

Decarbonization of Agribusiness

Ways to reduce emissions
and promote sustainability

October 2025



Technical Information Sheet - **Decarbonization of Agribusiness:
Ways to reduce emissions and promote sustainability**

© 2025 Brazilian Business Council for Sustainable Development (CEBDS). All rights reserved.

Study conceived and coordinated by the **Brazilian Business Council for Sustainable Development (CEBDS)**, with technical support from the **Boston Consulting Group (BCG)**.

CEBDS:

Marina Grossi | President
Alessandra Fajardo | Executive Technical Director
Daniela Mignani | Executive Corporate Director

Technical Team:

Juliana Lopes | Technical Director for Nature and Society
Anderson Ignácio | Technical Manager for Nature and Society
Marina Tiopisto | Project Manager
Carla Gheler | Agro-Food Systems Coordinator
Gabriella Marinho | Technical Analyst for Nature-Based Solutions

Communications Team:

Philippe Deschamps | Communications Manager
Joice Coletti | Communications and Press Relations Coordinator
Renata Pinheiro | Communications, Marketing, and Events Coordinator
Arianny Dias | Communications, Marketing, and Events Analyst
Josilene Rocha | Communications and Press Relations Analyst
Lucas Guimarães | Communications, Marketing, and Events Analyst

Institutional Relations Team:

Sueli Mendes | Institutional Relations Manager
Pedro Augusto | Institutional Relations and Fundraising Coordinator
Raquel Pereira | Institutional Relations Analyst
João Santiago | Data and Institutional Relations Intern

Coalition Member Companies:

AMAGGI | BAYER | CITROSUCO | NESTLÉ | SYNGENTA | TEREOS

Other intellectual property rights belong to **CEBDS, BCG**, the participating associations, and supporting companies.

YEAR: 2025

CEBDS Social Media:

cebds.org
Facebook.com/CEBDSBR
Twitter.com/CEBDS
Youtube.com/CEBDSBR
Instagram.com/cebdsbr
linkedin.com/cebds

CEBDS Address:

BQ Escritórios – Rua São José, 40, 3rd floor – Centro – Rio de Janeiro, RJ
ZIP Code: 20010-020
Phone: +55 (21) 2483-2250
E-mail: cebds@cebds.org

Suggested citation:

**CEBDS – Brazilian Business Council for Sustainable Development. Decarbonization of Agribusiness:
Ways to reduce emissions and promote sustainability**
Rio de Janeiro, October 2025.

INTRODUCTION

By Marina Grossi

President of CEBDS and Special Envoy for the Business Sector to COP30

Critical minerals are one of today's main pillars of the global energy transition. Elements such as lithium, nickel, copper, niobium, and rare earths underpin the production of batteries, electric vehicles, wind turbines, and digital technologies that are essential for decarbonization.

In this context, Brazil holds a strategic position. The country combines vast diversity and volume of mineral reserves, a predominantly renewable energy matrix, and well-established technical institutions. This combination grants the Brazilian mining sector the ability to produce critical inputs with lower carbon intensity, transparency, and traceability — attributes increasingly demanded by global value chains.

With this purpose, and at the invitation of Ambassador André Corrêa do Lago, President of COP30, CEBDS coordinated the **Business Coalition on Critical Minerals**, in partnership with **Vale** and **IBRAM**.

The initiative brought together **25 companies and associations** in a collaborative effort that outlines a **national strategy for a transition to low-carbon mining**, with concrete goals and instruments.

The study shows that the sector can **reduce up to one-third of its direct emissions by 2035** by expanding the use of clean energy, electrifying processes, and adopting operational efficiency technologies. It also highlights pathways to consolidate Brazil as a **reliable supplier of critical minerals**, adding value to production while ensuring alignment with international standards of sustainability and environmental governance.

More than a diagnosis, this Coalition represents a **business commitment to the future of the mining sector**. It embodies the convergence of competitiveness, legitimacy, and innovation, recognizing that Brazil's mineral leadership will depend on the coherence between productivity, climate action, and social governance.

It is about turning a **natural advantage into effective climate leadership**, contributing to a global transition based on value, transparency, and cooperation.

Agenda

1.	COVER LETTER.....	7
2.	EXECUTIVE SUMMARY.....	8
3.	CONTEXT.....	9
4.	STARTING POINT AND PROJECTION.....	14
5.	LEVERS AND OPTIMAL PATHWAY.....	20
6.	PRIORITIZATION OF LEVERS.....	30
7.	FINANCING AND ENABLERS.....	36



1. Cover Letter

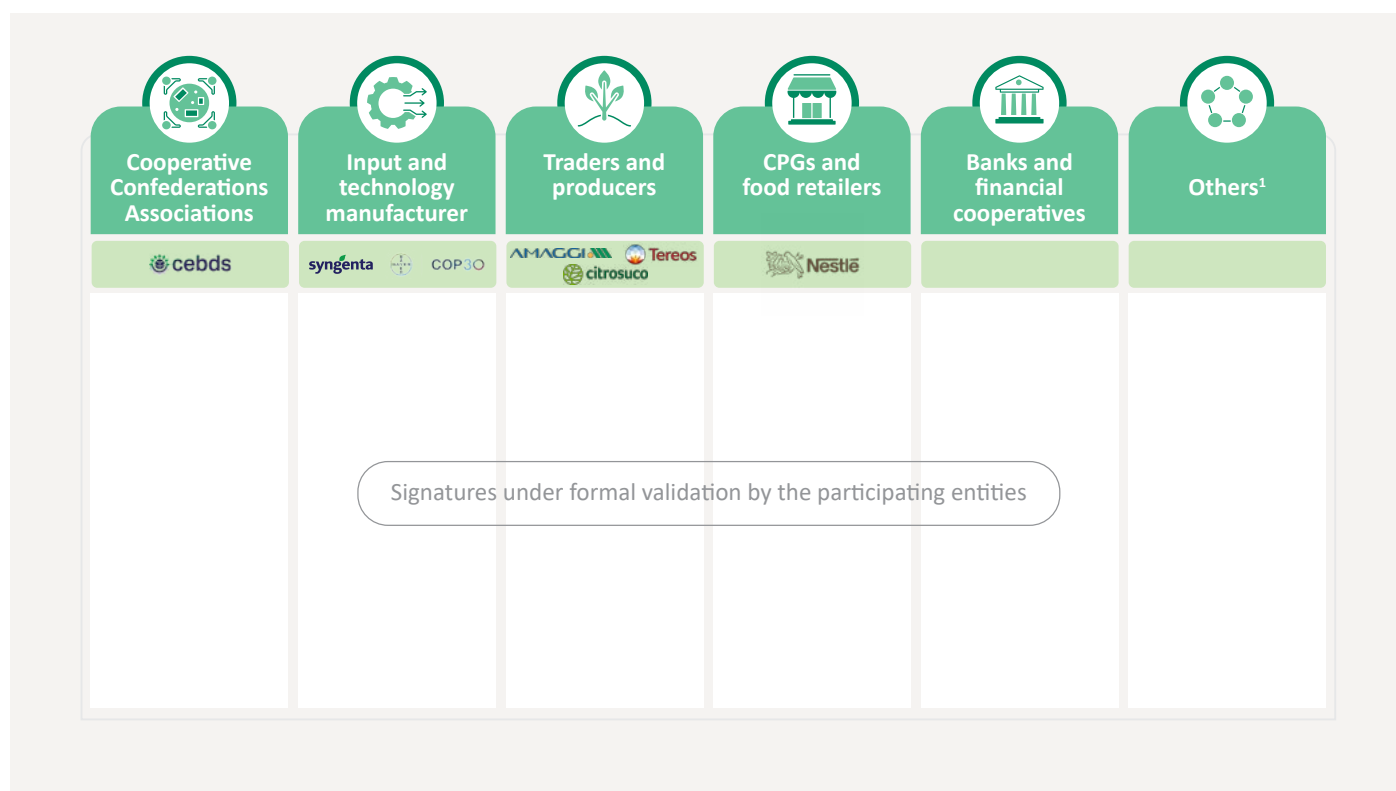
The **Agribusiness Coalition** is composed of more than 40 entities spanning the entire agricultural value chain, including producers, traders, input and technology manufacturers, associations, confederations, and cooperatives, as well as consumer goods companies, banks and credit cooperatives, academic institutions, think-tanks, and research centers. Its activities began in July 2025 with the goal of enhancing the influence of agribusiness in discussions and initiatives related to climate issues. Organized by the Brazilian Business Council for Sustainable Development (CEBDS), the initiative aims to create a cohesive plan to address climate challenges and provide essential technical and strategic inputs for discussions at COP30.

This collaborative effort will culminate in the creation of a report that integrates the various topics and perspectives discussed at listening sessions. This report will be used to draft a coherent plan for the sector's decarbonization by 2050. The final result will be delivered directly to the office of the presidency of COP30 in October 2025.

Participating entities:

- Involvement of **+40 highly influential entities** and companies in the agribusiness chain
- Active leadership of **6 co-leader entities**, representing the various links in the agribusiness chain
- Engagement of **+5 academic entities** throughout the report development process
- **+30 meetings and more than 50 hours have been devoted** to discussing various topics related to setting a baseline for emissions, identifying strategic levers, and considering capital/enablers

The Coalition mobilized 40+ entities from the entire industry chain



1. Public and multilateral institutions/Research centers.

2. Executive Summary

The updated Brazilian NDC, coupled with the upcoming COP30, offers a pivotal moment for the nation to assert global leadership in advancing decarbonization strategies. Agribusiness assumes a central role in this scenario, **responsible for nearly 30% of Brazil's net CO₂e emissions (~480 MtCO₂e), with livestock farming alone accounting for ~94% of that total.**

The **expected growth of agribusiness** by 2050 **magnifies the challenge and underscores the importance of maintaining momentum in decarbonization.** It is estimated that, in an **inertial scenario**, the total **net emissions** of the sector in 2050 could reach **~650 MtCO₂e** (+37% vs. 2023) and in an **inaction scenario** net emissions could total **~790 MtCO₂e in 2050** (+66% vs. 2023).

Given the scale of this challenge, coordinated mobilization of the agribusiness sector under a concrete and unified strategy is essential. To this end, **CEBDS, with the support of the co-leaders Amaggi, Nestlé, Syngenta, Tereos, Bayer and Citrosuco**, facilitated the creation of a **coalition composed of over 40 entities throughout the agribusiness chain** (associations, cooperatives, confederations, input/technology manufacturers, traders, producers, CPGs, banks, financial entities, institutes, etc.) in an effort to build a unified proposal for the decarbonization of the sector.

Building on established solutions and technologies (*e.g.*, ABC+ Plan), along with input from participating organizations, 15 key levers for regenerative and low-carbon agriculture were identified. These were grouped into landscape transformation and complementary levers, and prioritized based on investment required per MtCO₂e mitigated in an effort to mitigate financial stress for producers. Despite the need for initial investment, levers have a **positive financial return and increase producer competitiveness.**

Landscape transformation levers have the potential to mitigate 160~210 MtCO₂e in 2050, reaching a net emissions baseline of 580~630 MtCO₂e. Additionally, complementary levers mitigate 350~420 MtCO₂e in 2050, resulting in a net-zero emissions gap in 2050 of 160~280 MtCO₂e. 80% of the total mitigation potential is derived from: no-till and cover crop systems, integrated crop-livestock-forestry systems, increasing high-productivity pasture area, and boosting cattle productivity.

Addressing this gap to net zero will require both the exploration of levers that are still in their infancy (*e.g.*, supplements to reduce enteric fermentation) but expected to mature, and increased penetration of existing levers (*e.g.*, increase pasture recovery target).

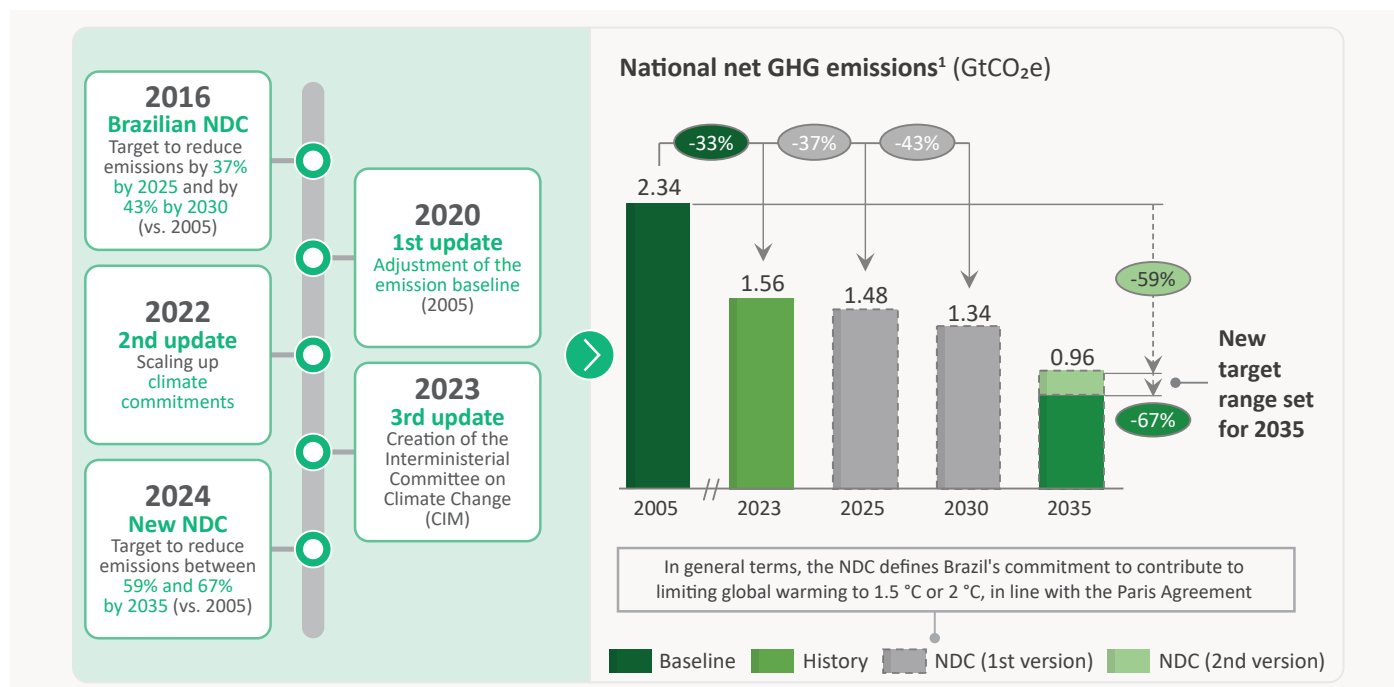
Given the scale of the challenge, USD 130~180 B of capital will be needed under the right conditions (subsidized rates, grace period, and extended timelines) to enable quantified levers by 2050. Taking into account current funds that are available on a regular or occasional basis aimed at decarbonizing the sector (with the Plano Safra (Harvest Plan) and Ecoinvest being the most representative initiatives at ~80%) and its **projection that by 2050 (USD 70~190 B) the investment gap required for net zero in 2050** could top more than **USD ~100 B.**

The gap is reduced through **seven potential solutions** divided between **enablers** (1. Increase catalytic capital earmarked for decarbonization efforts; 2. Ensure greater accessibility to catalytic capital; 3. Intensify direct support to producers; 4. Promote R&D of decarbonization techniques/technologies) and related incentive mechanisms; (5. Benefit producers who adopt regenerative practices; 6. Recognize the natural and biodiversity assets of producers; 7. Regulate and consolidate the carbon market).

Considering this, Brazilian agribusiness plays a leading role as part of the country's climate solution. Through regenerative agriculture, the sector can achieve net-zero emissions by 2050, delivering environmental benefits while also enhancing food security for rural producers.

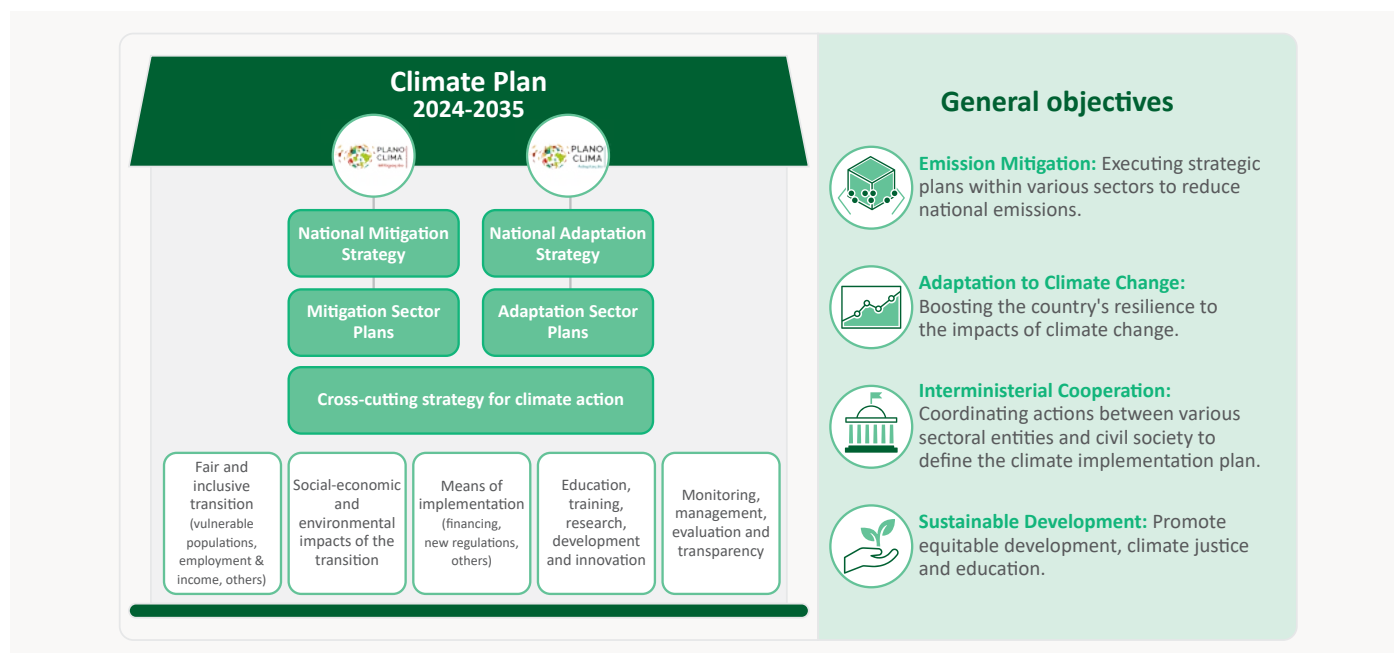
3. Context

The increasing ambition of NDCs requires intensified national efforts to achieve deeper emissions reductions



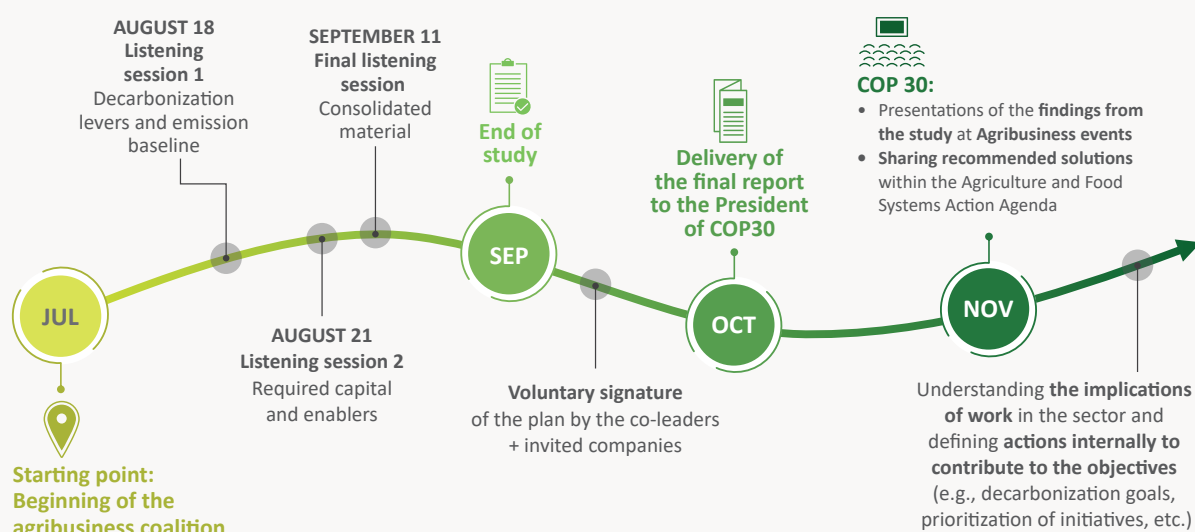
1. SEEG database, adding emissions not considered in the national inventory.
Source: Gov.br; WWF Brasil, SEEG.

To comply with the NDCs, the climate plan proposes sectoral actions for climate adaptation and mitigation



Source: Gov.br.

Against this backdrop, and drawing on a range of public and sector-specific sources, the coalition formulated a comprehensive decarbonization strategy for Brazil's agribusiness sector, outlined in the pages that follow. The construction process involved the active participation of various industry stakeholders throughout the entire period, helping to make sure everyone's views were heard and incorporated into a unified proposal representing the industry as a whole.



The Greenhouse Gas Emissions and Removals Estimation System (SEEG), led by IPAM, Imaflora, IEMA, and ICLEI, was used as a quantitative benchmark to define starting points, assess impacts, and guide decarbonization strategies for the sector, in alignment with other sectoral coalitions (e.g., Transportation, Mining).



The Greenhouse Gas Emissions and Removals Estimation System (SEEG)

- Considered one of the **largest gas emissions databases** in the world, covering five sectors – **agriculture and livestock, energy, land use change, industrial processes and waste**
- The **data is detailed down to the municipal level**, and there is more than **30 years of historical information available**
- Coordinated by **4 member institutions of the Climate Observatory: IPAM¹, IMAFLORA², IEMA³, ICLEI⁴**



Incorporation of **removals**, a particularly relevant amount in the **agricultural sector** (vs. other sectors).



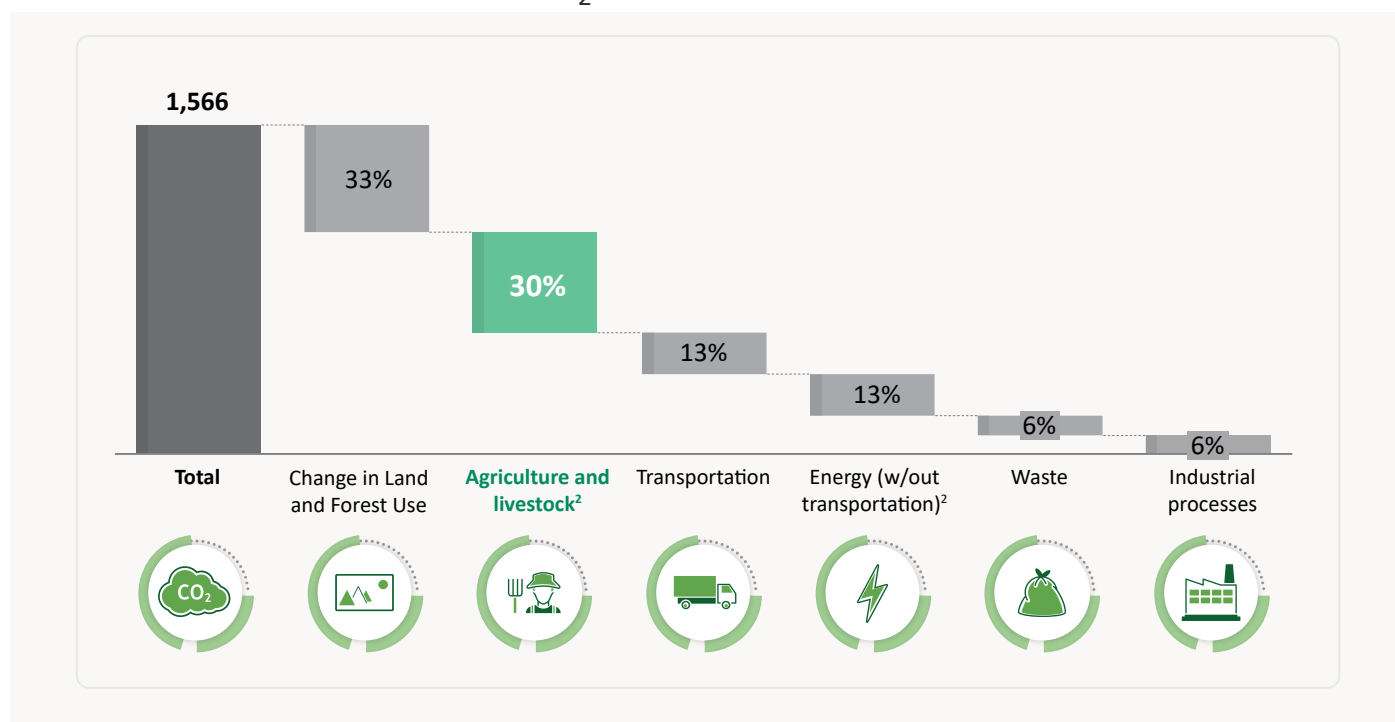
Consistency with **other sectoral coalitions, who also used SEEG as a basis** (e.g., Transportation, Mining)



In alignment with **detailed and comprehensive studies, such as the NDC submission prepared by the Climate Observatory, SEEG, Imaflora, Iema, WWF, Talanoa, among other partners⁵**

1. Amazon Environmental Research Institute; 2. Institute for Forest and Agricultural Management and Certification; 3. Institute of Energy and Environment; 4. Local Governments for Sustainability.

Net emissions in Brazil (MtCO₂e¹, 2023)



1. Methodology adopted: GWP-AR5; 2. Energy emissions for the agricultural sector were equally allocated between agriculture and livestock.
Source: SEEG, BCG analysis.

It should be pointed out there are still discussion on accounting for emissions and removals from agribusiness active, which are expected to produce important updates in the coming years:

- Current emission factors are primarily derived from temperate climate models, raising concerns about their accuracy and relevance when applied to Brazil's tropical conditions
- However, accounting for removals is also crucial for determining the impact of the sector on the accumulation of greenhouse gases in the atmosphere
- New studies are expected to indicate substantial changes in the baseline considered, which changes starting and ending points (such as net zero or even net negative)
- **Nevertheless, this change is not expected to significantly shift the mitigation trajectory (i.e., which levers to implement, along with their associated impact and cost)**

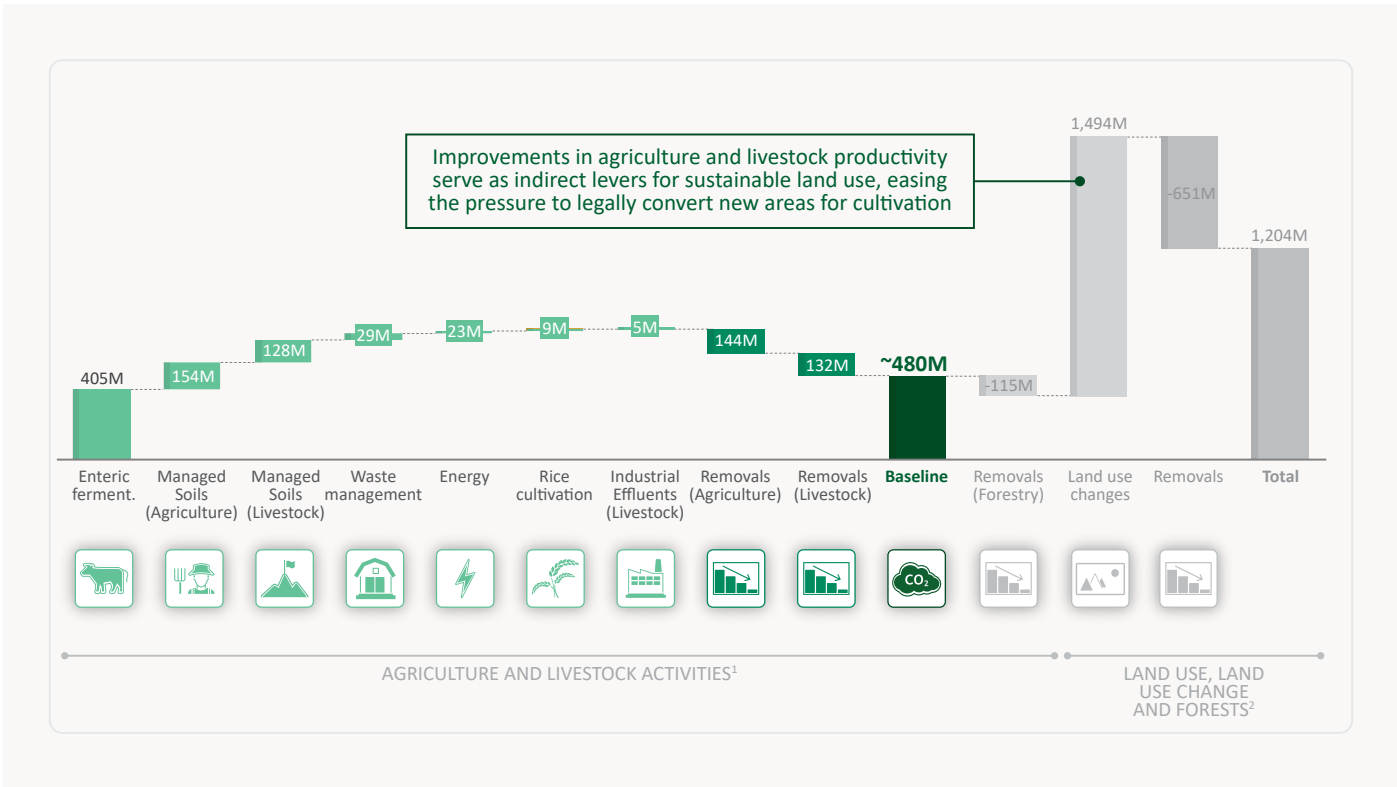
Agribusiness
accounts for **~30%**
of Brazil's net CO₂e
emissions
(~480 MtCO₂e)



4. Starting Point and Projection

The current baseline of greenhouse gas emissions related to agriculture and livestock activities, estimated at 480 MtCO₂e in 2023, was established using the SEEG methodology and considers both emissions and removals of greenhouse gases. Forestry was not included, as this portion of emissions will be addressed as part of the Forest Coalition discussions. Emissions from land use changes were also not considered, because the levers and production techniques considered (e.g., regenerative and low-carbon agriculture) have only an indirect impact by reducing the pressure for the legal opening of new areas (for example, by increasing the productivity of already open lands).

SEEG: National emissions for agriculture and livestock (MtCO₂e, 2023)



1. SEEG includes sources not accounted for in the National Inventory, such as emissions and removals due to soil carbon variation (pastures, no-till system (NTS), integrated crop-livestock-forestry (ICLF) systems, and planted forests), as well as pasture burning. Emissions from fuel use and livestock effluents are originally allocated to the energy and waste categories; 2. Includes land use change only related to agriculture and livestock, SEEG methodology considers annual transitions and evaluates the carbon stock of each MapBiomass native vegetation class by biome, in addition to including fires not associated with deforestation.
Source: SEEG, BCG analysis.

Emissions were projected according to MAPA projections by 2033 for tons produced, productivity and static agricultural area. Growth trends by 2033 were extrapolated by 2050 for the purposes of this study.

Agriculture: Methodology for projecting gross emissions by 2050 based on data from SEEG, FAOSTAT and MAPA

Category	Subcategory	Historical data	Projection data	Rationale for projecting emissions
Input (47%)¹	- Synthetic fertilizers - Liming	SEEG: emissions (tCO₂e) per input use from 2005 to 2023. FAOSTAT: total cultivated area (ha) from 2005 to 2023. EMBRAPA/ABRACAL: apparent consumption of fertilizer and lime in the country from 2005 to 2023.	MAPA: CAGR per year of total cultivated area (ha) up to 2034. ²	Projected emissions due to the expansion of cultivated area, assuming that input application rates per hectare and emissions per hectare remain constant.³
Managed Soils (28%)	- Waste: Rice; Soybean; Corn; Sugarcane; other crops - Mineralization of N in the soil. - Organic soils - Organic fertilizers	SEEG: emissions (tCO₂e) per product and category from 2005 to 2023. FAOSTAT: production (t) per agricultural product from 2005 to 2023.	MAPA: CAGR per year of production (t) per crop up to 2034. ²	- Emissions projected by the increase in production per crop. Constant emission factors (tCO₂e/t crop). Other crops were forecasted using the category's emissions CAGR. Constant emissions over the last 10 years. - Projected emissions with the CAGR of sugarcane production.
Rice cultivation (11%)	Flood-irrigated farming	SEEG: historical emissions (tCO₂e) FAOSTAT: rice planting area from 2005 to 2023.	MAPA: CAGR per year of total cultivated area (ha) up to 2034. ²	Projected emissions with an increase in the area of rice cultivation. Constant emission factor (tCO₂e/ha).
Energy (16%)	Cultivation of fuel	SEEG: historical emissions (tCO₂e) FAOSTAT: rice planting area from 2005 to 2023.	MAPA: CAGR per year of total cultivated area (ha) up to 2034. ²	Projected emissions with the CAGR of total production.

Note: 1. Percentages of emissions by category in 2022.; 2. Cultivated area projections were extended to 2050, incorporating a 0.1% yearly reduction in the growth rate, reflecting the constraint of diminishing land availability for agriculture.; 3. Latest data points of the factors.

Source: BCG analysis.

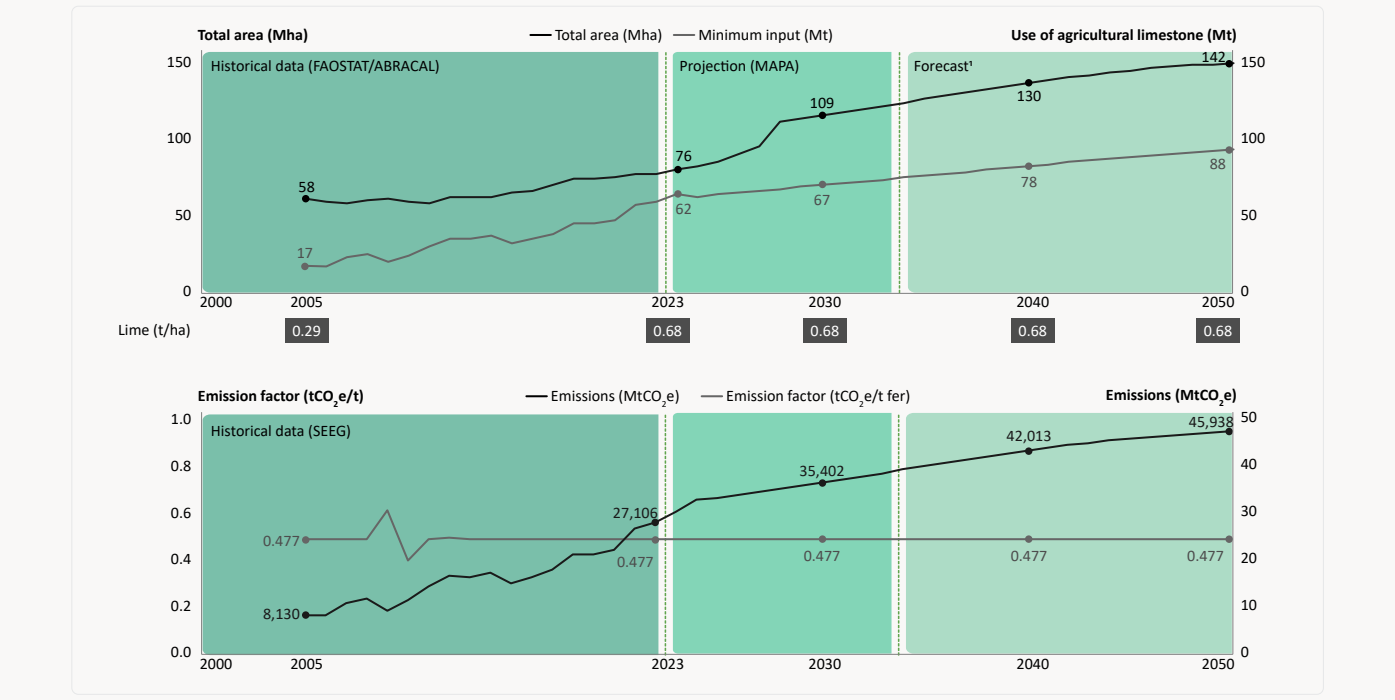
Deep-dive: Emissions that result from the use of urea and nitrogen-based fertilizers



Note: 1. Cultivated area projections were extended to 2050, incorporating 0.1% annual reduction in the CAGR.

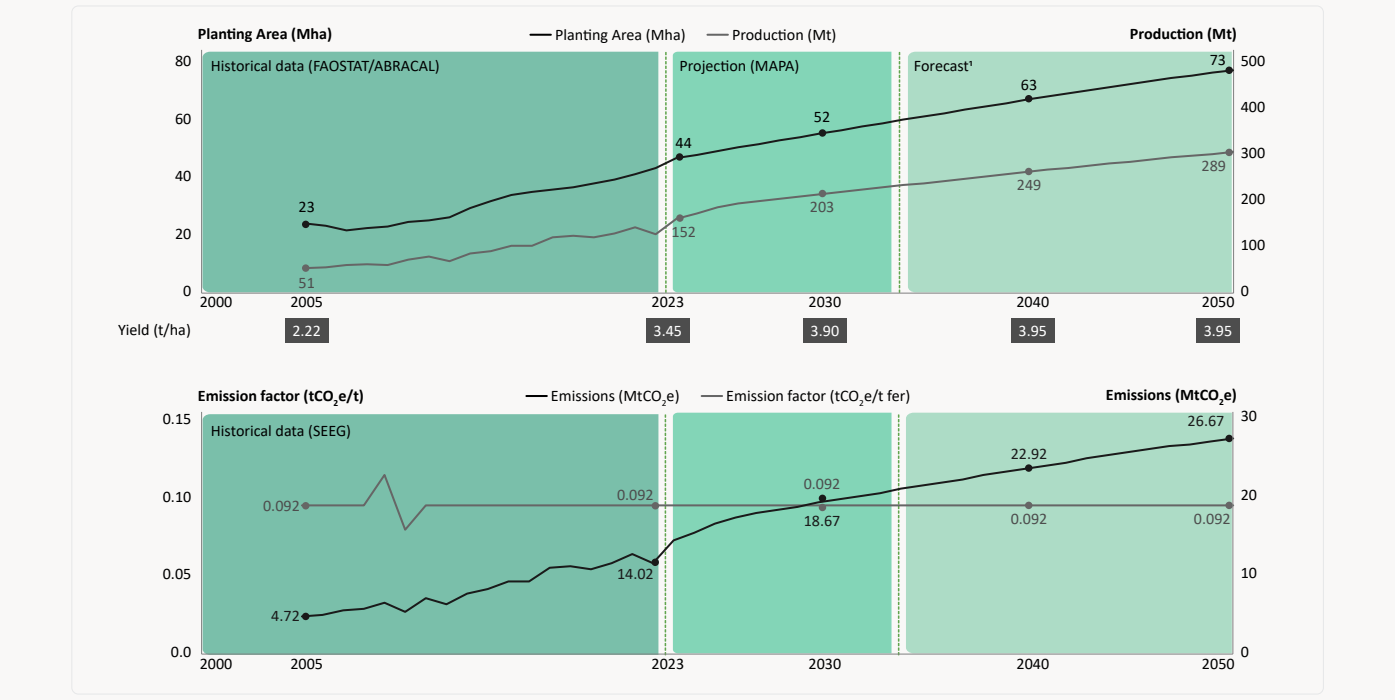
Source: SEEG, FAOSTAT, MAPA, EMBRAPA, BCG analysis.

Deep-dive: Emissions that result from the use of agricultural limestone



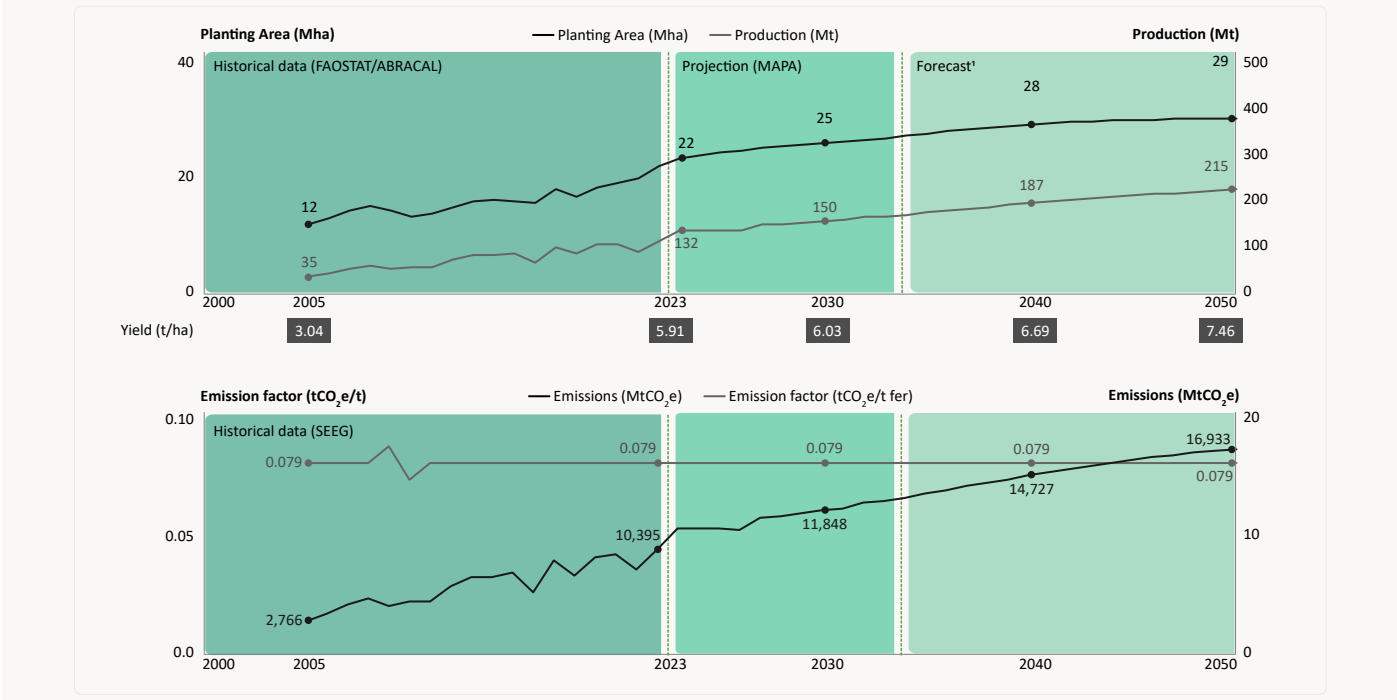
Note: 1. Cultivated area projections were extended to 2050, incorporating 0.1% annual reduction in the CAGR.
Source: SEEG, FAOSTAT, MAPA, EMBRAPA, BCG analysis.

Deep-dive: Emissions that result from agricultural residues in soybean crops



Note: 1. Cultivated area projections were extended to 2050, incorporating 0.1% annual reduction in the CAGR.
Source: SEEG, FAOSTAT, MAPA, EMBRAPA, BCG analysis.

Deep-dive: Emissions that result from agricultural residues in corn crops



Note: 1. Cultivated area projections were extended to 2050, incorporating 0.1% annual reduction in the CAGR.
Source: SEEG, FAOSTAT, MAPA, EMBRAPA, ABRACAL, BCG analysis.

Livestock: Methodology for projecting emissions by 2050 based on data from SEEG, FAOSTAT and MAPA

Category	Subcategory	Historical data	Projection data	Rationale for projecting emissions
Enteric fermentation	- Beef cattle - Dairy cattle - Swine - Sheep - Other animals	- SEEG: emissions (tCO₂e) per animal-by-product from 2005 to 2023. - FAOSTAT: production (t) per animal-by-product from 2005 to 2023.	MAPA: Annual rates of change in the production of animal by-product up to 2034. ¹	Projected emissions driven by the increase in production (t) per animal by-product, assuming fixed emission factors.²
Managed soils	- Beef cattle - Dairy cattle - Swine - Sheep - Other animals	- SEEG: emissions (tCO₂e) per animal-by-product from 2005 to 2023. - FAOSTAT: production (t) per animal-by-product from 2005 to 2023.	MAPA: Annual rates of change in the production of animal by-product up to 2034. ¹	Projected emissions driven by the increase in production (t) per animal by-product, assuming fixed emission factors.²
Waste management	- Beef cattle - Dairy cattle - Swine - Sheep - Other animals	- SEEG: emissions (tCO₂e) per animal-by-product from 2005 to 2023. - FAOSTAT: production (t) per animal-by-product from 2005 to 2023.	MAPA: Annual rates of change in the production of animal by-product up to 2034. ¹	Projected emissions driven by the increase in production (t) per animal by-product, assuming fixed emission factors.²
Effluents	- Beef cattle - Dairy cattle - Swine - Sheep - Other animals	- SEEG: emissions (tCO₂e) per animal-by-product from 2005 to 2023. - FAOSTAT: production (t) per animal-by-product from 2005 to 2023.	MAPA: Annual rates of change in the production of animal by-product up to 2034. ¹	Projected emissions driven by the increase in production (t) per animal by-product, assuming fixed emission factors.²

Note: 1. Animal-by-product (t) production was extrapolated to 2050, considering the CAGR of the projected period (2023-2034).; 2. Latest data points of the factors.
Source: BCG analysis.

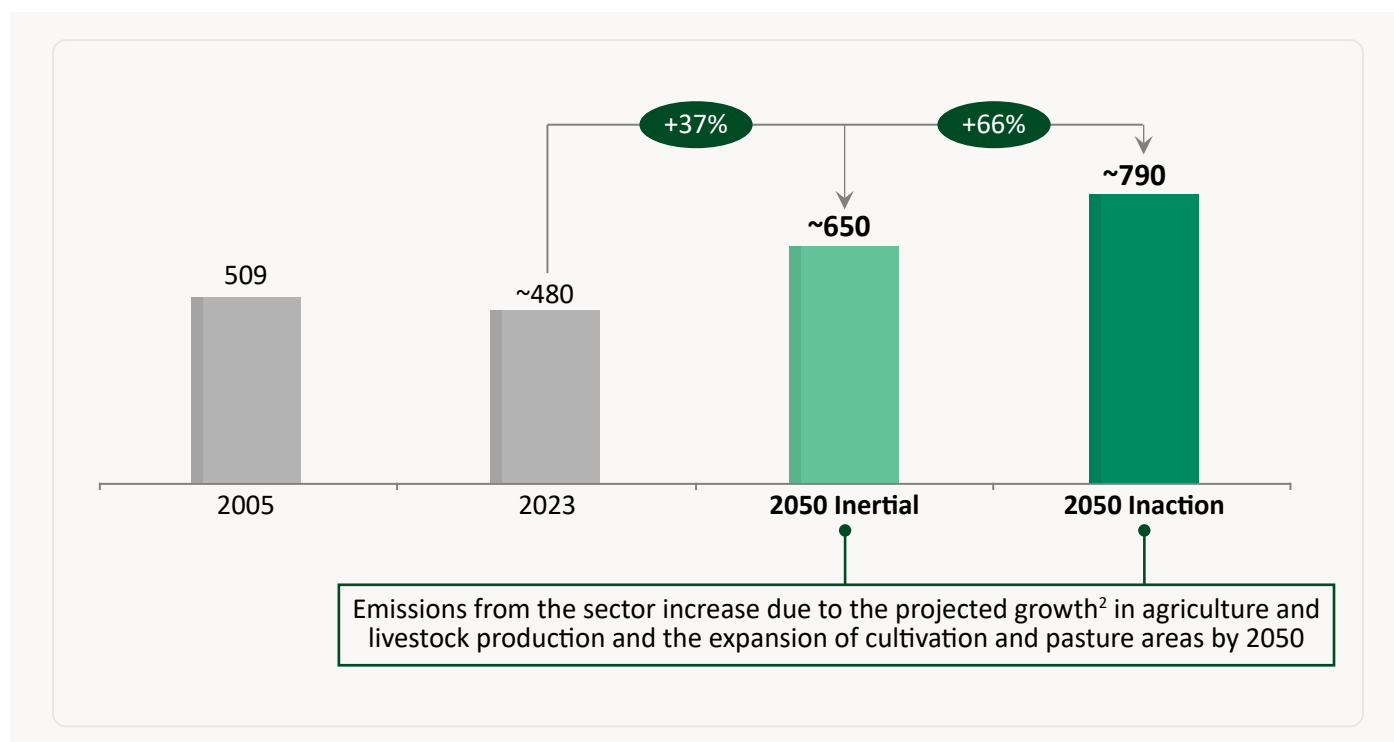
The pasture areas followed a trend that has been observed over time, as reported by MapBiomass.

Two possible reference scenarios for 2050 were then considered, before the implementation of the proposed decarbonization levers:

- **Inertial scenario:** New cultivation areas incorporate current levels of penetration of decarbonization levers (e.g., widely used no-till farming)
- **Inaction scenario:** New cultivation areas do not incorporate any decarbonization levers (e.g., a pessimistic scenario, but one which illustrates the impact of the levers already commonly implemented in the Brazilian planting system)

As such, starting from 480 MtCO₂e in 2023, we reached 650 MtCO₂e in 2050 in the inertial scenario, and up to 790 MtCO₂e in the inaction scenario. The difference between the two scenarios (~140 MtCO₂e) reflects the impact of existing adoption in Brazil of regenerative and low-carbon agricultural practices, which are expected to expand organically as cultivated areas grow and production increases in line with historical trends. In other words, if it were not for the good practices already applied today by the sector, the scenario of emissions in 2050 could be considerably higher.

Net emissions¹ from agribusiness (MtCO₂e)



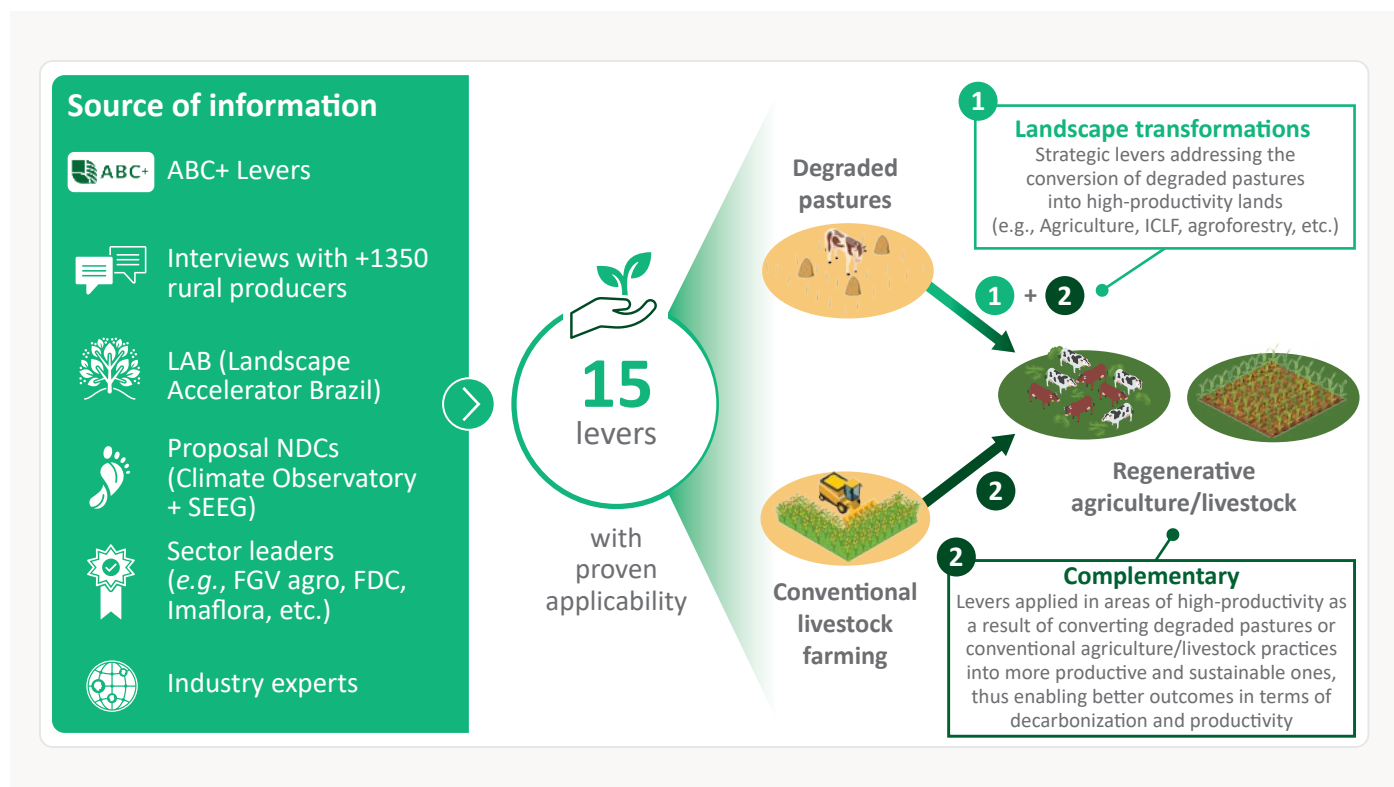
Note: 1. Net emissions include emissions and removals that are not considered in the National Inventory.; 2. CAGR projections for land use and agricultural production of Brazil's main crops and livestock, as forecasted by MAPA/Embrapa through 2034, were factored into the assessment. The cropland area was extrapolated to 2050, considering a decrease of 0.1% in the growth rate per year.

Source: SEEG, BCG analysis.

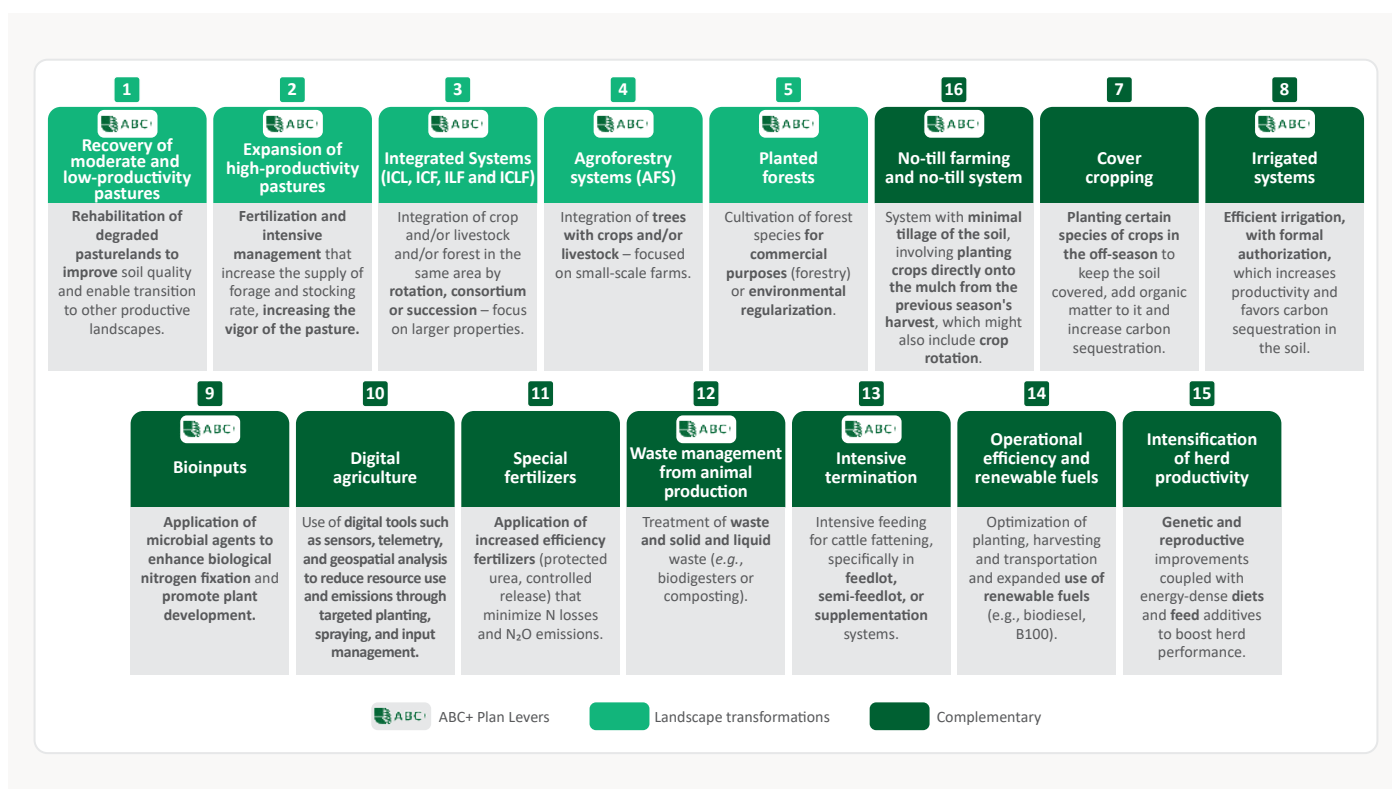
5. Levers and Optimal Pathway

Fifteen decarbonization levers with demonstrated applicability were prioritized, validated by established studies (*e.g.*, SEEG, ABC+) and intense consultation with industry leaders, sector experts, and members of the coalition. It is worth emphasizing the focus on levers that have already been widely discussed and successfully implemented as the most effective way to mitigate emissions in the sector, minimizing risk for producers (*i.e.*, these are not experiments, tests, or pilot projects). Plus, the indicated levers provide economic benefits in the medium to long term (greater productivity, greater climate resilience, lower variance in production) that considerably outweigh the investments required. As will be discussed in the next chapters, providing adequate credit and financing models under the right conditions to help producers financially is crucial (term, grace period, rate) to provide the producer with the adequate financial "breathing room."

Source of information and rationale for defining levers



Regenerative and low-carbon agriculture levers



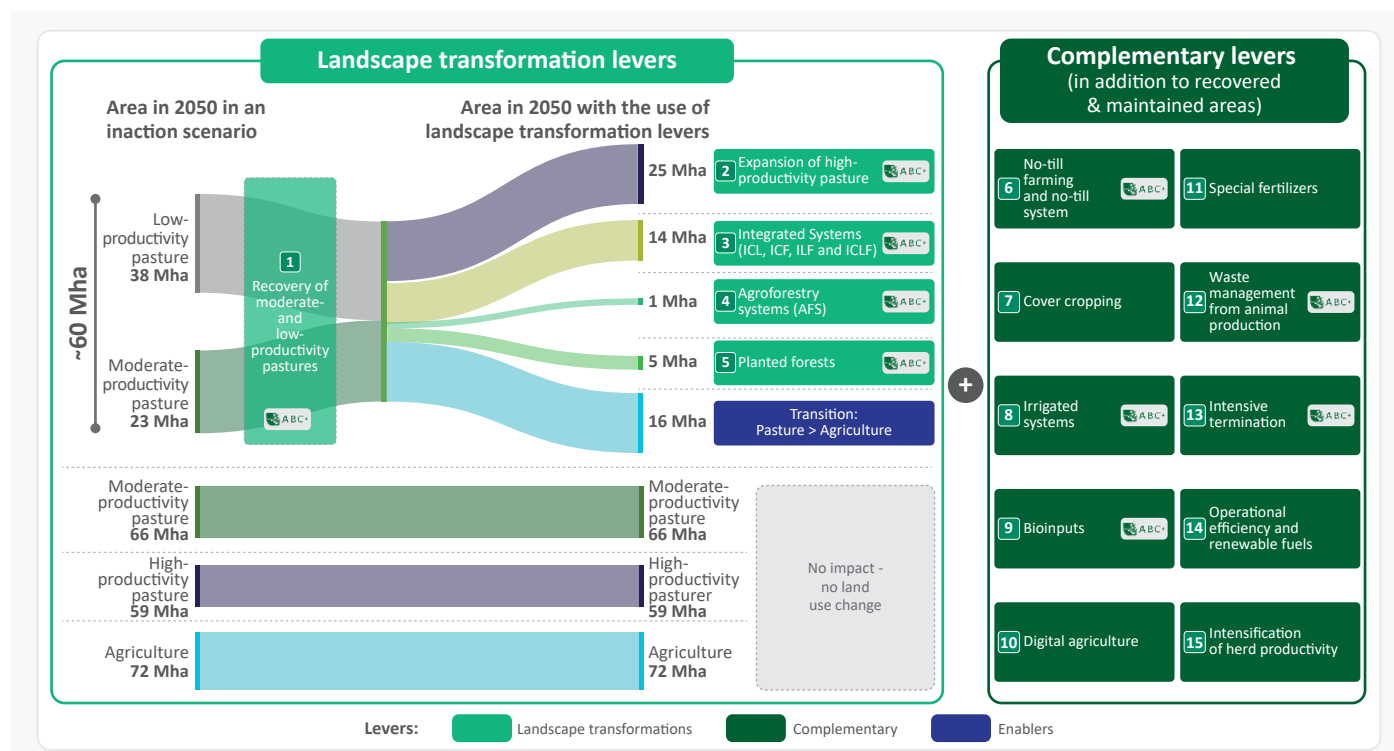
Source: ABC+ Plan (MAPA), expert interviews; BCG analysis.

To prevent impact overlap and ensure coherence and viability in the deployment of mitigation levers, we analyzed the land areas available for intervention, considering an inaction scenario through 2050 (for example, additional pasturelands are projected to degrade and thus demand rehabilitation).

The starting point for this process is the recovery of moderate- and low-productivity pastures, which restores soil vigor and enables the application of other landscape transformation levers (in green). Once the landscape transformation is complete, complementary levers (in yellow) are applied that are intended to elevate the productivity and mitigation potential of these areas without directly impacting the landscape. These are applicable both to areas that have gone through a landscape transformation and to those that have remained the same (e.g., pastures and areas of traditional agriculture that have remained productive).

PLANTED FORESTS: Impact is only related to carbon captured in the soil; additional mitigation and potential additional area will be considered by the forest coalition.

The diagram below shows the underlying rationale and linkage of the prioritized decarbonization levers:



Source: MAPA, MAPBIOMAS, SEEG, Interviews with industry experts; BCG analysis.

The table below presents the key indicators for each mitigation lever in a comparable format. The table summarizes the technical parameters, application assumptions, associated investments, and the estimated contribution to productivity and mitigation.

Detail: Impact and cost of levers 23-50'

Levers	Applicability Mha/M cab	Mitigation factor	Mitigation in '50 (MtCO ₂ e/year)	Investment (USD K) per ha or cab	Investment USD K/ tCO ₂ e	Total investment (USD B)
1 Recovery of moderate- and low-productivity pastures	21 40-50	0.9 ¹ MtCO ₂ /Mha.year	20 36-44	n/a ⁴	n/a ⁴	n/a ⁴
2 Expansion of high-productivity pastures	9 23-28	2.2 MtCO ₂ /Mha.year	20 51-62	1.5-1.6	~0.7	37-41
3 Integrated Systems (ICL, ICF, ILF and ICLF)	10 13-16	5.5 ³ MtCO ₂ /Mha.year	56 72-87	1.4-2.1	~0.3	20-30
4 Agroforestry systems (AFS)	0-2	7.3 MtCO ₂ /Mha.year	0-15	5.5-6.4	0-0.4	~6
5 Planted forests	2 4-5	0.8 MtCO ₂ /Mha.year	3-4	1.5-2.2	2.0-2.4	7-10
6 No-till Farming and No-till System	19 27-34	2.2 ³ MtCO ₂ /Mha.year	42 60-73	1.6-2.2	0.8-0.9	49-66
7 Cover cropping	40-49	1.2 MtCO ₂ /Mha.year	46-57	~0.1	~0.1	1-2
8 Irrigated systems	2-3	2.0 MtCO ₂ /Mha.year	5-6	1.5-2.2	0.8-1.0	4-6
9 Bioinputs (BNF)	7-9	2.0 MtCO ₂ /Mha.year	14-18	0	0	0
10 Digital agriculture	79-96	0.04 MtCO ₂ /Mha.year	3-4	0.0-0.1	0.5-1.3	2-5
11 Special fertilizers	29-36	0.2 MtCO ₂ /Mha.year	6-7	0	0	0
12 Waste management from animal production ²	1 15-21	0.5 MtCO ₂ /Mha.year	8-11	0.0-0.2	0-0.3	0-3
13 Intensive termination	0-1	0.6 MtCO ₂ /Mha.year	0-1	0	0	0
14 Operational efficiency and renewable fuels	Dispersed levers across agricultural land and livestock			Lever dispersed across the total area – its application varies case by case, making quantification difficult		
15 Intensification of herd productivity				Diffuse investment in the global player chain, making it difficult to quantify in the local environment		
TOTAL			~510-630			~120-170

Note: Dollar fixed at BRL 5.50.

1. Mitigation factor calculated by weighting the emission factors of low (1.03 × MtCO₂/Mha per year) and moderate (0.11 × MtCO₂/Mha per year) productivity pastures; 2. Lever applied to swine farming and beef and milk cattle, according to SEEG; 3. Considering areas that are no longer conventional plantations, with an emission factor of 1.47 × MtCO₂/Mcab per year 4. Costs accounted for in complementary levers; 5. Mitigation factor is considering the ICL system.

Source: SEEG, MAPA, Embrapa, LAB, World Bank, ABIEC, Industry Experts, BCG analysis.

It should be noted that the different dimensions of the table reveal different challenges in terms of implementation. For example, agroforestry systems require a relatively low investment per ton of CO₂e mitigated (0–0.4 USD/tCO₂e), but one of the highest costs per hectare (5.5–6.4K USD/ha). While this mitigation lever may appear "cost-effective" from a global perspective, its implementation demands substantial, localized investment, which poses a disproportionate financial challenge to a small group of productive landowners. It is important to keep in mind this broad view of the implementation challenges for each of the levers.

The subsequent pages offer a detailed breakdown of selected levers, integrating feedback and recommendations gathered during the extensive consultation process for this study.

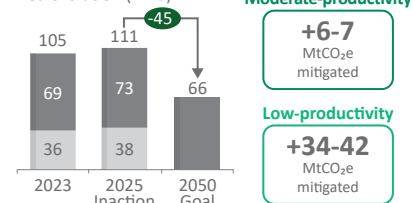
1 RECOVERY OF MODERATE- AND LOW-PRODUCTIVITY PASTURES

Rehabilitating degraded or degrading pasture areas with the goal of restoring their productive capacity.

Further mitigation levers may be applied, including landscape-level interventions such as ICLF and AFS, as well as complementary practices like cover crops and no-till systems.

Applicability

Area evolution (Mha)



Mitigation factors



Mitigation mechanisms

- Carbon fixation in the soil with restoration of vegetation cover and pasture ecosystem (physical, chemical and biological structure of the soil)
- Indirect: Increased productivity per hectare, resulting in less pressure to open new areas (indirect effect on land use)
- Indirect: Establishes the groundwork for deploying further regenerative and low-emission agricultural practices, thereby enhancing overall carbon sequestration

Main steps for implementation

- Soil correction and preparation: sampling, liming/gypsum application, establishment fertilization, weed control, and, when necessary, replanting of forage species
- Implement a system to monitor the productivity of pastures with technical assistance

Challenges

- The need for technical expertise and continuous assistance, coupled with variations in state-level governance and capacity, impacts execution
- Risk of re-degradation if management is not maintained after intervention (degradation compromises productivity and increases emissions)

Where to focus

Degraded areas (Mha)	Soy	Corn	Sugarcane	Rice	Other temporary crops	Perennial crops	Beef cattle	Dairy cattle
Cerrado					35			
Amazon					35			
Atlantic Forest					20			
Pampa								
Caatinga								
Pantanal								

Note: Costs related to the "recovery of moderate- and low-productivity pastures" are included in the costs of the other landscape transformation levers, Dollar fixed at BRL 5.50.

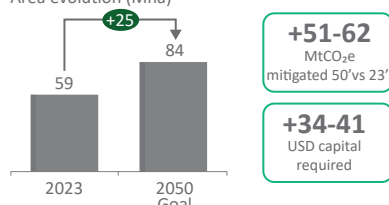
Source: Embrapa, MAPA, SEEG, ESALQ, FGV, FAO, FDC.

2 EXPANSION OF HIGH-PRODUCTIVITY PASTURES

Deploy a high-productivity pasture system characterized by accelerated biomass growth, regenerative potential, and increased forage yield, which allows for higher stocking rates per hectare while maintaining soil integrity.

Applicability

Area evolution (Mha)



Investment

+1.5-1.6K
USD/ha

Mitigation factor

2.2
MtCO₂e/Mha.year

Mitigation mechanisms

- Soil carbon sequestration through increased vegetation cover and accumulation of organic matter
- Decreased enteric methane emissions per unit of product due to a higher feed conversion rate and consequently shorter time spent on pasture
- Indirect: Higher animal productivity per unit of land, enabling a reduction in the need for legal land conversion

Main steps for implementation

- Apply soil correction and fertilization to enhance forage productivity
- Adopt high-yielding forage species adapted to the local climate
- Implement a system to monitor the productivity of pastures with technical assistance

Challenges

- The need for technical expertise and continuous assistance, coupled with variations in state-level governance and capacity, impacts execution
- Risk of re-degradation if management is not maintained after intervention (degradation compromises productivity and increases emissions)

Where to focus

Degraded areas (Mha)	Soy	Corn	Sugarcane	Rice	Other temporary crops	Perennial crops	Beef cattle	Dairy cattle
Cerrado								
Amazon								
Atlantic Forest								
Pampa								
Caatinga								
Pantanal								

Note: Includes costs related to the lever of "Recovery of moderate- and low-productivity pastures", Dollar fixed at BRL 5.50.

Source: Embrapa, MAPA, SEEG, ESALQ, FGV, FAO, FDC.

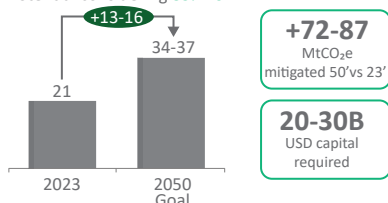
3 INTEGRATED SYSTEMS (ICL, ICF, ILF AND ICLF)

Integrates distinct agricultural, livestock, and forestry production systems within the same area.

Can be done in intercropping, in succession or in rotation.

Applicability

Potential considering 85% ICL



Investment

+1.4-2.1K
USD/ha

Mitigation factor

5.5'
MtCO₂e/Mha.year

Mitigation mechanisms

- Carbon fixation and accumulation in soil and biomass (via increased vegetation cover and trees)
- Improved nutrient cycling and increased organic matter
- Reduction of GHG emissions per unit of product, with greater productivity and conversion efficiency.

Main steps for implementation

- Define the integrated arrangement and the rotation/consortium schedule. Select the most suitable model among ICL, ICLF, ILF, or ICF, and plan the spatial layout (e.g., tree strips in forested systems) along with the timing windows for sowing, grazing, and harvesting
- Adjust fertility and nutrient cycling. Perform sampling, liming/gypsum and fertilization by production environment

Challenges

- Coordinating cropping, grazing, and, when applicable, forestry schedules requires robust planning and mature operational management
- Difficult for technical assistance to access some priority regions
- The forestry component increases implementation costs and extends the payback period, with uncertain profitability

Where to focus

Degraded areas (Mha)	Soy	Corn	Sugarcane	Rice	Other temporary crops	Perennial crops	Beef cattle	Dairy cattle
Cerrado								
Amazon								
Atlantic Forest								
Pampa								
Caatinga								
Pantanal								

Note: Includes costs related to the lever of "Recovery of moderate- and low-productivity pastures", Dollar fixed at BRL 5.50.

1. Mitigation factor is considering the ICL system.

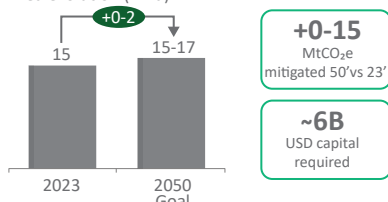
Source: Embrapa, MAPA, SEEG, SIPA, FDC.

4 AGROFORESTRY SYSTEMS (AFS)

Integration of tree cultivation with agricultural and/or livestock production in planned systems that promote ecological synergy and diversified production, typically within family farming contexts.

Applicability

Area evolution (Mha)



Investment

+5.5-6.4K
USD/ha

Mitigation factor

7.3
MtCO₂e/Mha.year

AFS vs. ICLF: AFS prioritize ecological diversity, restoration of degraded areas and multifunctional production, which are common in family farming. ICLF focuses on productivity and efficiency, integrating crops, pasture, and trees with sustainable intensification.

Mitigation mechanisms

- Carbon sequestration in biomass and soil through the tree component, improved nutrient cycling and soil protection, and diversification that reduces risks and may decrease input use
- Improvement of fertility and soil structure, with increased organic matter and permanent vegetation cover

Main steps for implementation

- Define the objective of the system (wood, fruits, shade, environmental services) and the temporal/spatial arrangement of the species
- Establish soil management (liming/fertilization), maintenance (pruning/thinning), harvesting and monitoring of productivity/soil, in addition to training for farmers

Challenges

- Low scale and current dispersion of projects
- Challenges faced in accessing specialized and premium markets (e.g. organic products or legally sourced timber)
- Higher initial investment than conventional systems

Where to focus

Degraded areas (Mha)	Soy	Corn	Sugarcane	Rice	Other temporary crops	Perennial crops	Beef cattle	Dairy cattle
Cerrado								
Amazon								
Atlantic Forest								
Pampa								
Caatinga								
Pantanal								

Note: Includes costs related to the lever of "Recovery of moderate- and low-productivity pastures", Dollar fixed at BRL 5.50.

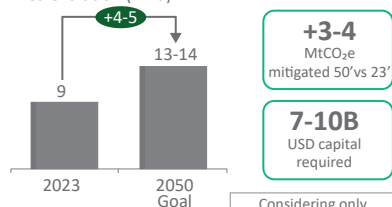
Source: Embrapa, MAPA, SEEG, SIPA, FDC.

5 PLANTED FORESTS

Cultivation of native or exotic forest species for economic purposes like timber, pulp, energy, or charcoal production, or for environmental objectives, including the restoration of Permanent Preservation Areas (PPAs) and Legal Reserves (LR).

Applicability

Area evolution (Mha)



Considering only below-ground carbon

Mitigation mechanisms

- Carbon sequestration in biomass and soil during tree growth
- Reduced pressure on native forests by meeting the demand for forest products with legally sourced timber

Main steps for implementation

- Assess site conditions and intended use (e.g., energy, pulp, timber), and select species/clones, soil preparation methods, and planting density
- Plan rotation, manage forest areas (fertilization, weed/pest control, thinning) and harvest

Challenges

- High initial investment with medium to long term return
- In the case of ICLF, it can generate shading/competition and operational restrictions
- Obtaining land/environmental licensing and regularization can be complex and challenging

Where to focus

Degraded areas (Mha)	Soy	Corn	Sugarcane	Rice	Other temporary crops	Perennial crops	Beef cattle	Dairy cattle
Cerrado								
Amazon								
Atlantic Forest	Prioritized biomes, regardless of previous activity.							
Pampa								
Caatinga								
Pantanal								

Note: Includes costs related to the lever of "Recovery of moderate- and low-productivity pastures", Dollar fixed at BRL 5.50.

Source: Embrapa, MAPA, SEEG, FDC.

6 NO-TILL FARMING AND NO-TILL SYSTEM

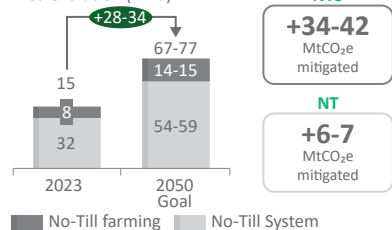
An agricultural system that maintains soil cover and avoids plowing, utilizing minimum disturbance for planting.

Based on three pillars:

- Minimal turnover, continuous coverage and crop rotation

Applicability

Area evolution (Mha)



AFS No-till System (NTS) vs. No-till farming (NT): NT involves sowing crops without disturbing the soil, while preserving the residue from the previous crop. The NTS incorporates no-till farming practices, but is built upon 2 more key principles, other than (1) avoiding soil disturbance: (2) maintaining permanent vegetative cover, and (3) implementing crop rotation strategies.

Mitigation mechanisms

- It reduces soil turnover, increases organic matter and carbon sequestration
- Decreases erosion and nutrient losses, keeping soil covered
- Fewer operational procedures and improved moisture retention increase efficiency per unit of product

Main steps for implementation

- Design the system to encompass crop rotation and succession, intercropping, and cover crops
- Ensure strong soil cover (e.g. grass + legume or corn with brachiaria) and correct soil (pH and P)
- Adjust seeder/planter and plan rotation scheduling
- Provide training to staff to regulate and use herbicides

Challenges

- Dependence on straw mulch or ground cover throughout the year
- Control without plowing: controlling resistant weeds without disturbing the soil requires modifications in how agricultural practices are managed
- Technical support required: fine tuning of machinery and learning curve to maintain NT/NTS quality
- Ensure intensive management to enhance the emissions-mitigation potential, considering the different variations within no-till farming and no-till system

Where to focus

Degraded areas (Mha)	Soy	Corn	Sugarcane	Rice	Other temporary crops	Perennial crops	Beef cattle	Dairy cattle
Cerrado	20	1	4					
Amazon	7	1						
Atlantic Forest	13	2	4					
Pampa	3	1						
Caatinga		1						
Pantanal								

Note: Includes costs related to the lever of "Recovery of moderate- and low-productivity pastures", Dollar fixed at BRL 5.50.

1. Emission factor to account for prevented emissions from areas that are no longer conventional plantations.

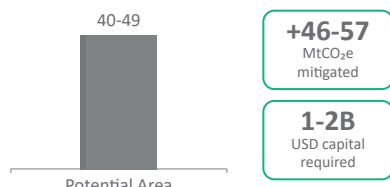
Source: Embrapa, SEEG, MAPA, Conab, Emater, Epagri, CATI-SP, MS-MS Foundation, APDC, FAO, IAPAR and Fuentes-Llanillo et al., 2021.

7 COVER CROPPING

Grow non-commercial cover species (e.g., brachiaria) to enhance soil health and provide protection during fallow periods between cash crops.

Applicability

Potential considering application of the lever in 80% of the No-Till farming areas



Investment

~0.1K
USD/ha

Mitigation factor

1.2
MtCO₂e/Mha.year

Mitigation mechanisms

- Carbon sequestration in the soil through the accumulation of biomass and organic matter
- Reduction of CO₂ emissions by preventing soil turnover and maintaining continuous coverage
- Decreased use of fertilizers and pesticides, via biological nitrogen fixation (in legumes) and natural control of pests and weeds

Main steps for implementation

- Select appropriate species and blends (e.g., grasses and legumes) based on climate, soil type, and specific objectives (residue coverage/mulch, biological nitrogen fixation (BNF), or deep soil loosening)
- Define inter-crop windows by synchronizing commercial crop harvests with cover crop sowing, and defining seeding density and desiccation or roller-crimping methods

Challenges

- The need for local technical expertise to be able to adapt mixtures and regional settings effectively
- Improper choice of cover species or failure in termination can result in resource competition, particularly for water and nutrients, with the subsequent commercial crop

Where to focus

Degraded areas (Mha)	Soy	Corn	Sugarcane	Rice	Other temporary crops	Perennial crops	Beef cattle	Dairy cattle
Cerrado	20	1						
Amazon	7	1						
Atlantic Forest	13	2						
Pampa	3	1						
Caatinga		1						
Pantanal								

Note: Dollar fixed at BRL 5.50.

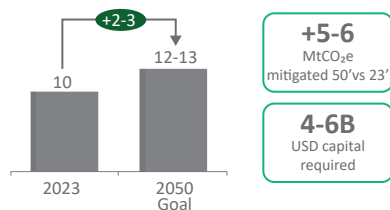
Source: Embrapa, SEEG, MAPA, Conab, Emater, Epagri, CATI-SP, MS-MS Foundation, APDC, FAO, IAPAR and Fuentes-Llanillo et al., 2021.

8 IRRIGATED SYSTEMS

Technically efficient irrigation systems that optimize water use, increase agricultural productivity and contribute to sustainable practices.

Applicability

Potential considering regulatory limitations and constraints on natural resources



Investment

+1.5-2.2K
USD/ha

Mitigation factor

2.0
MtCO₂e/Mha.year

Mitigation mechanisms

- Increased soil carbon sequestration by keeping the soil active and productive for a longer period of the year (even during the off-season)
- Encourage permanent soil cover, enabling crop cultivation during dry seasons (e.g., irrigated forage or cover crops)

Main steps for implementation

- Plan water rights and availability, selecting the irrigation system (drip, pivot, or sprinkler) according to crop, soil, and climate conditions
- Schedule irrigation based on sensors/evapotranspiration data, ensure regular maintenance of pumps/emitters, and, where applicable, apply well-calibrated fertigation

Challenges

- High cost of deployment and maintenance of modern systems
- Water management (permits, conflict of use) and risk of salinization/compaction if poorly managed
- Technical assistance: requires the appropriate qualifications for both sizing and continuously operating the systems

Where to focus

Degraded areas (Mha)	Soy	Corn	Sugarcane	Rice	Other temporary crops	Perennial crops	Beef cattle	Dairy cattle
Cerrado		1	4					
Amazon		1						
Atlantic Forest		2	4					
Pampa		1		1				
Caatinga		1						
Pantanal								

Note: Dollar fixed at BRL 5.50.

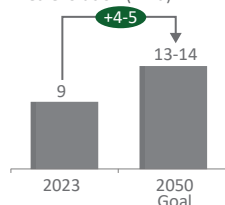
Source: Embrapa, MAPA, SEEG, ANA, FDC.

9 BIOINPUTS

Use of beneficial microorganisms such as nitrogen fixing bacteria and growth promoters such as biostimulants and nutrient solubilizers.

Applicability

Area evolution (Mha)



+14-18
MtCO₂e
mitigated 50'vs 23'

0B
USD capital
required

Investment

OK
USD/ha

Mitigation factor

2.8
MtCO₂e/Mha.year

Mitigation mechanisms

- Significant reduction of emissions associated with the use of nitrogen fertilizers, which are large emitters of nitrous oxide (N₂O), a high-impact GHG
- Biological nitrogen fixation (BNF): replaces part of the mineral N, reducing emissions associated with manufacturing and losses of N in the soil, with productivity gains
- Increased productivity of crops with a lower carbon footprint, as it promotes root development and nutrient absorption

Main steps for implementation

- Choose the technically appropriate bioinput according to the crop and soil type
- Ensure proper storage and application (avoid incompatible heat, light, and chemicals)
- Provide training to technicians on managing biological products

Challenges

- Performance sensitive to soil conditions (pH, humidity, temperature) and seed management
- Proper quality and storage of inoculants in the field
- Not much technical knowledge being shared about the effects and management of microorganisms

Where to focus

Degraded areas (Mha)	Soy	Corn	Sugarcane	Rice	Other temporary crops	Perennial crops	Beef cattle	Dairy cattle
Cerrado	20	11	4					
Amazon	7	4						
Atlantic Forest	13	5	4					
Pampa	3	1						
Caatinga		1						
Pantanal								

Note: Dollar fixed at BRL 5.50.

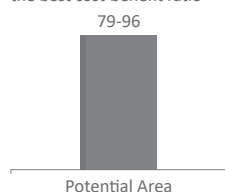
Source: Embrapa, MAPA, SEEG, ANA, FDC.

10 DIGITAL AGRICULTURE

Application of digital tools, including sensors, remote telemetry, satellite and drone imagery, and geospatial analytics, to enable data-driven field decisions that improve production efficiency and reduce ecological footprint.

Applicability

Potential considering application across 80% of the planted area of soy, corn, and sugarcane – which are crops with the largest area, highest mechanization, and capitalization, where digitalization scales with the best cost-benefit ratio



3-4
MtCO₂e
mitigated

2-5B
USD capital
required

Investment

~0.2K
USD/ha

Mitigation factor

0.04
MtCO₂e/Mha.year

Mitigation mechanisms

- Reduction of emissions associated with the excessive use of fertilizers and pesticides by ensuring that only the necessary amounts are used
- Decreased use of fuel and energy in mechanized operations, with optimized routes and targeted interventions
- Prevents waste and losses, increasing land use efficiency and reducing the need for area expansion

Main steps for implementation

- Map fields and pastures, adopting guidance and variable-rate technologies (for seeds, soil amendments, and fertilizers) and using sensors for soil, climate, and NDVI data
- Provide training to staff and standardize data collection/quality and interoperability between machines/software

Challenges

- Low rural connectivity, especially on small farms
- Lack of specialized technical assistance, in addition to difficulties in governing data
- Training for data analysis and evidence-based decision-making

Where to focus

Degraded areas (Mha)	Soy	Corn	Sugarcane	Rice	Other temporary crops	Perennial crops	Beef cattle	Dairy cattle
Cerrado	20	11	4					
Amazon	7	4						
Atlantic Forest	13	5	4					
Pampa	3	1						
Caatinga		1						
Pantanal								

Note: Dollar fixed at BRL 5.50.

Source: Embrapa, MAPA, IHS Markit.

11 SPECIAL FERTILIZERS

Application of enhanced-efficiency fertilizers (EEFs) — such as nitrification inhibitors and controlled-release formulations — to reduce nutrient losses, synchronize nutrient release with crop demand, and lower greenhouse gas emissions.

Applicability

Potential considering application across 80% of the planted area of soy, corn, and sugarcane — which are crops with the largest area, highest mechanization, and capitalization, where digitalization scales with the best cost-benefit ratio

29-36



Potential Area

+6-7

MtCO₂e mitigated

0B

USD capital required

Investment

~0K

USD/ha

Mitigation factor

0.2

MtCO₂e/Mha.year

Mitigation mechanisms

- Less N₂O: N stabilization in the soil and less nitrification/denitrification (effect of inhibitors)
- Reduction of volatilization and leaching/runoff by cutting direct and indirect emissions (NH and NO)
- Greater nutrient use efficiency (NUE): same productivity with lower dose

Main steps for implementation

- Diagnosis and technical recommendation: soil analysis, choice of product and dose by crop/climate
- Correct application (time, shape/installment, compatibility with machinery/fertigation)

Challenges

- Technical knowledge is required for correct positioning by crop/environment, and access to technical assistance is uneven, especially for small producers
- Monitoring of results to justify adoption

Where to focus

Degraded areas (Mha)	Soy	Corn	Sugarcane	Rice	Other temporary crops	Perennial crops	Beef cattle	Dairy cattle
Cerrado		11	4					
Amazon		4						
Atlantic Forest		5	4					
Pampa		1						
Caatinga		1		1				
Pantanal								

Note: Dollar fixed at BRL 5.50.

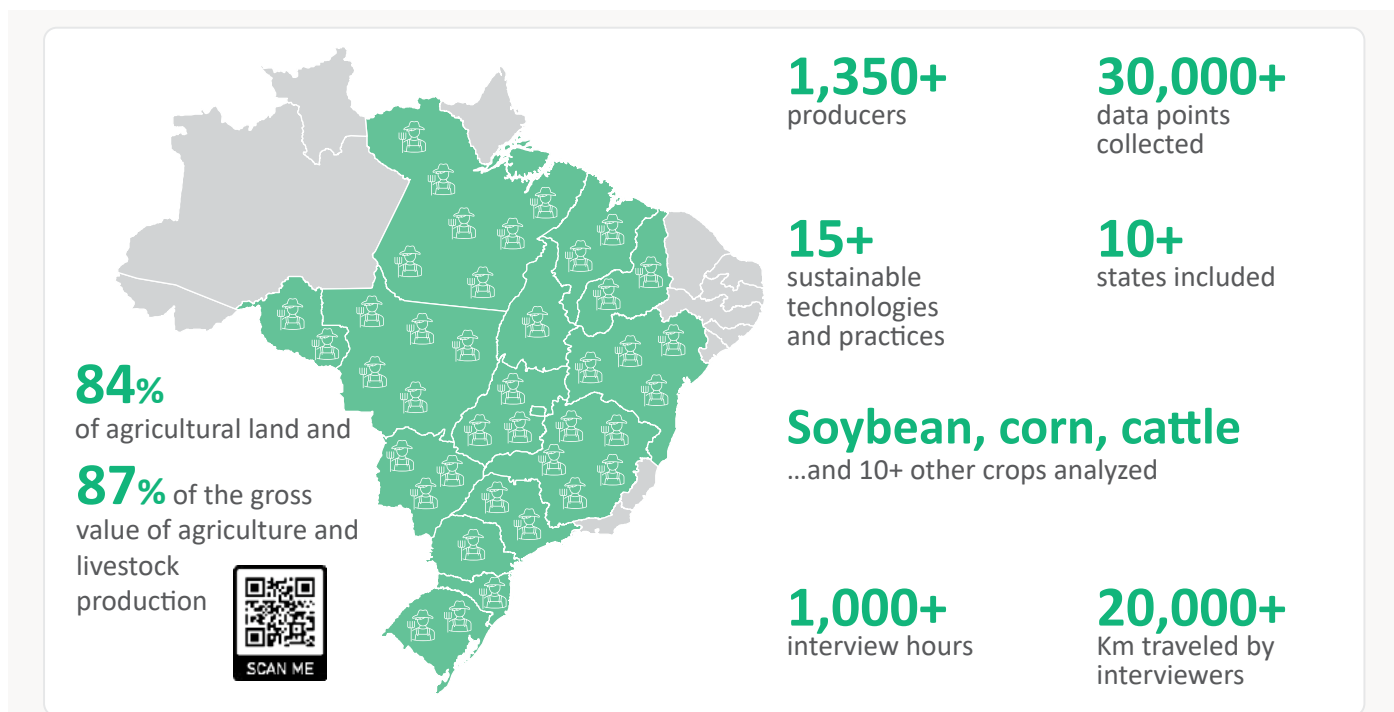
Source: Embrapa, MAPA, IHS Markit.

6. Prioritization of Levers

The prioritization of levers reflects the economic and productive dynamics of the transition: a need exists for initial investment and a maturation period in which profitability remains under pressure before recovering and exceeding the original level.

To substantiate the prioritization choices, the report utilizes inputs from the *O Pulso do Produtor Brasileiro* survey (The Pulse of the Brazilian Producer), which was conducted with over 1,350 producers across +15 states. This involved more than 1,000 hours of in-person interviews and the collection of +30,000 data points, covering 84% of agricultural land and 87% of the gross production value. The approach combines quantitative and qualitative data, allowing it to capture patterns of behavior, technological adoption, and funding barriers that influence the pace of transition in the field.

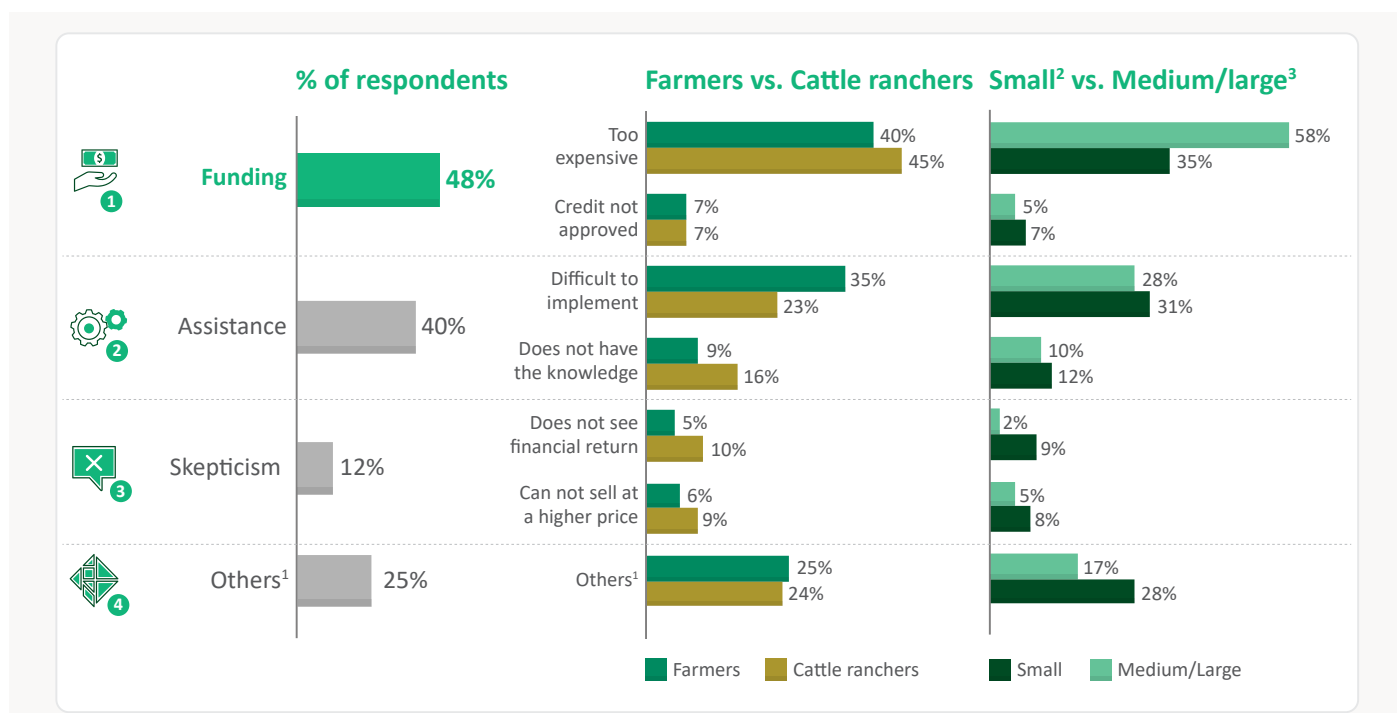
The "*O Pulso do Produtor Brasileiro*" study provided a vision of product challenges to support an optimal path



The results point out that the cost of credit and access barriers — guarantee requirements and lengthy approval processes — are recurring barriers, with greater intensity among small producers. A central challenge lies in securing financial capacity, as the transition requires capital investment and imposes a 2–4 year phase of limited profitability before enabling return on investment and financial gains for the next 5-7 years.

Barriers to adopting regenerative practices

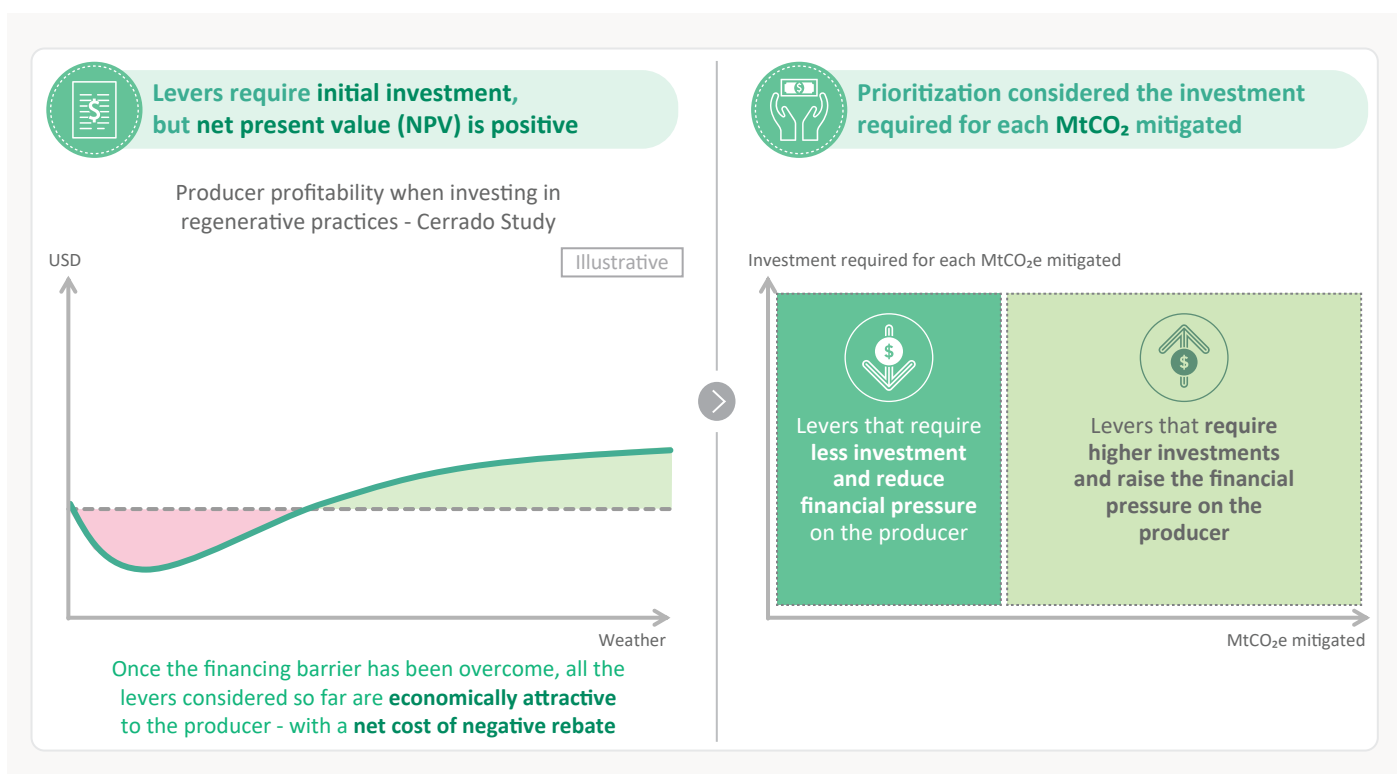
In percentage of respondents



1. Others represent a combination of diverse factors, including responses such as geographic limitations, restricted access to resources, ownership restrictions, lack of interest, and limited autonomy in decision-making; 2. Properties up to 100 hectares; 3. Properties larger than 100 hectares.

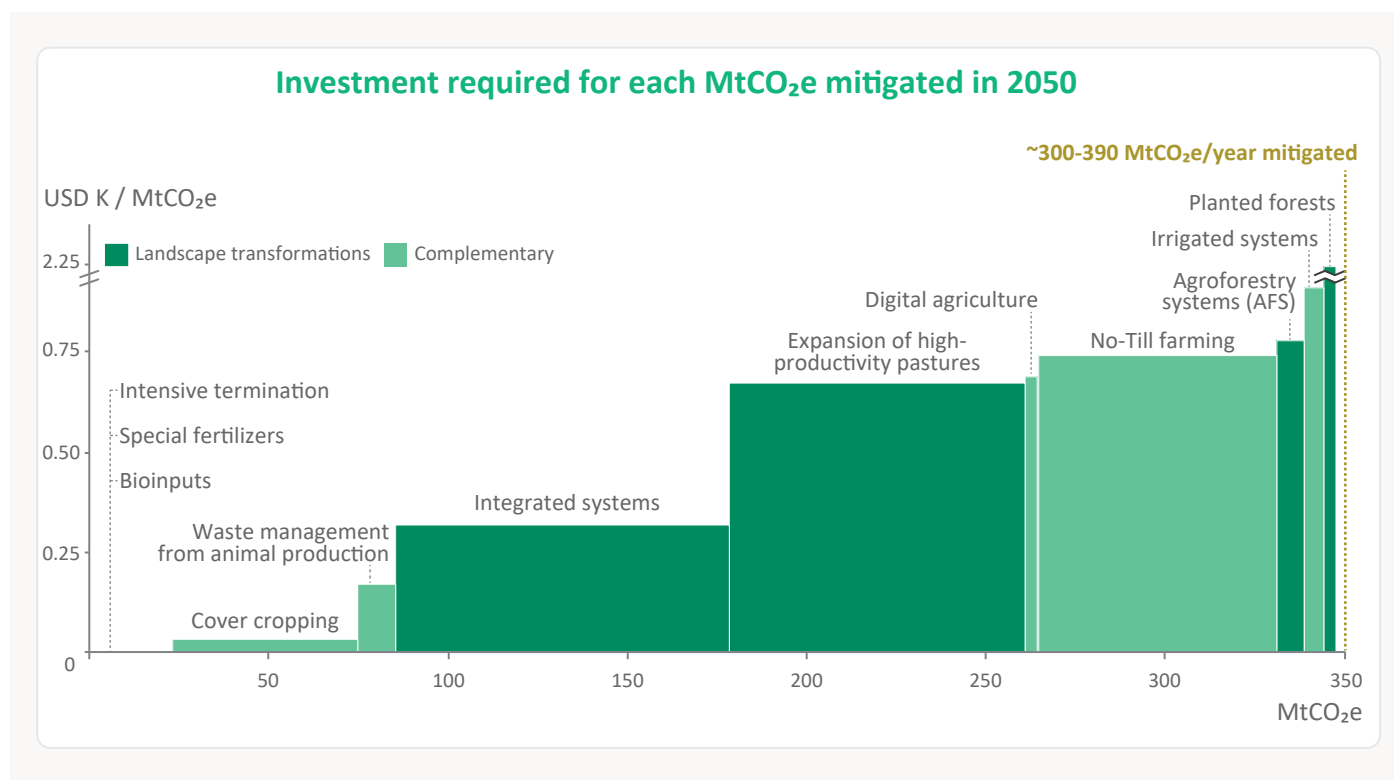
Source: "O Pulso do Produtor Brasileiro" Survey (N=421); BCG analysis.

In light of these dynamics, levers were prioritized based on the investment required per mitigated MtCO₂e, favoring measures with lower relative investment and a sequencing that smooths the cash flow profile at the beginning of the transition. With this, a decarbonization path is defined that minimizes the financial stress of the producer in the short term.



Accordingly, when considering potential impact and ranking from the lowest to the highest investment cost, four levers account for about 50% of the decarbonization potential by 2050: Cover Cropping, Integrated Systems, Expansion of High-Productivity Pastures, and No-Till farming and No-Till System.

Subsequently, the abatement curve shows the accumulated contribution of these and the other levers up to the estimated total of ~300–390 MtCO₂e/year mitigated in 2050.



Note: Dollar fixed at BRL 5.50.

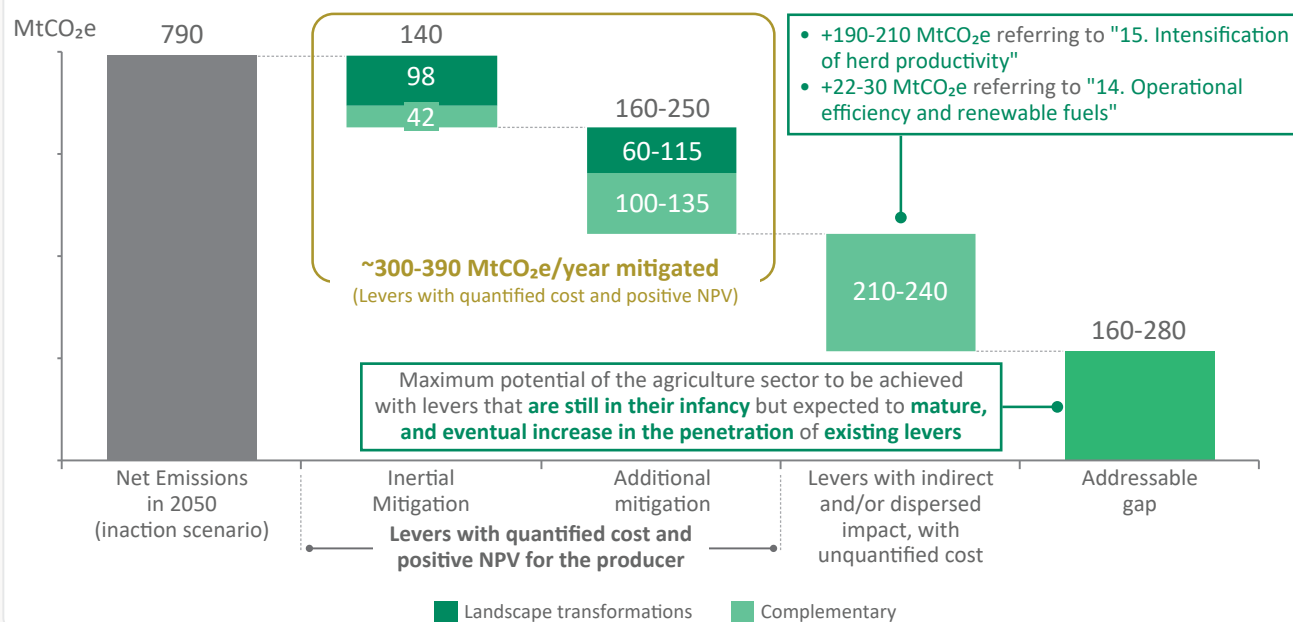
Source: SEEG, MAPA, Embrapa, LAB, World Bank, ABIEC, Industry Experts, BCG analysis.

Under the inaction reference scenario, net emissions are projected to hit 790 MtCO₂e by 2050. Once the 140 MtCO₂e of inertial mitigation—reductions that occur naturally—are factored in, a substantial gap of ~650 MtCO₂e must still be closed to reach net zero.

From the same set of levers previously discussed, the additional portion to the inertial component adds 160–250 MtCO₂e/year of abatement in 2050, reaching 300–390 MtCO₂e/year.

There are also levers without quantified cost — of indirect or distributed effect, with cost difficult to measure —, whose mitigation potential is estimated at 210–240 MtCO₂e/year in 2050, which are **intensification of herd productivity and operational efficiency and renewable fuels**.

Steps and potential for reduction to net zero by 2050



Source: SEEG, MAPA, Embrapa, LAB, World Bank, ABIEC, Industry Experts, BCG analysis.

However, despite the effort to prioritize and define the decarbonization pathway, a significant gap persists — 160–280 MtCO₂e — the addressing of which will require additional effort and the adoption of complementary strategies, such as:

- **Increase penetration of existing levers** (e.g., increase pasture recovery target)
- Make the **natural recovery of vegetation** (e.g. incentives, PESs) economically viable, **given its low economic attractiveness by itself**
- Explore **levers that are still in their infancy** and/or **in need of further development** (e.g., supplements to reduce enteric fermentation)

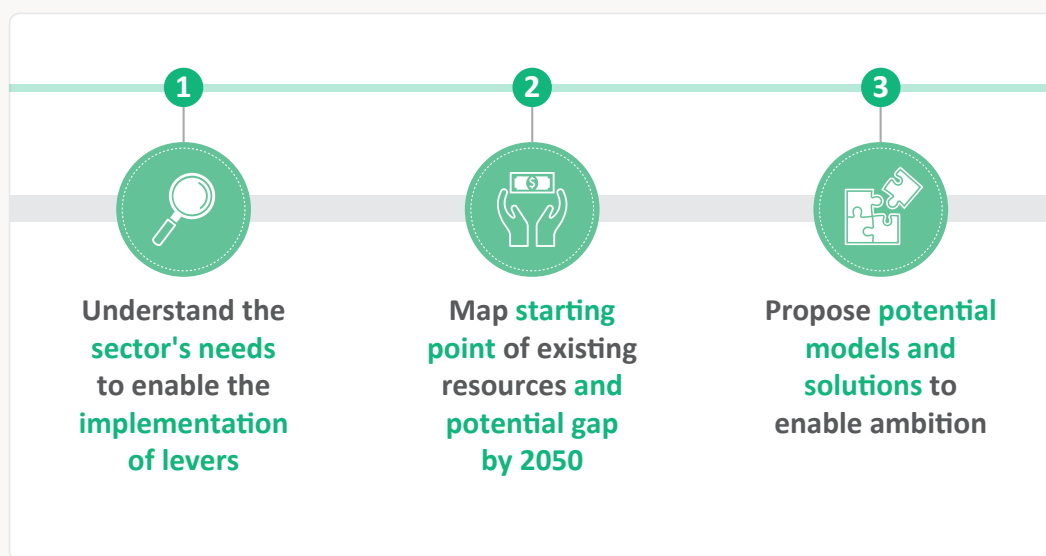


Roughly **80%** of agribusiness mitigation (400–500 MtCO₂e/year) can be achieved via no-till farming and cover cropping, integrated crop-livestock-forestry systems, expansion of high-productivity pastures and increased herd productivity



7. Financing and Enablers

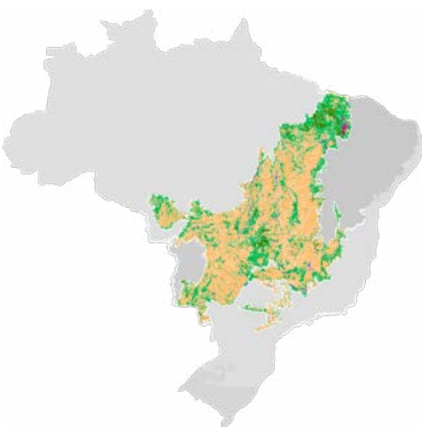
Analysis of the financial resources and instruments needed to enable the adoption of decarbonization levers was structured in three key stages.



7.1. Understand the sector's needs to enable the implementation of levers

The study titled *Resilience for the Future: A Viable Pathway for Regenerative Landscapes in the Cerrado*, conducted under the Landscape Accelerator – Brazil (LAB) in partnership between BCG, CEBDS, and WBCSD, with technical support from MAPA, mapped farm-level transition opportunities across the biome. The analysis identified 32.3 million hectares with viable business cases for regenerative agriculture.

Cerrado study



LAB
(Landscape Accelerator Brazil)

BCG

cebds

wbcscd

MINISTÉRIO DA AGRICULTURA E PECUÁRIA

GOVERNO FEDERAL

BRASIL

UNIDADE DE REGULAÇÃO TECNOLÓGICA

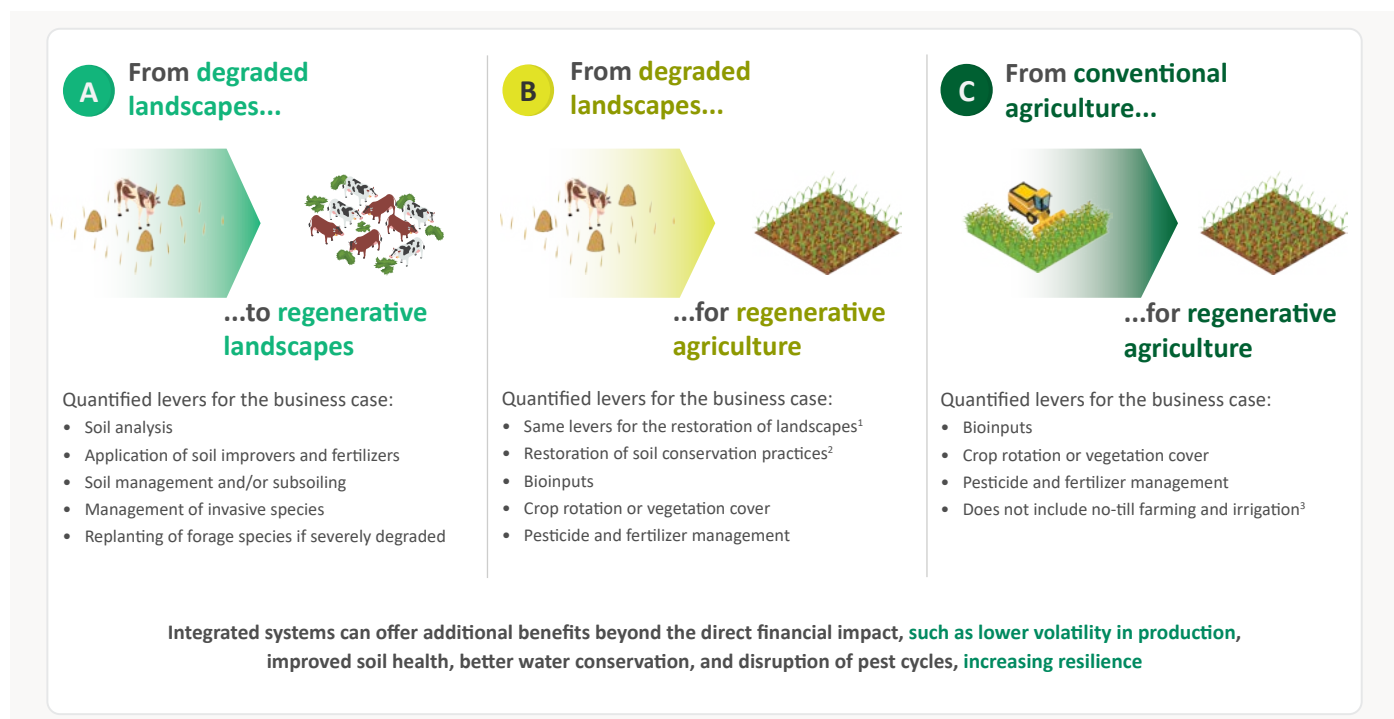
This study identified, specifically at the level of individual properties or farms, the potential for transition of more than **32.3 Mha** to areas of regenerative agriculture¹

Key conclusions on financing from the producers' perspective

- Initial investment (Capex)** can reach USD 2.9K/ha, but NPV is positive
- After investment in **regenerative practices**, **return of profitability to initial levels** may require 3 to 5 years
- Deadline for **return on investment** may take **4-10 years** depending on the **degree of degradation**
- In addition to **greater profitability**, regenerative agriculture ensures **greater climate resilience** (e.g., prolonged droughts) and reduces the **risk of the operation**

1. Transitions from degraded pastures to regenerative pastures & crops or from conventional agriculture to regenerative crops.

Investment in regenerative practices was analyzed across three transition archetypes, defined at the property level, in order to capture the technical and financial differences according to the starting point and the degree of land degradation. These archetypes make it possible to assess in a comparable way the economic attractiveness and the productive impact of the main trajectories of change towards regenerative agriculture and livestock systems.



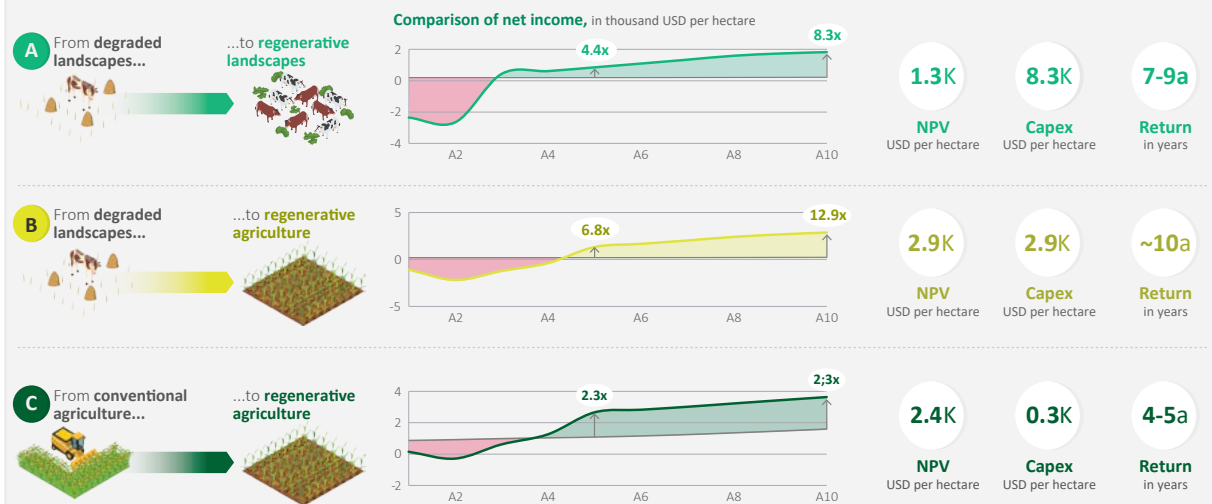
1. Except forage replanting.; 2. If the pasture is severely degraded.; 3. Not considered no-till, as Brazil has already adopted this technique virtually throughout its agricultural area. Irrigation is likewise excluded, given the prevailing reliance on dryland farming for soybean and corn, and its misalignment with regenerative agriculture principles.

Source: EMBRAPA; Expert interviews; BCG analysis.

Regenerative agriculture ensures greater profitability in the medium to long term, with positive net present value (NPV)—meaning that it adds economic value to the producer. But the transition demands significant upfront investment and involves a period of cash flow pressure until profitability returns to initial levels—averaging three to five years, with a payback period of four to ten years, depending on the degree of land degradation.

The analysis by archetype highlights the central trade-off of the transition: capital intensity at the start versus speed of economic recomposition and productive stability. Transitions from degraded pastures require rebuilding the productive base (soil and pasture), concentrating investment and delaying results, while transitions from conventional agriculture rely mainly on management and input adjustments, reducing capital needs and accelerating returns.

Example of a model result for a 250-hectare property in the south of Mato Grosso

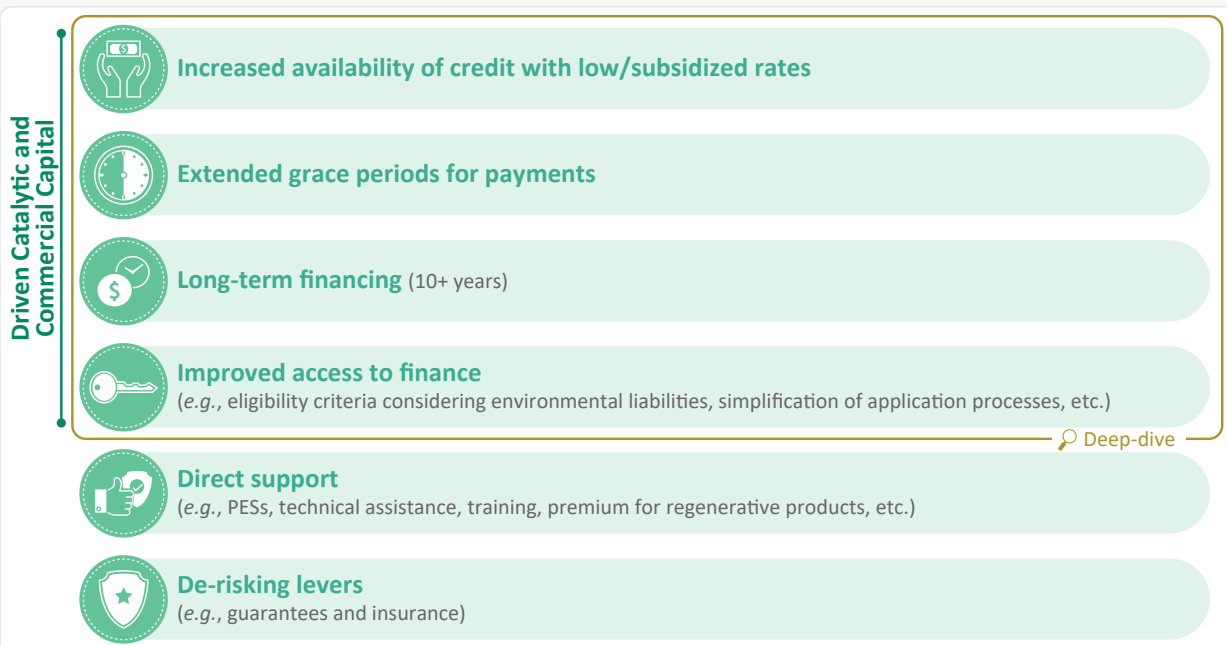


Note: Recovery costs for Moderately Degraded Pastures; Dollar fixed at BRL 5.50.

1. Considering no special financing conditions for the transition of regenerative practices (not considering RenovAgro interest).

Source: EMBRAPA; Expert interviews; BCG analysis.

Regenerative agriculture offers solid financial returns over the medium-to-long-term horizon. However, for this type of agriculture to expand on a larger scale, it is necessary to alleviate the initial financial pressure on producers and reduce the risks associated with adopting these practices. Overcoming this challenge involves having six mechanisms adopted:



The first four mechanisms function as catalytic capital and leveraged commercial capital, directed toward the direct financing of regenerative practice implementation. The details of the existing financing lines, structured based on these mechanisms, will be presented below.

7.2. Map the starting point of existing resources and potential gap by 2050

Decarbonization financing is structured into three complementary functional blocks: catalytic capital — resources that take on higher risk, accept lower returns, and/or offer grace periods and extended terms to enable regenerative practices (e.g., grants and subsidized credit); commercial capital — equity, conventional loans, or market-rate financing linked to catalytic capital (e.g., interest rate equalization or blended finance structures); and direct support — such as payments for ecosystem services (PES), technical assistance, and access to the market.

Seven public & private instruments drive the decarbonization of agribusiness

	 Instruments	 Definitions	 Examples
 Deep-dive Catalytic capital	 Grants	Non-refundable resources, intended directly for the adoption of sustainable practices.	- RenovAgro (Plano Safra): Capital disbursed by the government for interest rate subsidy - Philanthropy and climate funds
	 Funding subsidized	Resources that assume more risk, accept lower returns, have a grace period or longer repayment schedule to enable sustainable practices.	- Eco Invest: Portion from public capital earmarked as catalytic capital - Multilateral funds and development banks (e.g., JICA) - Agri3 Fund (Rabobank + Mirova)
Commercial capital	 Commercial financing	Free credit or financing at market rates linked to public rate equalization programs or intended as a counterpart in blended finance structures.	- Capital from private banks allocated to financing the RenovAgro program - Private capital allocated as a counterpart in blended finance structures in the EcoInvest program
	 Equity	Investments in exchange for equity interest, made by private funds or companies.	- SP Ventures investing in agtechs focused on reducing chemical inputs - Aqua Capital – PE focused on agricultural companies with an eye on efficiency and sustainability
Direct support	 Direct payouts	Financial incentives, such as PESs ¹ , carbon credits and subsidies that offer direct financial support to producers with consideration.	"Cerrado em Pé" Program: Compensation provided per hectare of land conserved or restored
	 Technical Assistance	Provision of technical assistance related to credit, business practices and agricultural techniques.	SENAR & Embrapa engaging in the training of producers for ICLF and pasture recovery via ABC+ Plan
	 Access to markets	Long-term purchase agreements that reduce marketing risks for farmers and ensure supply from buyers.	Scheffer + Bayer Group: Regenerative soybean production with access to premium international markets

1. Payment for ecosystem services - Bill 15.042/2024 creates PRAFs (Federal Environmental Services Remuneration Projects), legal instruments that enable the implementation of PESs, defining rules, contracts and incentives to compensate ecosystem services provided by rural producers.

7.2.1 Catalytic Capital

Some of the key sources of catalytic capital include the Plano Safra and Ecoinvest, both federal government programs. Plano Safra is a recurring instrument that provides annual rural credit, whereas Ecoinvest operates on a targeted basis, structured around thematic blended finance models designed to mobilize private capital for the sustainability agenda.

7.2.1.1 Plano Safra (Harvest Plan)

Plano Safra is an annual rural credit policy of the federal government that provides access to financing lines with below-market interest, extended payment terms and grace periods. The operations are arranged into four groups: financing, investment, marketing and industrialization.

Within the scope of financing directly aimed at agribusiness decarbonization, the 2024-25 Plano Safra mobilized ~2 USD billion for investments and operating costs linked to sustainable practices. Among its subprograms, Renovagro stands out, with ~1 USD billion disbursed in the last crop year.

Plano Safra 2024/25 allocated USD 68 B in rural credit between four key categories...

Total credit in USD B



COSTING – expenses related to production cycles, from the purchase of inputs to harvest (e.g., purchase of seeds)



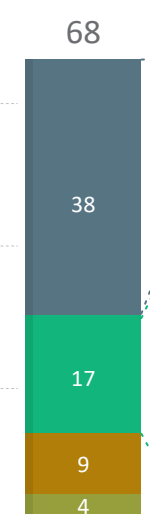
INVESTMENT – resources set aside for goods or services with long-term benefits in various production cycles (e.g., agricultural machinery/implements)



SALES – resources made available to rural producers or cooperatives to support product commercialization efforts (e.g., transportation, marketing)



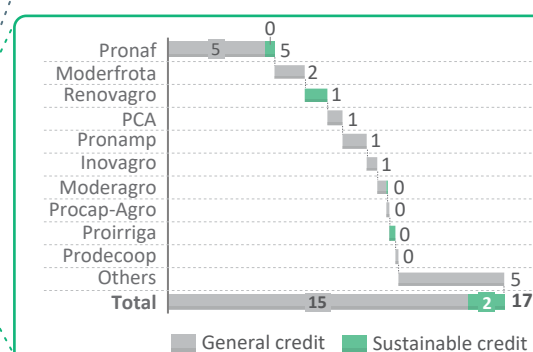
INDUSTRY – processes for the industrialization of agricultural products, carried out by cooperatives or producers (e.g., implementation of a processing unit)



...totaling ~USD 2 B in investment and funding with a focus on sustainable practices

Total investment credit, in USD B

An incentive mechanism offering a **0.5 p.p.** discount on rural credit rates for sustainable practices², backed by catalytic public funding (grants) with a projected volume of up to **~USD 0.2 B**



Note: Dollar fixed at BRL 5.50.

1. Refers to the cycle from July 2024 to June 2025; **2.** Producers who have obtained investment credit through RenovAgro (formerly the ABC Program) within the last five years, or who hold valid certification under PI Brasil (Integrated Production), Good Agricultural Practices (GAP), or the Participatory Guarantee System (PGS). However, available data does not disaggregate the share of working capital credit effectively granted with preferential conditions.

Source: Bacen; Ministry of Agriculture and Livestock; BCG analysis.

The Plano Safra's sustainable credit lines support various practices related to decarbonization and are structured with reduced interest rates, while also offering an extended grace period and longer financing terms.

The Plano Safra's sustainable credit lines support various practices related to decarbonization and are structured with reduced interest rates, while also offering an extended grace period and longer financing terms.

Plano Safra¹: Total credit of sustainable programs USD M

			Interest rates ²	Terms	Grace Period	Credit Limit	Target Audience
Renovagro	Soil management	402	8.5% p.a	10 years	5 years	0.9	Farmers and cooperatives
	No-Till farming	340	8.5% p.a	10 years	5 years	0.9	
	Recovery and conversion	236	7.0% p.a	10 years	5 years	0.9	
	Integrated systems	60	8.5% p.a	10 years	5 years	0.9	
	Forests	52	8.5% p.a	12 years ³	8 years ³	0.9	
	Environmental	21	7.0% p.a	10 years	5 years	0.9	
	Waste management	8	8.5% p.a	10 years	5 years	0.9	
	Organic	3	8.5% p.a	10 years	5 years	0.9	
	Bioinputs	3	8.5% p.a	10 years	5 years	0.9	
Pronaf	Bioeconomy	413	3.0% p.a	10 years	5 years	0.05	Farmers with DAP ⁵ and income of up to USD 91,000.00.
	Forests	15	3.0% p.a	20 years	12 years	0.02 ⁴	
	Agroecology	2	3.0% p.a	10 years	3 years	0.05	
Proirriga	Sustainable irrigated agriculture and livestock	308	10.5% p.a	10 years	10 years	0.6	Farmers and cooperatives
	Protected environment	13	10.5% p.a	10 years	10 years	0.6	
Moderagro	Recovery of soil	17	10.5% p.a	10 years	2 years	0.4	Farmers and cooperatives

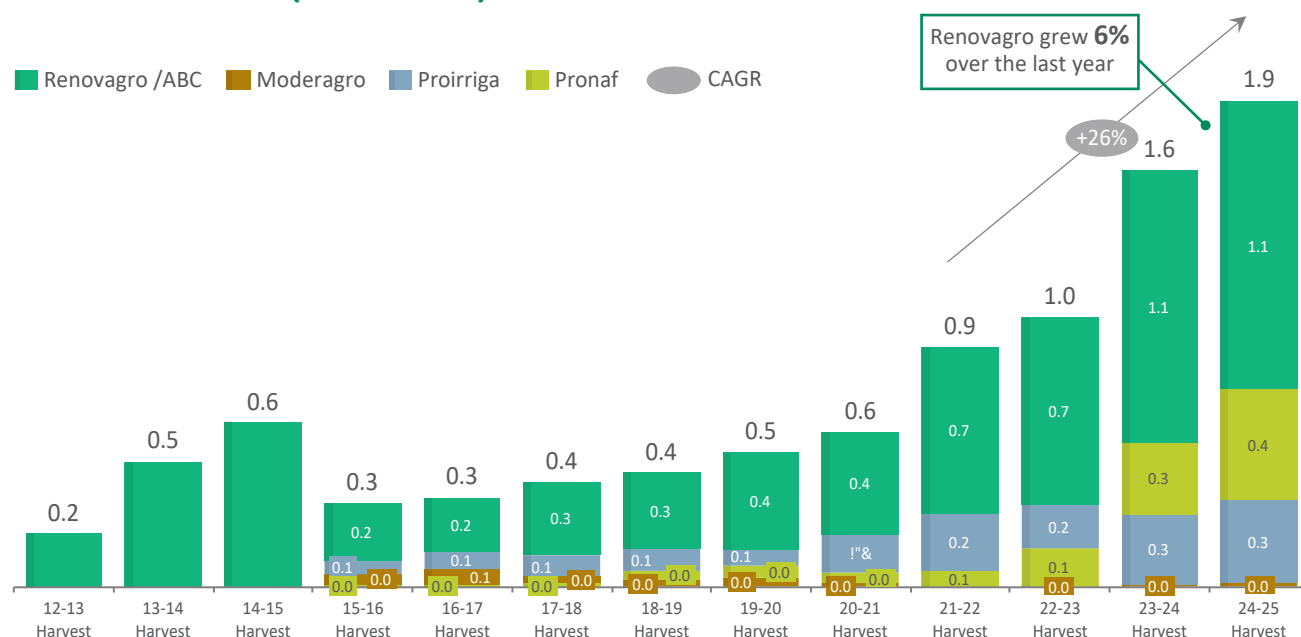
Note: Variations in the interest rate, term, grace period and credit limit may occur depending on the objective of the project and the group of beneficiaries. Unless otherwise specified, the data presented reflect the values for "all other purposes" in each program; Dollar fixed at BRL 5.50.

1. Refers to the cycle from July 2024 to June 2025; 2. Fixed interest rates; 3. For projects intended for the implementation, maintenance or restoration of commercial forests, forests of specific crops and conservation areas; 4. Credit limit specifically for agroforestry systems; 5. Statement of Fitness for Pronaf.

Source: Bacen MCR; BNDES; BCG analysis.

Sustainable lines have been gaining traction, with accelerated growth since the 21-22 harvest, with RenovAgro being the most representative program.

Sustainable credit (Plano Safra): USD B



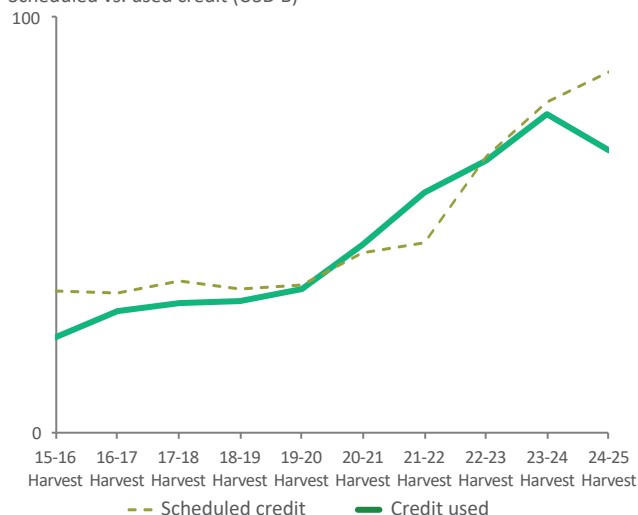
Note: Dollar fixed at BRL 5.50.

Source: Bacen; Ministry of Agriculture and Livestock; public reports and company releases, BCG analysis.

Despite the progress in sustainable lines, the implementation of Plano Safra remains historically sensitive to the cycle of interest rates: in periods when the Selic rate is high, there is a reduction in contracts, underscoring how the plan is sensitive to the cost of rural credit.

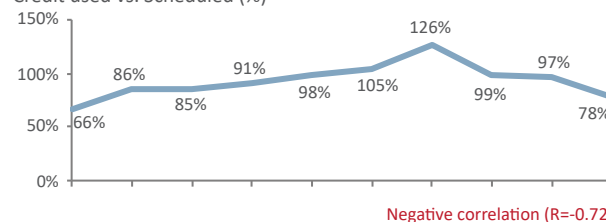
Implementation of Plano Safra has varied significantly over the years...

Scheduled vs. used credit (USD B)

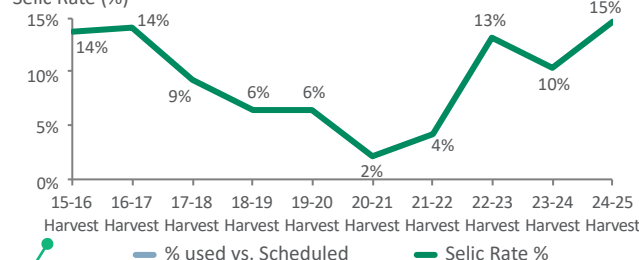


...is highly influenced by the cost of credit during the period

Credit used vs. Scheduled (%)



Selic Rate (%)



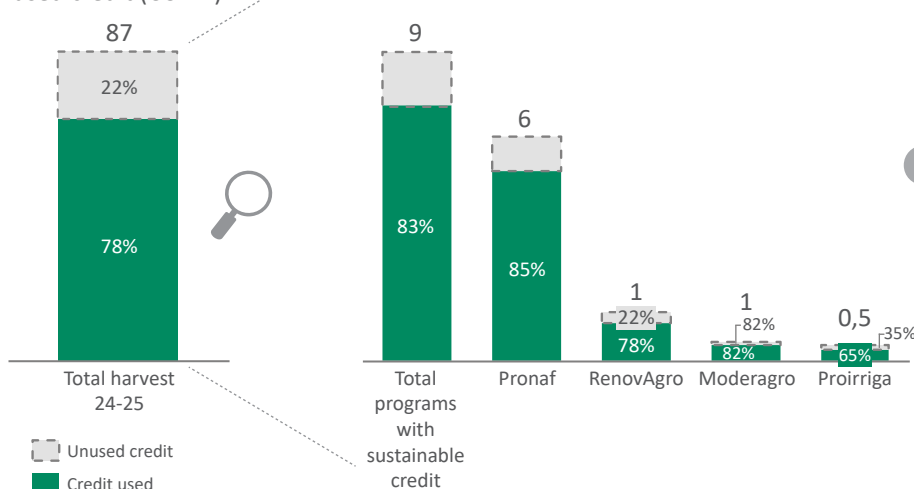
Negative correlation ($R=-0.72$)

- Lower execution of Plano Safra is influenced by:
1. High cost of rural credit for producers
 2. Banks with more restrictive credit criteria due to a greater risk of default

Note: Dollar fixed at BRL 5.50.

In the 24-25 Harvest plan, only ~78% of the scheduled credit was used...

Scheduled vs. used credit (USD B)



... a similar trend among programs with sustainable credit, with only ~83% of credit used

Key reasons for underutilization



Rise in interest rates and increase in rural credit cost



More restrictive credit criteria adopted by banks, given the greater risk of default



Temporary suspension of financing due to the delay in the approval of the annual budget law

Note: Dollar fixed at BRL 5.50.

Programs entirely or partially composed of sustainable credit lines.

Source: Monthly rural credit monitoring report (FaesP and Senar).

7.2.1.2 Ecoinvest

Ecoinvest is a federal government program intended to stimulate sustainable investments. Structured in a blended finance model, it combines public and private resources to reduce risks and attract national and international capital.

Unlike Plano Safra, which is a recurring rural credit line, Ecoinvest functions on a thematic and occasional basis, focusing on specific projects related to decarbonization, environmental conservation, and productive innovation.

Ecoinvest

Introduced in 2024, the program combines resources from the **Climate Fund** and **private capital** to finance **sustainable projects** in the bioeconomy, energy transition, circular economy, biome recovery and green infrastructure sectors, offering **currency protection** to attract international capital.

Auctions

USD 8.0 B
1st auction

1st auction (9 institutions covered - broad focus)

- Blended finance with 6:1 leverage and foreign exchange hedging requirement in 60% of external financing

2nd auction (11 institutions covered – focus on regenerative bioeconomy)

- Blended finance with 1.5:1 leverage, with execution deadlines and proof of private mobilization up to 24 months

USD 5.7 B
2nd auction

Target

1st auction:

- Companies and projects returning to the energy transition (~49% of resources)
- Circular economy/sanitation (~29% of resources)
- Bioeconomy/low-carbon agribusiness (~12% of resources)
- Green infrastructure/climate adaptation (~10% of resources)

2nd auction:

- Recovery of degraded pastures (~1.4 Mha by 2027)

Funding Mechanisms

- **Origin of resources:** National Fund on Climate Change, international capital (e.g., IDB, World Bank) channeled to the FNMCI, international technical and financial cooperation (e.g., UK Embassy, for currency hedging)
- **Payment structure:** Long-term credit in reais, with a grace period of up to 3 years (CMN Resolution 5.205/2025) and subsidized interest with mandatory private exchange hedging in at least 60% of the associated external debt

Challenges

- Ensure greater leverage of catalytic capital in blended finance structures, including increased participation of private and international capital
- Establish robust eligibility criteria and monitoring metrics to verify the implementation of sustainable practices

Note: Dollar fixed at BRL 5.50.

Source: Central Bank

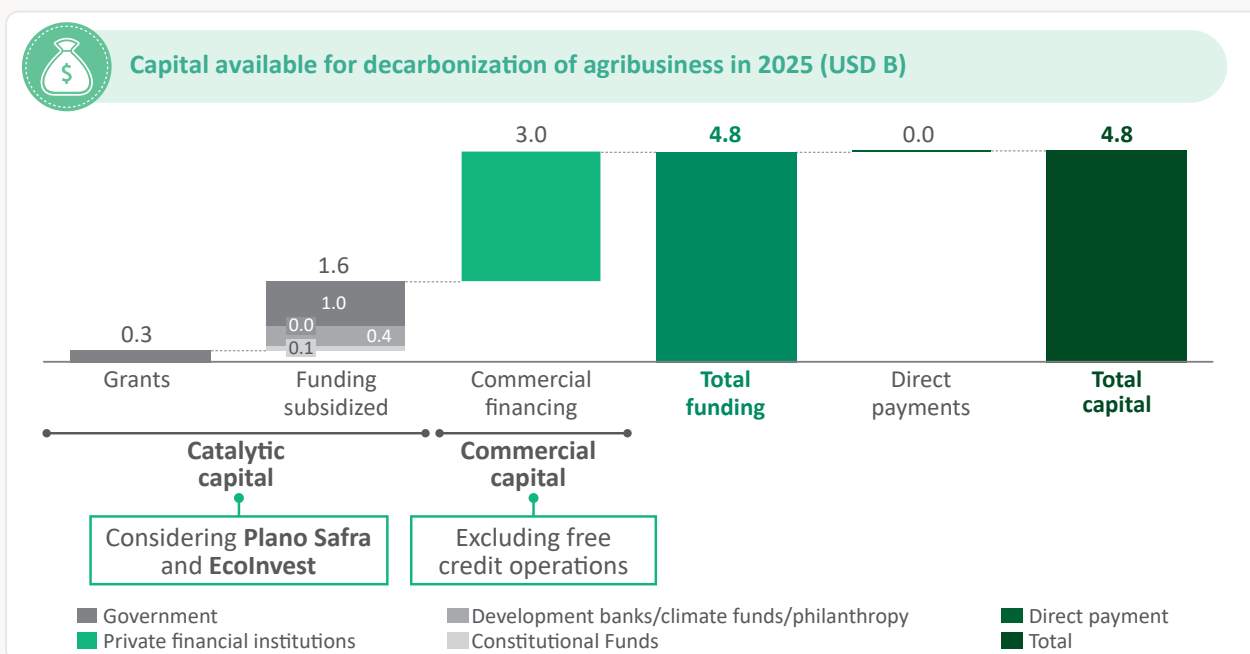
Ecoinvest has, to date, launched two capital allocation rounds via competitive resource auctions. The first one had a broader focus directed towards the energy transition. The second focused on the agricultural sector, allocating USD 5.7 billion by 2027 (~USD 1.8 billion/year) for the recovery of 1.4 million hectares of degraded areas, emphasizing its role as a strategic instrument of catalytic capital for the decarbonization agenda.



Note: Dollar fixed at BRL 5.50.

7.3 Map the starting point of existing resources and potential gap by 2050

The total estimated funding available for decarbonizing Brazilian agribusiness in 2025 is around USD 4.8 billion, comprising both recurring and one-off capital. This assessment is not comprehensive and specifically excludes free credit. Of this total, around USD 1.9 billion corresponds to catalytic capital (grants and subsidized credit), with Plano Safra and Ecoinvest as the main instruments. The remaining amount is mainly composed of commercial financing linked to incentive mechanisms (e.g., equalized interest or blended-finance).



Note: Dollar fixed at BRL 5.50.

Source: Bacen; Ministry of Agriculture and Livestock; public reports and company releases, BCG analysis.

	Origin	Description	Instruments	Value 2025 (USD B)
PLANO SAFRA	RenovaAgro	• Plano Safra credit line for low-emission agriculture and livestock practices, with reduced interest rates and a focus on sustainability	Commercial financing	1.1
	Pronaf	• Plano Safra credit line focused on family farming (study took into account only resources destined to regenerative agriculture-bioeconomy, forest, agroecology)	Grants (Government)	0.04
	Proirriga	• Plano Safra credit line that finances irrigation and protected cultivation systems (study took into account only resources destined to regenerative agriculture)	Commercial financing	0.4
	Moderagro	• Plano Safra credit line focused on the modernization of agriculture, financing infrastructure and technologies (study took into account only funds earmarked for regenerative agriculture)	Grants (Government)	0.04
	Costs	• A 0.5 percentage point discount on the rural credit interest rate for producers who adopt certified sustainable practices (e.g., Good Agricultural Practices—GAP)	Commercial financing	0.3
			Grants (Government)	~0
	Constitutional Funds (FCO, FNE and FNO)	• Dedicated green financing lines embedded in constitutional development funds, targeting sustainability-driven initiatives that promote environmental conservation and lower emissions	Commercial financing	0.02
	Private funding for decarbonization	• Credit initiatives exclusively from the private sector offering better terms, allocated for decarbonization (e.g., financing from Itaú for cover crops, certifications, and bioinputs)	Grants (Government)	~0
	Ecoinvest ¹	• Climate finance program to boost sustainable private investments and attract external capital for long-term projects (study only accounted for the second auction focused on the recovery of degraded lands)	Commercial financing	0.02
			Funding subsidized (Government)	0.8
	Development banks and private institutions	• They offer subsidized capital for regenerative agriculture practices, acting as catalysts (e.g., IFC, IDB, Amazon fund)	Funding subsidized	1.0
	Direct support from various sources	• Mechanisms that enable and promote the adoption of regenerative agriculture practices by expanding access to credit, reducing operational risk, and facilitating the implementation of decarbonization levers (like direct payments, technical assistance, and market access)	Direct payouts	~0.5
				~0
TOTAL				4.8

~ USD 2 B

Deep-dive

Legend: Recurring (green circle), Occasional (green pin)

1. Note: Figures refer to investments already made, as well as future expectations, and are subject to change; Dollar fixed at BRL 5.50.

2. Second auction predicts ~USD 5.5 B to be financed between 2025-2027.

Source: Bacen; Ministry of Agriculture and Livestock; public reports and company releases, BCG analysis.

Among the capital mobilized by development banks, private institutions, and direct support, there is a set of initiatives spread across the different agents in the sector. The (non-exhaustive) mapping identified some of the most relevant, totaling approximately USD 0.5 billion in funding allocated to the decarbonization agenda.

Origin	Description	Instruments	Total amount (USD B)	Annualized amount (USD M)
IFC	• Subsidized financing for São Martinho to install its first biomethane plant using sugarcane vinasse, reducing emissions	Funding subsidized	182 (2025)	182
IFC + BTG	• Blended finance fund for reforestation/ecological restoration and sustainable forestry	Funding subsidized	227 (2021 > 2024)	57
IFC	• Subsidized financing for LDC for traceable and deforestation-free soy and corn purchases in the Cerrado	Funding subsidized	182 (2020 > 2025)	36
IFC	• Financing for Gencau to expand sustainable cocoa production in Brazil with traceability and a positive impact on the climate	Funding subsidized	8 (2024)	8
Reverte Program (Itaú, Syngenta)	• Financing the transformation of degraded areas into crops, preserving native vegetation and promoting regenerative agricultural practices	Funding subsidized	75 (2024)	75
IDB	• Subsidized financing distributed through SICOB, targeting sustainable agriculture and renewable energy, with a focus on micro, small, and medium-sized enterprises in the Amazon region	Funding subsidized	71 (2025)	71
Amazon Fund	• Amazon Fund projects, via the BB Foundation and local associations, to finance agroecological and extractive chains with a focus on conservation and productive inclusion	Funding subsidized	15 (2024)	15
Agri3Fund	• Loan for Agro São José via Rabobank, with 40% guarantee by AGRI3fund, with extended payment terms, supporting regenerative practices in orange, cane and lemon	Funding subsidized	18 (2024)	18
Caixa	• Payments directed to regenerative agriculture projects and restoration of degraded areas in the Legal Amazon	Direct payouts	9 (2025)	9
State governments (GO and PA)	• Payments for Ecosystem Services (PES) for rural producers who conserve/regenerate native vegetation	Direct payouts	4 (2025)	4
Reg. IA	• Private consortium (BRF, Bayer, Agrivalle and Produzindo Certo) to reward and scale regenerative soy production with traceability, technical assistance and a commercial bonus of 2%	Access to markets	1 (2025)	1
Unilever	• Technical support + direct financial incentives, focusing on producers who adopt regenerative practices and are integrated into the Unilever soybean chain	Technical Assistance + Direct payment	6 (2025 > 2030)	1
TOTAL			~800 (Validity period)	~480

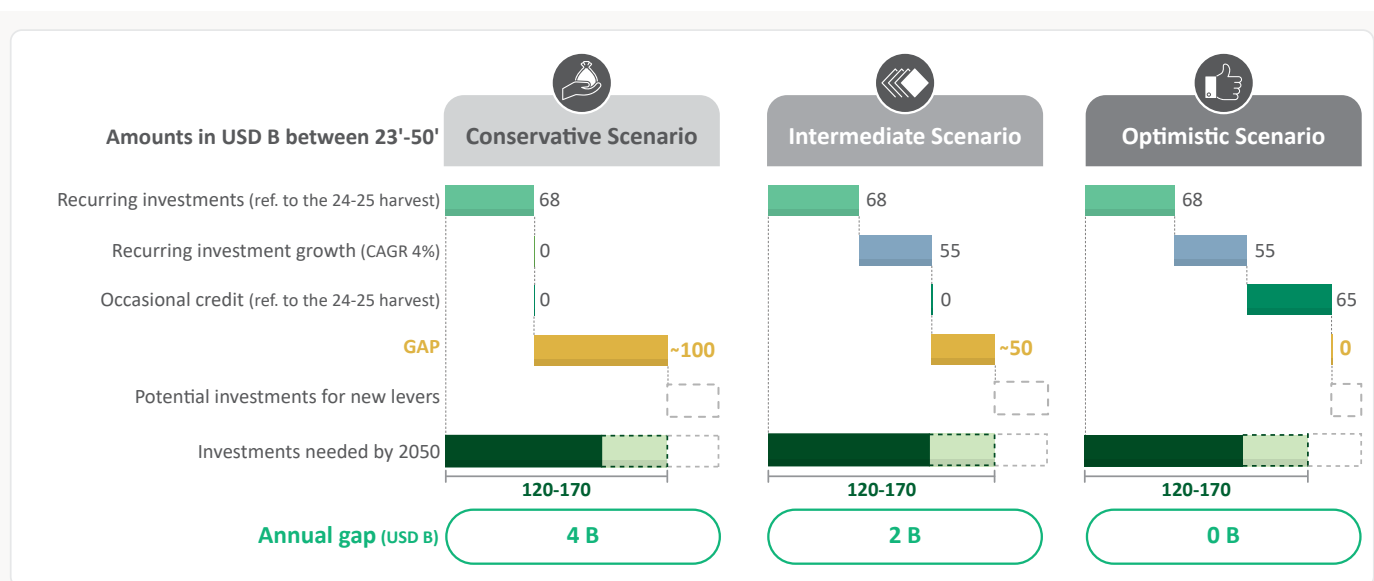
Note: Dollar fixed at BRL 5.50.

1. Subsidized funding and direct payment programs were based on programs effective in 2024-2025.

Source: Public reports and company releases, BCG analysis.

The implementation of the quantified levers will require estimated investments of between USD ~120 and 170 billion by 2050. Despite projected growth, recurring capital will not suffice to meet aggregate demand under conservative and intermediate scenarios, leading to a financing gap of ~USD 50 to 100 billion.

Given this, the deployment of ad-hoc credit instruments, such as Ecoinvest, is important to mitigate the funding shortfall and facilitate the adoption of levers needed to put the sector on a path toward net zero by 2050.



Note: Dollar fixed at BRL 5.50.

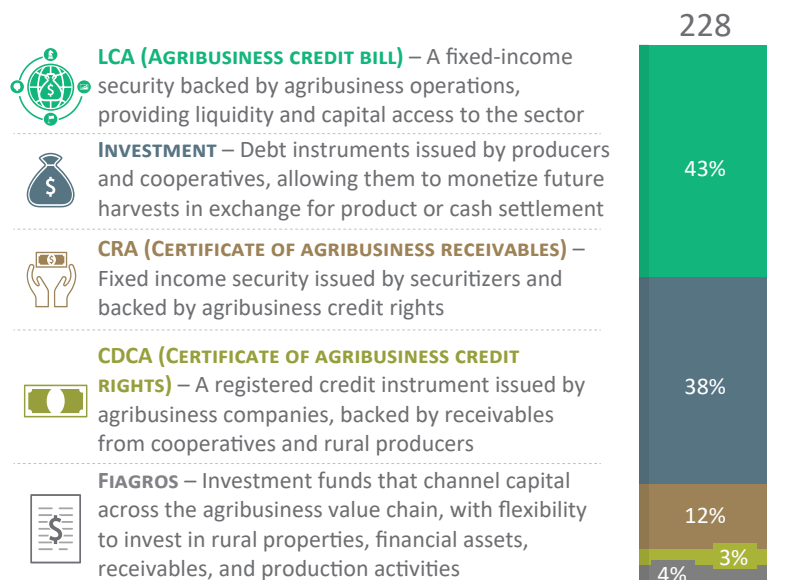
Source: Climate Plan, BCG analysis.



Investment gap
required for net zero by
2050 could reach more
than **USD ~100 B**

Despite the potential financing gap by 2050, addressing this gap seems feasible due to the significant amount of private capital already invested in agribusiness, estimated to be around USD ~228 billion. In a conservative scenario, this gap is expected to represent approximately 10% of this volume, which reinforces the concrete possibility of mobilizing the necessary resources for the transition.

Stocks of private securities financing agribusiness¹ USD B



The gap in the conservative scenario (USD ~4B/year), distributed and accumulated over time, is expected to represent ~13% of the private capital stock allocated to Agribusiness²

Note: Dollar fixed at BRL 5.50.

1. Data from February 2025; **2.** Considering a 10-year financing term and a 5-year grace period.

Source: Ministry of Agriculture.

7.3.1 Potential models and solutions to enable ambition

Addressing the financing gap necessary to enable the implementation of the levers and achieve net zero by 2050 requires seven main solutions, which are divided into enablers and incentives, and necessitates joint participation from the public and private sectors.

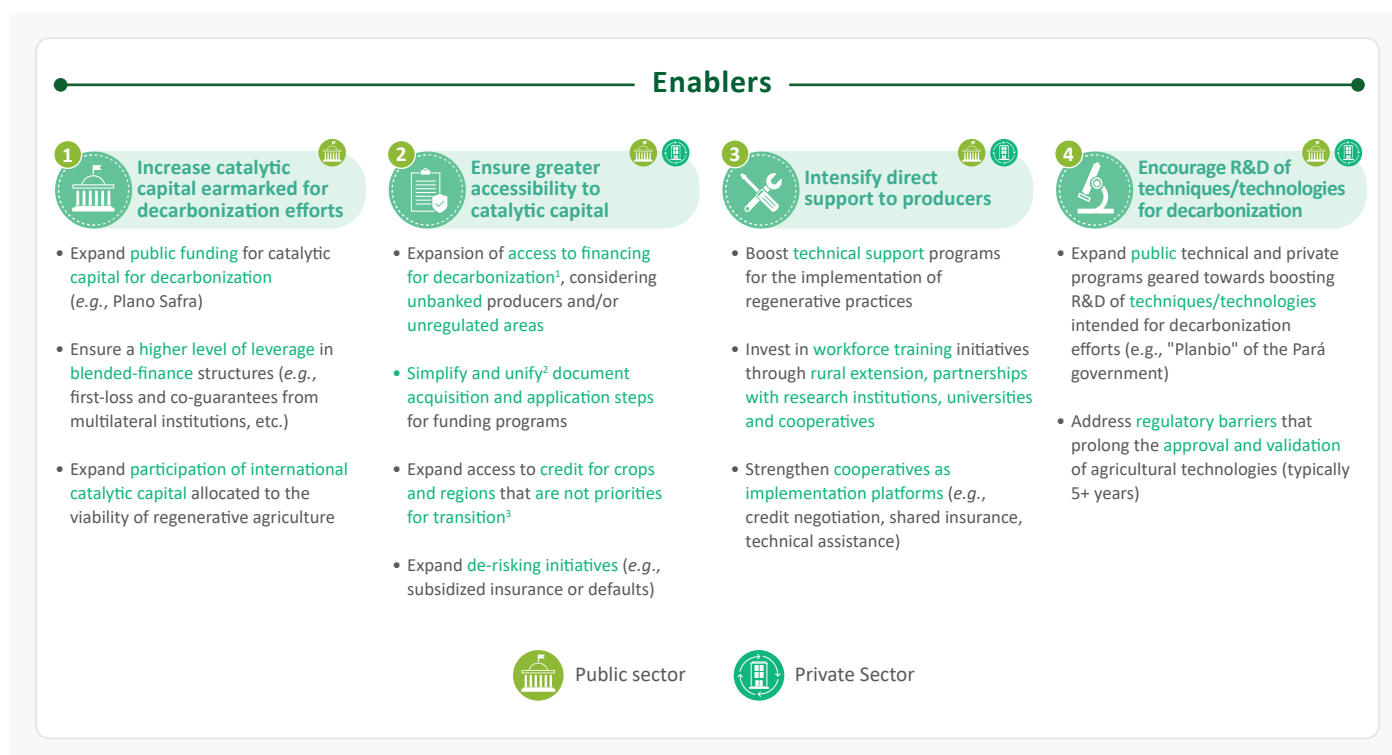
Enablers are focused on facilitating financial support for reducing the carbon footprint in the sector by making credit more accessible and affordable under appropriate conditions (*i.e.*, subsidized interest, grace period, extended terms). In addition to procedural and documentation hurdles in securing financing, some producers face access constraints due to being unbanked, operating in crops or regions not prioritized for the transition, or lacking eligibility for certain tax benefits. This is either by exceeding permitted size thresholds or falling short of the minimum scale required by many distribution channels.

In addition to the enablers, a number of incentives play a central role in promoting the sector's decarbonization levers, directly benefiting producers who adopt regenerative and environmental conservation practices. To extract the full potential of these solutions, it is vitally important to develop regenerative agriculture indicators adapted to the tropical climate, capable of differentiating producers who adopt practices with greater intensity. Similarly, it is essential to create methodologies that enable natural assets to be measured and accounted for in the balance sheets of rural properties.

		Responsible Party			
		 Public sector	 Private sector		
ENABLERS	1 	Increase catalytic capital earmarked for decarbonization efforts			
	2 	Ensure greater accessibility to catalytic capital			
	3 	Intensify direct support to producers			
	4 	Encourage R&D ¹ of techniques/technologies for decarbonization			
INCENTIVES	5 	Benefit producers who adopt regenerative practices			
	6 	Recognize producers' natural and biodiversity assets			
	7 	Regulate and consolidate the carbon market			

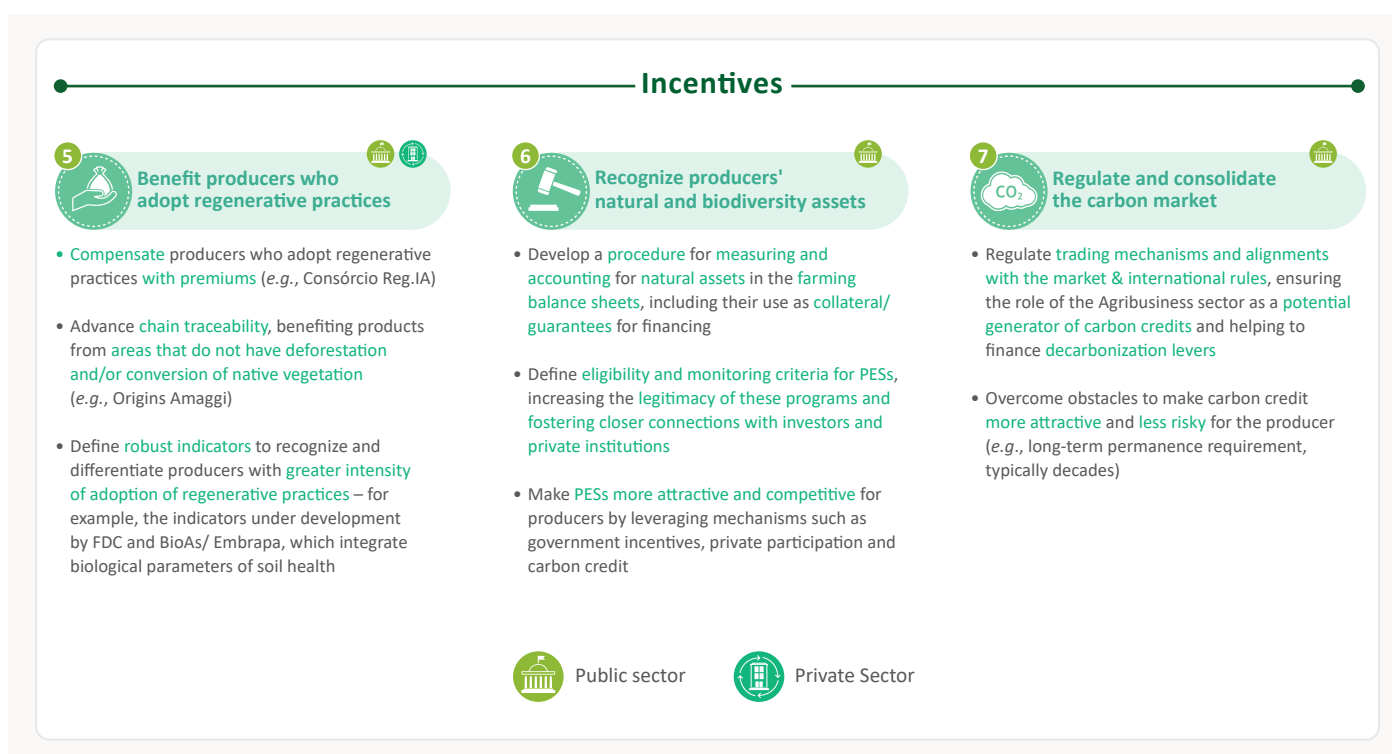
1. Research and Development.

Key enablers to implement levers



1. Considering the enabling frameworks and conditionalities; 2. For example, the process for obtaining the PRA (Environmental Regularization Program) has different requirements and deadlines by state; 3. Despite their limited individual weight in Brazil's agricultural matrix, crops such as cocoa, coffee, fruits, legumes, and other minor commodities collectively hold strategic relevance, with potential to represent a more relevant share of national agricultural value.

Key incentives to implement levers



Rural producers face multiple structural constraints in accessing public policies. One of the biggest challenges is land tenure regularization, which remains highly complex and has low uptake. Added to this scenario is the environmental liability of approximately 15% (compared to the required legal reserve).

These regulatory and environmental gaps directly restrict producers' ability to access financing lines and incentive programs. These days, roughly 15% of rural properties have some active financing contract, illustrating the weak penetration of financial instruments among rural producers.



There are many challenges to regularize rural properties...



Low validation index of CARs
(only ~3% of validated CAR of the existing 7.2 million)



Non-unified Environmental Regularization Program (PRA) and low adherence among states (only 17 of the 25)



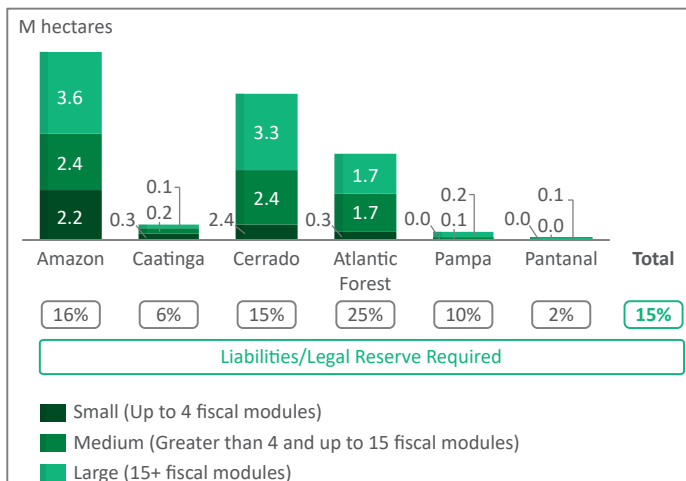
Low producer adherence to the PRA due to the requirement for a valid CAR and limited visibility on restored areas



Lack of incentives - lack of support and financial incentives for producers



...in addition to the environmental liability reaching 15% of the required legal reserve



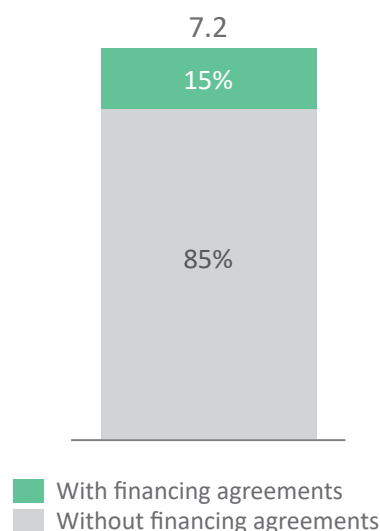
Source: Forest Code Observatory.



Only **~15%** of rural properties have a financing contract...

...underscoring the challenge of access to credit by relevant producers

of properties with vs. without financing agreements (M)



Source: Central Bank rural credit matrix and CAR newsletter.

In Brazil, there are several publicly originated Payment for Ecosystem Services (PES) models, such as Cerrado em Pé and Pará – Valoriza Territórios Sustentáveis. However, the model remains difficult to scale and faces financial, regulatory, and operational challenges. The primary one is the opportunity cost between payments under PES schemes and agricultural production, as productive land can generate returns up to ten times higher. This reinforces the need to make the mechanism more competitive.

Payment for ecosystem services (PESs)

A public policy instrument that financially rewards environmental conservation and restoration practices from monetary and non-monetary resources (such as technical support) for areas exceeding the legal minimum for conservation.

Main Programs

USD 2.4 B
million invested
to date

- **Cerrado em Pé (GO):** Annual payment (USD 90-120/ha), with USD ~1.4 million disbursed
- **Pará – Valoriza Territórios Sustentáveis:** Annual payment up to ~USD 470/ha (limit 5 ha), with USD ~36.2 K disbursed
- **Floresta+ Amazônia (Federal):** Payment in stages ~USD 35-145/ha, USD ~1 M disbursed

Target Audience

- **Landowners and small rural producers** who have native vegetation in excess of the legal minimum or degraded areas to be recovered
- **Family farmers**, agrarian reform settlers, **Indigenous peoples**, **quilombola** communities, extractivists and other traditional groups
- Communities and collective territories

Funding Mechanisms

- **Origin of payments:** **public resources** (public environmental funds), international cooperation (Amazon fund), related revenues (collection for water use) and environmental fines
- **Contractual model:** **contracts or terms of adherence**, with payments conditioned on remote and technical monitoring

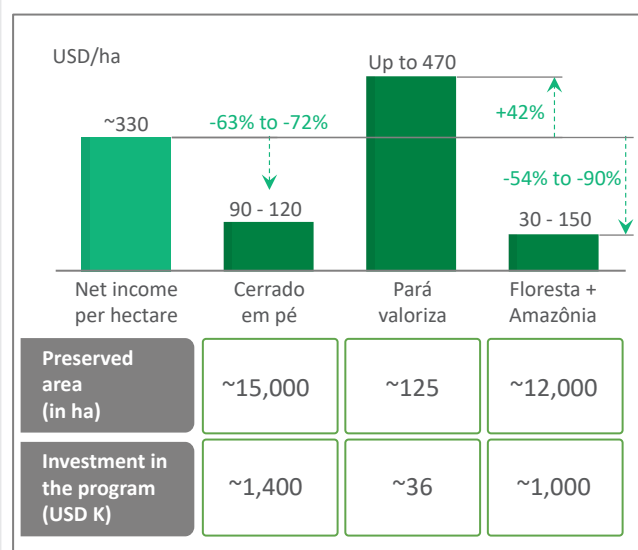
Challenges

- **Financial hurdles:** include **returns that fall below the cost of opportunity**, a lack of tax incentives, and concerns over the continuity of funding
- **Legal/regulatory:** delay in federal regulation and need to make laws compatible with one another
- **Monitoring:** Insufficient enforcement of certain standards, particularly challenging in remote areas
- **Social:** low publicity, bureaucracy, distrust

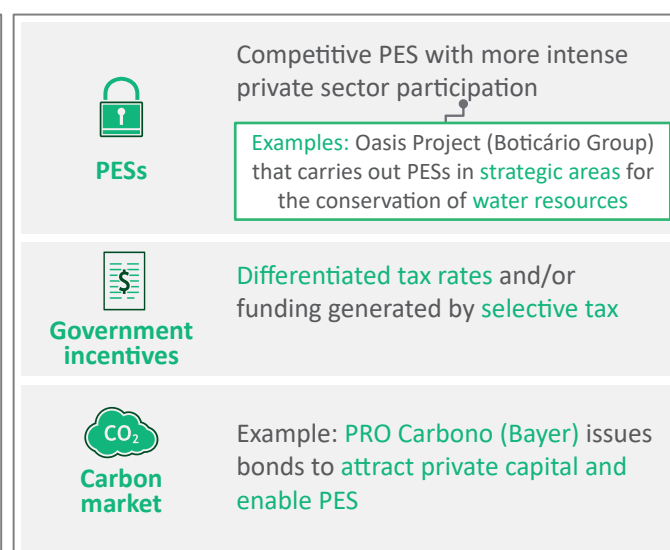
Note: Dollar fixed at BRL 5.50.

Source: Federal Government, Government of Goiás, Government of Pará.

Productive Hectare has a profitability up to 10x higher than existing PESs



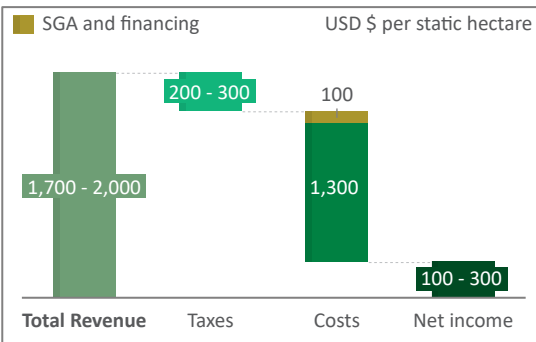
Three main mechanisms to directly encourage regenerative practices



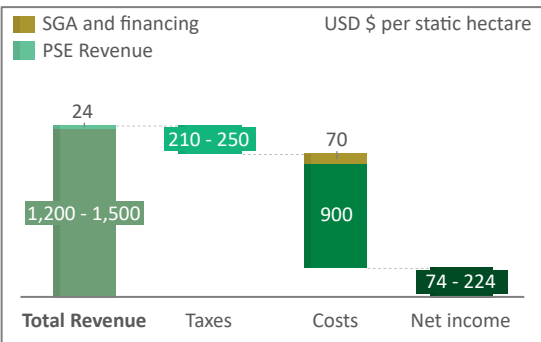
Note: Dollar fixed at BRL 5.50.

Adherence to the PES implies a relevant loss of margin to the producer

Scenario 1: No adherence to PSE



Scenario 2: With adherence to PSE



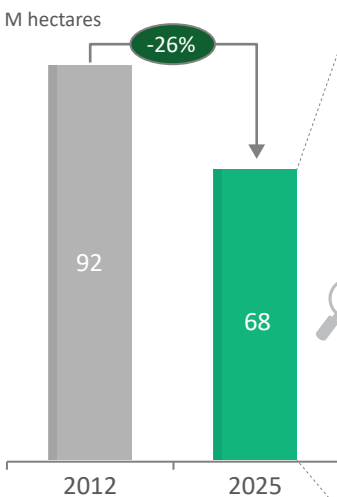
General minimum conservation area	20%	
Productivity per hectare	60 - 70 bags	
Soybean price / bag	USD 24	
Production area (Soybean)	80%	60%
PSE Area	0%	20%
Total PSE revenue	USD 0	USD 24 K

Source: Government of Goiás, Embrapa.

In addition, should PES mechanisms become more competitive, they have the potential to contribute meaningfully to the conservation and expansion of protected areas. Brazil has approximately 68 Mha of legal surplus (i.e., preserved areas that exceed the minimum legal preservation requirement), over which PSEs can be a major contributor to conservation.



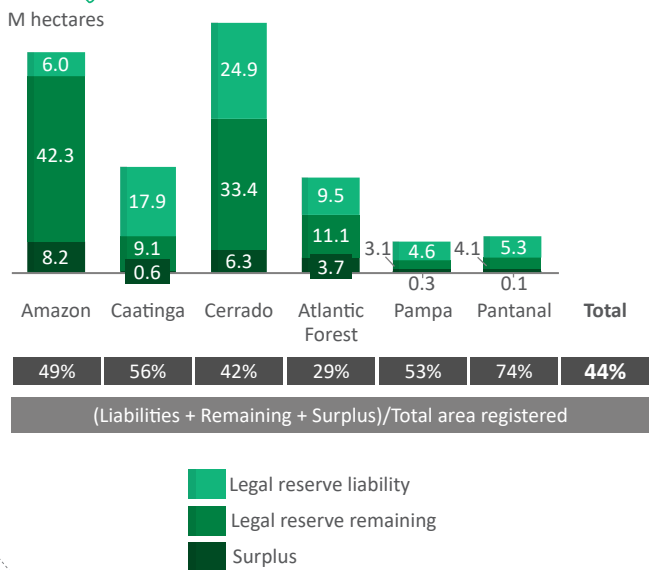
Evolution of the legal surplus area



Legal surplus: Preserved area that exceeds the minimum legal preservation requirement



Deep-dive by Biome

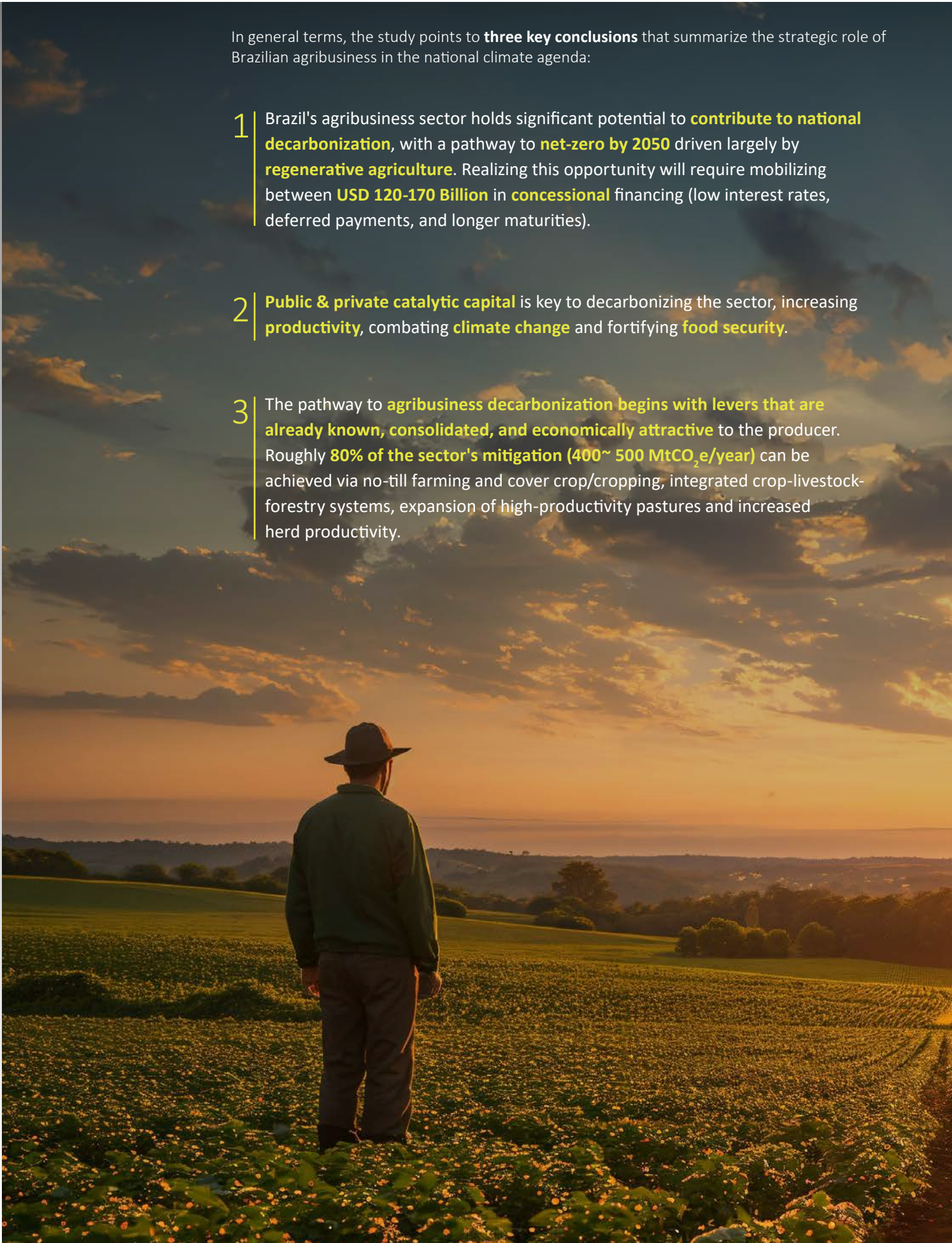


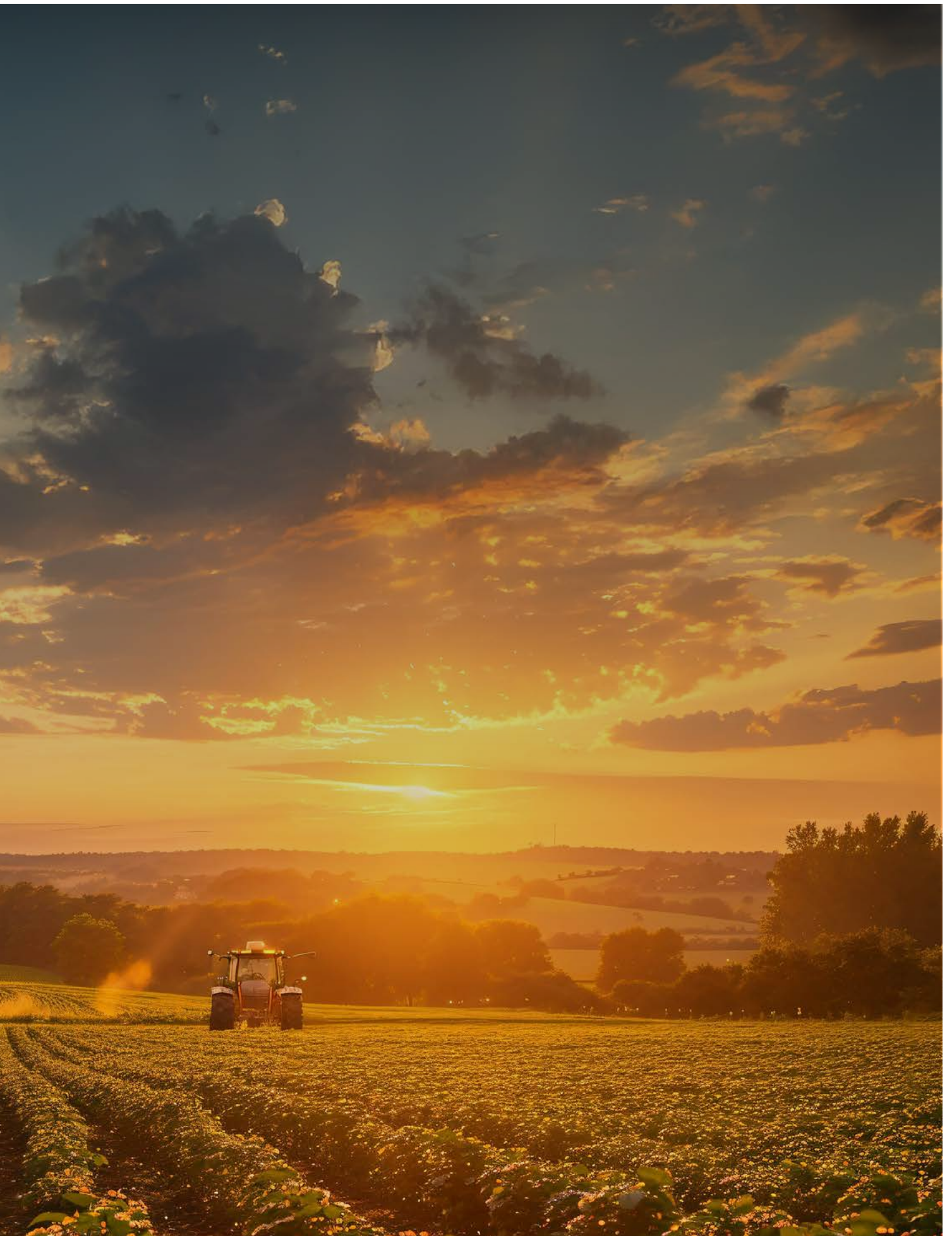
Considering a competitive compensation of USD 330, the maintenance of 190 Mha will require **USD 62 B/year**

Source: Soares-Filho et al. (2014), Forest Code Observatory (2025).

In general terms, the study points to **three key conclusions** that summarize the strategic role of Brazilian agribusiness in the national climate agenda:

- 1 | Brazil's agribusiness sector holds significant potential to **contribute to national decarbonization**, with a pathway to **net-zero by 2050** driven largely by **regenerative agriculture**. Realizing this opportunity will require mobilizing between **USD 120-170 Billion** in **concessional** financing (low interest rates, deferred payments, and longer maturities).
- 2 | **Public & private catalytic capital** is key to decarbonizing the sector, increasing **productivity**, combating **climate change** and fortifying **food security**.
- 3 | The pathway to **agribusiness decarbonization begins with levers that are already known, consolidated, and economically attractive** to the producer. Roughly **80% of the sector's mitigation (400~ 500 MtCO₂e/year)** can be achieved via no-till farming and cover crop/cropping, integrated crop-livestock-forestry systems, expansion of high-productivity pastures and increased herd productivity.







The Brazilian Business Council for Sustainable Development (CEBDS) serves as a platform for corporate engagement in sustainability, advancing responsible practices, innovation, and public policy frameworks aligned with long-term sustainable development goals.



AMAGGI is the largest national grain and fiber company and has four business areas (Agribusiness, Commodities, Logistics and Operations, and Energy). It operates throughout Brazil with farms, warehouses, offices, factories, river and road fleet, port terminals and hydroelectric plants, and is also present in seven other countries. It has a strong commitment to sustainable practices, with publicly assumed goals.



Nestlé has been active in Brazil for more than 100 years, with more than 30,000 employees, 18 factories and a presence in 99% of homes. It promotes nutrition, inclusion and sustainability, with responsible practices from the field to the table, reducing environmental impacts and regenerating the planet.



Tereos, originating as a cooperative, is a global powerhouse in the production of sugar, ethanol, and starches. Its significant Brazilian operations are concentrated on driving innovation, bioenergy development, and implementing sustainable practices.



Syngenta is a global agricultural technology company that offers seed and crop protection solutions, supporting producers in adopting more sustainable, resilient and efficient production systems.



Guided by its mission "Health for all, hunger for none," Bayer is a global company committed to developing innovative solutions that address some of humanity's greatest challenges in health and agriculture. Founded in Germany in 1863 and present in more than 80 countries, it has been active in Brazil for nearly 130 years — its second largest market in the world — with businesses in the Agriculture, Pharmaceutical and Consumer Health segments. It is committed to innovation, diversity and sustainability, continuously investing in research and development to promote advances that unite productivity, environmental preservation and access to quality health.



Citrosuco grows, produces and delivers food of natural and sustainable origin to various countries throughout the world. We develop our business based on integrity, with a focus on promoting a healthy planet and people, nurturing diverse and influential relationships with the entire chain.

