com.br/app/conteudo\\_18/2016/07/18/11404/1807-EstudoFinanciamento-dolInvestimentoemInfraestrutura.pdf](http://arquivos.portaldaindustria.com.br/app/conteudo_18/2016/07/18/11404/1807-EstudoFinanciamento-dolInvestimentoemInfraestrutura.pdf)>
- 127 EPL, 2018. Plano Nacional de Logística. Available at: <<https://www.epl.gov.br/rede-georeferenciada-pnl-2021>>
- 128 EPL, 2018. Plano Nacional de Logística. Available at: <<https://www.epl.gov.br/rede-georeferenciada-pnl-2021>>
- 129 Apex, 2019. Apex Investment Guide to Brazil 2019. Available at: <<https://portal.apexbrasil.com.br/wp-content/uploads/2019/11/investment-guide-to-brazil-2019.pdf>>
- 130 PPI, 2020. Infrastructure Projects. Available at: <<https://www.ppi.gov.br/projetos1#/s/Em%20andamento/u/e//m//r/>>
- 131 CBI, 2020. Transport Criteria. Available at: <<https://www.climatebonds.net/standard/transport>>
- 132 MME, EPE, 2019. Plano Decenal de Expansão de Energia 2029 / Ministério de Minas e Energia. Empresa de Pesquisa Energética. Brasília: MME/EPE, 2020. [online] Available at: : <<http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/Documents/PDE%202029.pdf>>
- 133 Machado Mayer Advogados, julho 2019. Available at: <<https://www.machadomayer.com.br/pt/inteligencia-juridica/publicacoes-ij/financiamento-de-projetos-e-infraestrutura-ij/perspectivas-para-o-financiamento-de-infraestrutura-no-brasil>>
- 134 CBI, 2019. Green Infrastructure Investment Opportunities in Brazil. Available at: <[https://www.climatebonds.net/files/reports/cbi\\_giio\\_2019\\_02c\\_0.pdf](https://www.climatebonds.net/files/reports/cbi_giio_2019_02c_0.pdf)>
- 135 MAPA, 2019. Guidelines for the Sustainable Development of Brazilian Agriculture. Available at: <<https://www.gov.br/agricultura/pt-br/assuntos/noticias/semana-verde-na-alemanha/Agendaestrategicaingls2.pdf>>



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