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BOOSTING REGENERATIVE AGRICULTURE IN BRAZIL:

a strategic analysis of metrics
and financing



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TECHNICAL INFORMATION

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COORDINATION:

Carla Gheler Costa – CEBDS

CONTENT AND REVIEW:

Carla Gheler Costa - CEBDS

Juliana Lopes - CEBDS

Anderson Ignácio - CEBDS

Gabriela Mota da Cruz - Consultant

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CEBDS ADDRESS:

Rua São José, nº 40. Edifício São José, 3º andar. Centro, Rio de Janeiro - RJ. CEP: 20010-020

Rua Dr. Virgílio de Carvalho Pinto, 445 – 3º andar (CIVI CO), São Paulo, SP. CEP: 05415-030

Contato: (21) 2483-2250 E-mail: cebds@cebds.org

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1. REGENERATIVE AGRICULTURE:

a Brazilian Pathway toward
Resilient Agricultural Systems
in the Face of Climate Change

This regenerative production model goes beyond sustainability, actively seeking to restore soil health, increase biodiversity, improve water cycles, and sequester carbon, while ensuring the productivity and resilience of the agricultural sector.

For regenerative agriculture to grow in scope and be acknowledged as a valuable practice, it is essential to develop solid, results-based metrics. These metrics, which measure everything from soil organic matter content and carbon sequestration to socio-economic indicators, are the key to unlocking green financing, attracting investment and guiding effective public policies. COP30 in Belém offers a unique opportunity for Brazil to present these solutions, highlighting its leadership in leveraging science and technology to turn agribusiness into a driver of positive environmental and social impact.

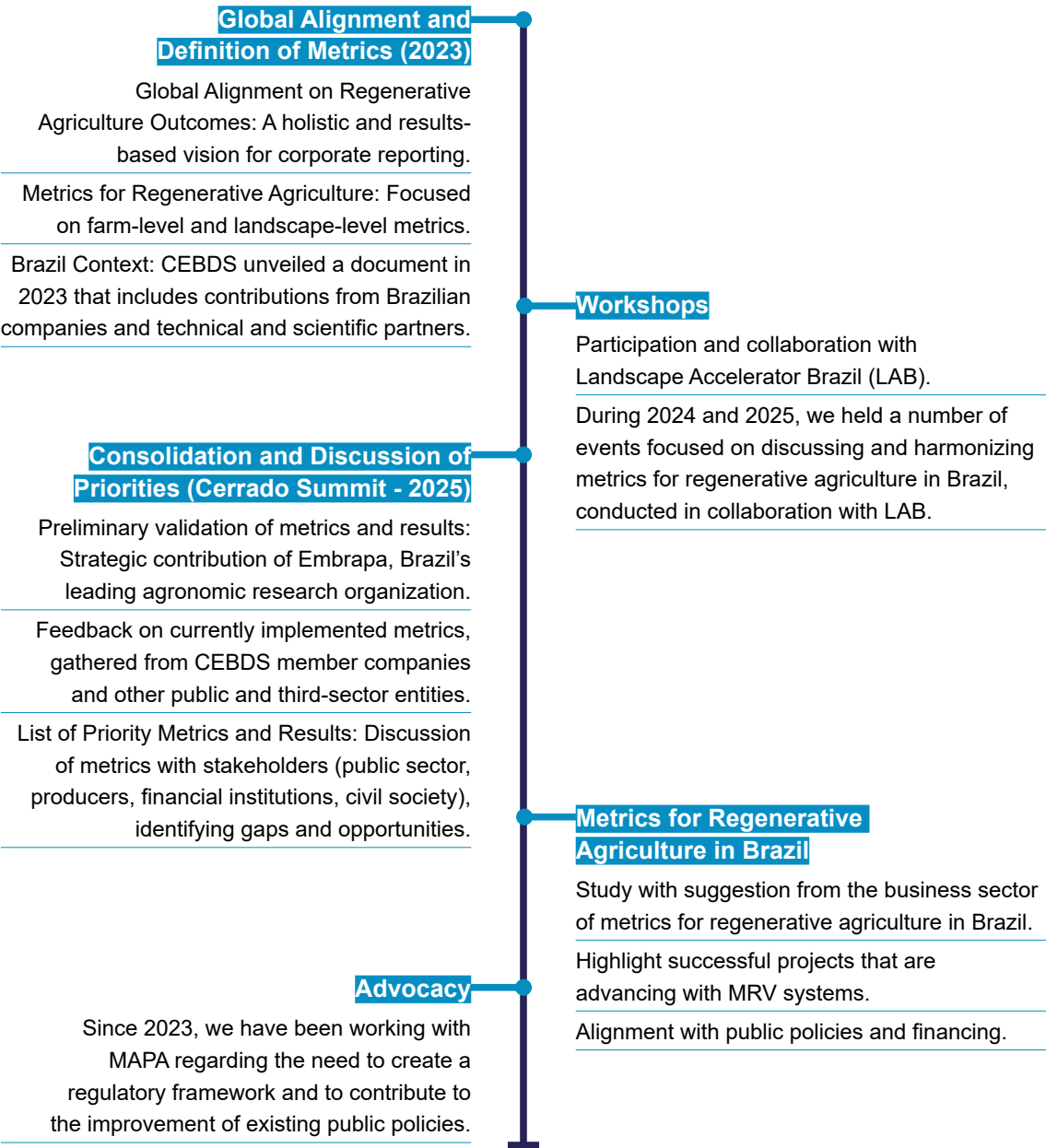
While the shift to more sustainable practices is already in progress across Brazil, a broader and more comprehensive strategy is necessary. Brazil's public programs — ABC Plan, ABC+, and RenovAgro — have shown measurable success. ABC Plan alone exceeded its targets, encompassing 52 million hectares and mitigating 170 million tons of CO₂ equivalent emissions. However, the scale required for transforming the sector demands a new financing architecture. Blended finance is emerging as an extremely important tool. It combines public and private capital to mitigate risks and leverage investments in projects that would otherwise not be viable. This approach, which uses guarantees and technical assistance to attract private investors, is crucial for Brazil to reach its full potential to be a leader in global climate discussions and initiatives at COP30.

One example of blended finance is ECOInvest, which is gaining recognition as a strategic financing mechanism under Brazil's Ecological Transformation Plan. With the goal of mobilizing between US\$9 and US\$11 billion in public and private capital by 2027, the fund was designed to accelerate the transition of agriculture toward low-carbon and regenerative practices. Structured as a Credit Rights Investment Fund (FIDC) and backed by the federal government as anchor investor, ECOInvest employs a blended finance approach to de-risk investments and mobilize private capital, providing long-term financing and more favorable interest rates for productive restoration initiatives. One of its core pillars is the Caminho Verde Brasil Program, which, supported by an initial investment of R\$30.2 billion, seeks to restore as much as 3 million hectares of degraded areas in its first phase. The initiative combines financing with stringent socio-environmental requirements, including a prohibition on deforestation, while also enabling strategic international partnerships, such as the negotiation with JICA (Japan International Cooperation Agency) for a potential US\$1 billion contribution. ECOInvest therefore represents a pivotal development in the strategy of combining food security, energy transition and environmental conservation, offering the private sector a secure and profitable pathway to invest in the restoration of millions of hectares of pastureland in Brazil.

From 2023 to 2025, the Thematic Chamber on Agrifood Systems engaged in the critical task of harmonizing and localizing global metrics to reflect Brazil's agroecological and socio-economic realities. The harmonization process was undertaken primarily through activities in collaboration with Landscape Accelerator Brazil (LAB), an initiative of the World Business Council for

Sustainable Development (WBCSD), CEBDS, and Boston Consulting Group, in partnership with the Brazilian Ministry of Agriculture and Livestock (MAPA). LAB's objectives are to foster: i) blended finance solutions to mobilize the transition; ii) effective MRV (Monitoring, Reporting, and Verification) systems to operationalize it; and iii) coherent public policies that sustain the transition and unlock private capital and scalable impact (Figure 1). By leveraging existing sector metrics and collaborating with the LAB team, we have developed a preliminary list of metrics suitable for measuring and tracking the outcomes of regenerative practices locally and across the landscape, which will also help facilitate financing and mitigate agricultural risks..

Figure 1. Timeline of the process of harmonizing metrics for regenerative agriculture in Brazil.



Source: CEBDS

For regenerative agriculture to grow in scope and be acknowledged as a valuable practice, it is essential to develop solid, results-based metrics. COP30 in Belém offers a unique opportunity for Brazil to present these metrics, highlighting its leadership in leveraging science and technology to turn agribusiness into a driver of positive environmental and social impact

This study displays how the Brazilian business sector is advancing regenerative agriculture through evidence-based strategies, while also strengthening the groundwork for creating effective public policies. The findings we highlight in the 2023 publication¹ demonstrate that regenerative agriculture is already in active implementation in several links in the production chain, showing significant and tangible progress in sustainable practices in Brazil.

Connecting the environmental, social and economic dimensions, this study emphasizes the importance of recognizing and rewarding agricultural practices that promote soil regeneration, biodiversity, water resources, safety and well-being for the producer, in addition to reducing GHG emissions. We do this without overlooking crucial aspects such as fair compensation for producers and improving the quality of life in rural areas. This integrated approach not only supports environmental and social sustainability, but also seeks to establish Brazil as a global leader in transitioning to a more regenerative, sustainable, and equitable way of conducting agricultural and livestock production.

The absence of clear metrics and performance indicators for regenerative agriculture has been one of the biggest challenges for its adoption and large-scale financing in Brazil. This gap has constrained producers' ability to adopt sustainable and regenerative practices and to access the capital needed for the transition. By providing guidelines and criteria for the development of metrics, this study is intended to make a decisive contribution to the ongoing discussion, with the goal of recognizing and validating farms that adopt regenerative practices and, in doing so, unlocking the financing potential for a more sustainable and resilient agribusiness in Brazil. Given that Brazil presents a strategic investment opportunity for the regenerative transition, an allocation of US\$93 billion enables pasture restoration and the expansion of regenerative practices over 50 million hectares, delivering an average internal rate of return (IRR) of 19% within 10 years, with feasibility validated across diverse biomes and agricultural models.

¹ Regenerative Agriculture in Brazil: challenges and opportunities. 2023. Available at: <https://cebds.org/publicacoes/agricultura-regenerativa-no-brasil-desafios-e-oportunidades/>

The regenerative agriculture approach extends beyond the traditional concept of sustainability, and actively seeks to continuously improve agricultural ecosystems. Its foundational elements include:

- **Optimization of Soil Health:** Increased organic matter and microbial life.
- **Increasing Biodiversity:** Promoting the diversity of plant species and beneficial fauna.
- **Improvement of Water Cycles:** Enhancing water infiltration and retention in the soil.
- **Input Management:** Strategic management to minimize the use and waste of agricultural inputs, increasing the efficiency and productivity of the crops.
- **Carbon Sequestration:** Capture and storage of atmospheric carbon in the soil.
- **Improvement of Rural Quality of Life:** Focusing on social and economic aspects, as well as the well-being of communities.

Practices such as no-till farming, crop rotation, integrated crop-livestock-forestry (ICLF) systems and the strategic use of bioinputs, and improved herd productivity are important elements of this approach, and together represent a potential to mitigate 80% of greenhouse gas (GHG)². To measure the success and impact of these practices, comprehensive metrics need to be developed that not only assess productivity, but also the health and resilience of the agricultural ecosystem as a whole.

² Agriculture Coalition - Decarbonization of agribusiness: Ways to reduce emissions and promote sustainability.

2. METRICS AND INDEXES: an Inclusive and Strategic Tool

This metric system has been carefully designed to consider its application for both large and small producers, providing a reliable and inclusive method to verify adherence to regenerative practices. Implementing these metrics can not only facilitate access to special markets and customized financing options, but also provide crucial data for public policies that drive agricultural sustainability. The business sector, represented here by CEBDS and LAB³, believes that studies and discussions are fundamental for the continuous refinement of metrics that will ensure the recognition and expansion of the positive results of regenerative agriculture in Brazil.

The coordination between the private and public sector, fostered by multi-sector analyses such as this, is essential for developing innovative financial mechanisms and boosting the scalability of these practices. Creating robust indicators to measure and certify the impact of regenerative agriculture is key to mainstreaming the model and unlocking progress toward a more inclusive and climate-resilient agrifood system for all stakeholders.

In this study, we examine potential metrics that demonstrate the effective adoption of regenerative agricultural practices by Brazilian producers, as well as the resulting social, environmental, financial, and economic outcomes.

The proposed metrics are intended to help the agricultural sector measure the multiple benefits of implementing regenerative agriculture, highlighting:

- Reduce greenhouse gas (GHG) emissions;
- Increase the resilience of food production systems in light of climate change, strengthening national food security;
- Improve soil structure and fertility by increasing organic matter and reducing erosion, improving water retention and preventing soil degradation;
- Promote biological diversity and ecosystem resilience.

It should be noted that the metrics presented here come from extensive consultation and discussion that have been ongoing since the study was initiated in 2023³, and in partnership with LAB3, MAPA, Embrapa and other civil society entities. This proposed set of metrics is neither final nor fixed. It represents an initial contribution from the business sector and may serve as a baseline for future discussions and initiatives aimed at developing regulatory frameworks, while also supporting existing public policies (Box 1).

³ Landscape Accelerator Brazil – An initiative of WBCSD/CEBDS/BCG under the Action Agenda on Regenerative Landscapes. Available at: <https://www.wbcsd.org/actions/landscape-accelerator-brazil-lab/>

Box 1. Metrics for measuring the results of regenerative agriculture practices in agricultural production in Brazil
(✓ - direct relationship; ☑ - indirect relationship)

Metrics	Unit of measurement	Related metrics	 Water	 Biodiversity	 Climate	 Social and economic	 Soil
GHG Emissions	MT CO ₂ e	Carbon intensity per unit of production or harvest.			✓		
Organic carbon in soil or organic matter content in soil	Mg C/ha		☑	☑	✓		✓
Above-ground carbon sequestration	MT CO ₂ e		☑	☑	✓	☑	☑
Biological health of the soil	BioAs (EMBRAPA)		☑	☑	☑	☑	✓
Application rate and type of input	kg/safra	Efficient use of nutrients (N and P) and environmental impact coefficient. Use of integrated pest and disease management. Use of bioinputs.	✓	✓	✓	☑	✓
Crop diversity	Unit	Functional index of crop diversity.	☑	✓	☑		✓
Presence of natural habitat (native vegetation) in the agricultural landscape	%/Km ²	Habitat connectivity index. Legal reserve surplus. Presence of permanent preservation areas.	☑	✓	☑	☑	☑
Change in land use (deadline in the forest code)	ha		☑	✓	✓	☑	☑
Use of freshwater	m ³ /production	Water stress risk level. Intensive water use per production unit or harvest.	✓	☑	☑	☑	☑
Productivity	t/ha			☑		✓	☑
Producers' perceptions of changes in quality of life and farm success	Socio-economic data of the farm – production/ha/crop, financial return	Net income from the property. Average productivity of the farm per crop and per hectare				✓	☑

Source: Prepared based on the CEBDS study (2023) and the work of LAB.

Given the need for a results-based methodology and the inherent complexity of the Brazilian agribusiness, the development of metrics should follow these guiding principles:

- **A Holistic Approach:** Not just a focus on carbon sequestration, but extending further to include biodiversity, water quality, soil health, and social and economic issues.
- **Regional Adaptability:** Ensure sufficient adaptability to adjust to the diverse climate conditions and soil types found in Brazil.
- **Ease of Measurement:** Prioritize indicators that can be collected in a practical and cost-effective way, especially for small and medium producers.
- **Alignment with International Standards:** Ensure compatibility with global frameworks to facilitate certification and access to international markets.
- **Focus on Results:** Emphasize metrics based on the impacts achieved, encouraging innovation and supporting local adaptation of practices.
- **Integration with Technology:** Incorporate the use of remote sensing, IoT (Internet of Things) and other technologies to optimize data collection and verification.
- **Social and Economic Inclusion:** Assess the economic and social impact on rural communities.
- **Transparency and Traceability:** Develop systems that allow practices and results to be tracked, boosting the trust of investors and consumers.
- **Long-term Approach:** Establish metrics that encourage and evaluate lasting changes in agricultural systems, recognizing that regeneration is an ongoing process.
- **Multi-sectoral Collaboration:** Ensure that producers, scientists, financiers and policymakers are all involved in the development of metrics to ensure their relevance and applicability.

Overall, these metrics are crucial for:

- **Certifying regenerative practices**, lending credibility and recognition.
- **Attracting investments** by quantifying the environmental and financial return.
- **Providing guidance** on effective and evidence-based public policies.

In addition to the socio-environmental benefits, adopting these regenerative practices and metrics is designed to promote the financial sustainability of rural producers. Properties that implement such practices not only protect the environment, but also experience tangible improvements in their profitability and operational efficiency. The metrics are designed to provide guidance to agricultural producers on the effective implementation of practices and tracking results that maximize these multiple benefits, which are fundamental to the long-term viability of regenerative agriculture in Brazil.

3. CONNECTING ENVIRONMENTAL SUSTAINABILITY

and Socio-economic
Prosperity

Integrating both the environmental and socio-economic factors, this study underscores the necessity of recognizing and rewarding farming practices that drive soil regeneration, preserve biodiversity, and mitigate climate change, all while securing equitable returns for farmers and enhancing the well-being of rural populations. This comprehensive and innovative approach helps solidify Brazil's position as a global leader in the transition to a regenerative, sustainable and equitable model of agricultural and livestock production, playing a key role in combatting food insecurity.

In order to scale-up financing for regenerative agriculture in Brazil and position the country as a global leader in the sector, an integrated strategy is proposed, based on the following:

- 1. Developing an Integrated National Strategy:** Align public policies, market instruments and private initiatives.
- 2. Creating Risk Assurance and Mitigation Mechanisms:** Develop specific financial instruments for regenerative agriculture projects.
- 3. Fostering Public-Private Partnerships:** Expand the development of blended finance programs.
- 4. Implementing a National Monitoring and Verification System:** Ensure that there is evidence to support the effectiveness and impact of these regenerative practices.
- 5. Training for Rural Producers:** Offer training in regenerative practices and access to innovative financing mechanisms.
- 6. Establishing Tax Incentives:** Create incentives for companies that invest in regenerative agricultural supply chains.
- 7. Developing a National PES Market:** Focus on Payment for Ecosystem Services for regenerative agricultural practices

These measures are necessary for establishing an environment that is conducive to the growth of investments in regenerative agriculture in Brazil, promoting a fair and efficient transition to more sustainable and resilient agricultural practices, while also strengthening Brazil's leadership role in the global agenda.

Well-defined metrics are the backbone for financing regenerative agriculture. They provide the basis for financial institutions, investors and policymakers to quantify environmental and economic benefits, which makes it easier to allocate resources and create appropriate financial products. Moreover, robust metrics help reduce risk, enhance transparency, and build market trust, which are critical elements for attracting large-scale investments.

According to the study titled *Resilience for the Future: A Viable Pathway to Regenerative Landscapes in the Cerrado*⁴, there are multiple opportunities to position the Cerrado as a global beacon for regenerative landscapes and agriculture. The region contains approximately 23.7 million hectares of degraded land and 8.6 million hectares under conventional agriculture, which adds up to around 32.3 million hectares with viable business cases for transition toward regenerative landscapes. The outlook is for approximately 100 billion dollars in NPV (Net Present Value) by transforming these 32.3 million hectares into regenerative landscapes, representing thousands of hectares of standing natural areas in the biome that could be conserved. In terms of emissions, this is equivalent to more than 140 million tons of CO₂e in mitigation and sequestration potential, while considering a business plan that implements regenerative practices, and it can benefit around 400,000 farmers.

There is a clear pathway in sight to scale regenerative landscapes in the Cerrado, primarily through a landscape approach built on three pillars, and requiring collaboration from the entire supply chain, financial actors, and the government to unlock the Cerrado's full potential:

- Motivating and initiating action among farmers;
- Financing for the transition;
- Verifying practices and results.

3.1 Public Financing: Initial Catalyst

Public funding for regenerative agriculture in Brazil has been a fundamental starting point, with flagship programs such as the ABC Plan (Low-Carbon Agriculture), ABC+, and RenovAgro paving the way. These programs offer advantageous conditions and have delivered significant results:

- The ABC Plan (2010-2020), for example, exceeded its initial targets, covering 52 million hectares (152% of the target) and mitigating 170 million tons of CO₂ equivalent (119% of the target), according to official data.
- RenovAgro, the successor to the ABC Program, allocated R\$7.68 billion for the 2024–2025 cycle, with interest rates between 7% and 8.5% per year, providing favorable terms to producers.

Despite the progress that has been made, it is clear that public financing alone is not enough to address the necessary scale of transformation in the Brazilian agricultural sector.

3.2 Blended Finance: Leveraging Private Capital

The transition to more sustainable and regenerative practices requires a more comprehensive approach — one that combines public and private funding. In this context, blended finance is becoming recognized as a crucial tool for leveraging additional resources and mitigating risks. This strategic approach merges public funds with private investment to finance projects that

⁴ *Resilience for the Future: A Viable Pathway to Regenerative Landscapes in the Cerrado*. March 2025. By Arthur Ramos, Shalini Unnikrishnan, Matheus Munhoz, Lucas Moino, Jack Bugas and Santino Lacanna.

have social and environmental impacts, using public or philanthropic funding to catalyze private investment in areas that would otherwise be considered high-risk or unattractive.

Blended finance mechanisms may include:

- **First-loss Guarantees:** Public or philanthropic funds assume the initial risks of an investment, making it more attractive to private investors.
- **Technical Assistance:** Public or philanthropic funds finance technical assistance to improve the viability and impact of projects, reducing risks for private investors.
- **Subordinated Funding:** Public or philanthropic capital accepts smaller returns or longer maturities, improving terms for private investors.

3.3 Other Funding Opportunities

- **Carbon Market:** Provides a significant opportunity for financing regenerative agriculture. Carbon credits, which are generated through regenerative practices, can be sold, thereby providing producers with a new source of income. Integrating these mechanisms with public policies and private financial instruments is essential to creating a more attractive and secure investment environment.
- **Payment for Ecosystem Services (PES):** PES is an increasingly important tool used to compensate producers for biodiversity conservation and deploying sustainable practices, complementing other forms of financing for regenerative agriculture.
- **Green Bonds:** These are debt securities used to fund projects with a positive environmental impact, like restoring degraded areas and sustainable land management. The growth potential of this market in Brazil is significant, but requires regulation and clear certification standards.
- **Cooperatives and Agricultural Associations:** Play a crucial role in helping small rural producers gain access to financial resources. These organizations can aggregate demands, reduce transaction costs, and offer the scale needed to access more sophisticated financing mechanisms, including blended finance and carbon markets. They also provide technical assistance and training, essential elements for the successful implementation of regenerative practices.

4. REGENERATIVE AGRICULTURE:

The Brazilian
Response to COP30

A clear and consistent definition of regenerative agricultural practices, along with standardized outcome indicators, is critical to enable their effective adoption and financing in Brazil. The absence of such definitions has limited the ability of producers to implement sustainable methods and to access financing that supports such initiatives. Consequently, this study aims to spearhead this dialogue, providing a framework for the creation of criteria and metrics essential for recognizing and validating farms that implement regenerative methods.

The proposed metric system has been developed to be applicable to both large and small producers, providing a reliable and inclusive method to verify adherence to regenerative practices. Implementing these metrics will facilitate access to special markets and customized financing options, and will also provide valuable data for formulating public policies that drive agricultural sustainability throughout the country.

These metrics are therefore essential not only for certification and financing, but also for guiding producers in optimizing their practices and for informing policymakers on priority areas for the development and support of regenerative agriculture in Brazil. This study emphasizes the central role that CEBDS has in driving this debate and continuously refining the metrics that will pave the way for a more sustainable and resilient agricultural future.

Regenerative agriculture is emerging as an essential paradigm for addressing the global challenges of climate change and food security. This document presents an in-depth analysis of robust metrics and the innovative financing mechanisms necessary to catalyze the adoption and scalability of regenerative practices in the Brazilian agricultural sector.

For regenerative agriculture to grow in scope and be acknowledged as a valuable practice, it is essential to develop solid, results-based metrics. These metrics, which measure everything from soil organic matter content and carbon sequestration to socio-economic indicators, are the key to unlocking green financing, attracting investment and guiding effective public policies. COP30 in Belém offers a unique opportunity for Brazil to present these solutions, highlighting its leadership in leveraging science and technology to turn agribusiness into a driver of positive environmental and social impact.

Opportunities to adopt regenerative practices cover an area of 32.3 million hectares, which is the size of Norway. The transition in 23.7 million hectares of degraded pastures, with the potential to restore ecosystem cycles, projects a return in 7 to 9 years. In another 8.6 million hectares of crops, the intensification of regenerative practices can generate an IRR (internal rate of return) of 16% to 29% and payback in 3 to 5 years. Based on interviews with local producers, BCG⁵, identified a clear openness to change, emphasizing that access to financing and technical assistance are key to making the transition viable. According to the World Economic

⁵ Available at: <https://cebds.org/publicacoes/resilience-for-the-future-a-viable-pathway-to-regenerative-landscapes-in-the-cerrado/>

Forum (WEF)⁶, the transition to regenerative agriculture can create a vast amount of business opportunities, which could potentially yield about US\$1.4 trillion a year and create 62 million new jobs worldwide.

CEBDS built a unified proposal² — a Science-based Agriculture Coalition to support the decarbonization of national agriculture. This initiative is designed to provide technical and strategic subsidies that provide guidance on the pathways for implementing the country's new NDC (Nationally Determined Contribution). This document presents 15 levers to drive low-carbon and regenerative agriculture, organized into two key areas:

- **Landscape Transformation Levers:** Include the conversion of degraded pastures into sustainable productive systems, such as integrated crop-livestock-forestry or high-yield pastures.
- **Complementary Levers:** Include practices applied in already productive areas that are capable of simultaneously increasing decarbonization and productivity, such as no-till farming, the use of cover crops and improving efficiency in livestock farming.

However, isolated practices are not enough. Creating a favorable investment environment requires both enabling conditions — such as accessible credit, risk-tolerant capital from development finance or philanthropic sources, and quality technical assistance — and targeted incentives that reward farmers who adopt regenerative practices, expand payment for ecosystem services, and build a strong carbon market. This combination of practical solutions, financial instruments, and consistent public policy signals has the potential to transform Brazilian agriculture into a global benchmark for regenerative production that is good for people, the environment, and the climate, while increasing the sector's competitiveness and resilience.

Scaling regenerative agriculture is the most promising path to a resilient and low-carbon agribusiness. Beyond simply being a set of practices, it is a strategy aimed at actively regenerating soil health, increasing biodiversity, and optimizing resource use. In social and economic terms, this transition ensures that input costs are reduced and the long-term profitability of the producer is strengthened, while also increasing productive resilience to extreme weather events, contributing to the fight against food insecurity. In environmental terms, regenerative agriculture is a powerful solution to climate challenges. It increases carbon sequestration in agricultural areas, with the potential to mitigate a significant portion of emissions and improve water cycles and the quality of ecosystems. Brazil, as an agricultural powerhouse, has the opportunity to take the lead in this global transition, merging economic prosperity with nature restoration.

⁶ The Future of Nature and Business, of the World Economic Forum - 2020. Available at: <https://www.weforum.org/search/?query=The+Future+of+Nature+and+Business%2C+do+F%C3%B3rum+Econ%C3%B4mico+Mundial>

5. CASE

Basic information



Bayer

Programa PRO Carbono

Bayer's PRO Carbono Program is the largest carbon program in Brazilian agriculture. It is active in 16 states and 671 municipalities, covering an area of approximately 220,000 hectares of soybeans, corn and cotton. Over 300,000 soil analyses were conducted, and the estimated benefits of the initiative are an average productivity gain of more than 11% and a carbon sequestration of 16%. The program was also launched in Argentina and is now present in 10 provinces.

The initiative is overseen by Bayer and engages a broad coalition of stakeholders, ranging from universities and agri-input firms to financial institutions. Partnerships work together to create protocols and models that fit the realities of tropical agriculture, and this collaboration is important to ensuring the effectiveness and scalability of the program.

The program is structured in phases that ensure the effectiveness and sustainability of the agricultural practices implemented. The process starts with the selection of plots, followed by a socio-environmental compliance evaluation to verify that participating areas adhere to the stipulated criteria. Next, soil sampling and analysis takes place to evaluate fertility and carbon, providing a detailed understanding of soil conditions and their carbon sequestration capacity. Producers receive technical assistance to develop a three-year management plan tailored to the specific needs of each property, with the goal of optimizing agricultural practices. In addition, the program offers access to special conditions for companies that encourage and facilitate the adoption of sustainable technologies and inputs.



Context

Bayer's PRO Carbono initiative is a three-year program, which began in the 2021-2022 harvest, and features a structured framework divided into key implementation phases. During the first year, the program was formally launched, including the selection of participating farmers and the designation of pilot areas. Baseline data were then collected, with the initial analysis of carbon present in the soil in the selected areas. Sustainable agricultural practices were also implemented during this period, accompanied by intensive training for farmers on soil management and the importance of carbon sequestration.

With the scaling up of regenerative agriculture practices, backed by academic collaboration and technical supervision, the program's third and final year features a second soil sampling and analysis phase geared towards evaluating carbon input compared to first-year benchmarks. An analysis of the results makes it possible to conduct a comprehensive evaluation of the overall impact of the program on agricultural practices and carbon sequestration. The results, which include increases in productivity and carbon sequestration, are presented in a final report.

Bayer's PRO Carbono not only focuses on carbon sequestration, but also promotes sustainable agricultural practices that aim to improve soil health and long-term productivity. The success of the program relies on collaboration with farmers in order to ensure that practices are adapted to local realities.

Also, our partnership with Embrapa, the largest research institution in the country, reinforces our ability to innovate and implement solutions based on scientific evidence. Together, we are exploring new frontiers in regenerative agriculture and decarbonization in an effort to scale sustainable practices and positively impact the agricultural sector as a whole. One of the key outcomes of the partnership with Embrapa is the creation of the PROCS model. It is a predictive tool that simulates soil carbon stock dynamics, helping reduce measurement costs and uncertainties, and enabling the rapid implementation of large-scale carbon removal projects. We also created the Footprint PRO Carbono, specifically adapted to the particularities of the Brazilian agricultural system, which calculates the carbon footprint of agricultural products in production systems, including soybean, corn and, more recently, cotton, helping in the most effective strategies for the decarbonization of the agricultural chain. These innovations are vital for making progress on the creation of indices that help farmers and industries in the decarbonization of their operations, promoting a more sustainable future for Brazilian.



Materiality

The broad scope of PRO Carbono demonstrates Bayer's commitment to sustainable agricultural practices and climate change mitigation, as well as the regeneration of agriculture through innovative and proven methods. PRO Carbono continually seeks to increase its impact and reach. Bayer has been investing in technology and strategic partnerships to facilitate the large-scale adoption of regenerative agricultural practices. This includes the use of tools like the Conecta PRO Carbono platform, which offers integrated MRV solutions. Bayer is also developing innovative methodologies to improve soil health and increase carbon sequestration, with the goal of expanding these practices to more regions and farmers.

PRO Carbono's expansion strategy also includes efforts to strengthen partnerships with research institutions, agricultural supply companies, and financial organizations. The goal is not only to scale up the adoption of sustainable practices, but also to ensure that farmers have access to the resources and support needed to implement them. Bayer is committed to continuing the development and scalability of PRO Carbono to address the challenges of climate change and promote a more sustainable and resilient agriculture in the future.



Financial amount

The program currently includes upwards of 1,900 producers in Brazil and 165 in Argentina, representing a network of more than 2,000 agricultural stakeholders throughout Latin America.

Bayer's agriculture division invests in innovation more than in any other industry in the sector. As of now, over 2.6 billion euros have been invested by 2024 in research and development of

new seeds and biotechnologies, more advanced crop protection products and digital tools that help us address the challenges posed to the global food system.



Analysis based on the maturity matrix of the sectoral context

By collaborating with research institutions, universities, and sector companies, PRO Carbono leverages a partnership ecosystem. This partnership model is vital for increasing the program's adaptability and facilitating its growth into new production areas. The use of blockchain technology for product traceability and information security strengthens stakeholder confidence and reduces risks, which is another factor behind the program's continuity and expansion.

Our partnership with Embrapa, the largest research institution in the country, reinforces our ability to innovate and implement solutions based on scientific evidence. Together, we are exploring new frontiers in regenerative agriculture and decarbonization, with the goal of scaling sustainable practices and positively impact the agricultural sector as a whole. This collaboration provides us with the opportunity to advance in technology and methodologies, as well as to ensure that our initiatives are aligned with national sustainability and economic development goals.

Our goals to achieve an 11% increase in productivity and the removal of 928 kg CO₂e/ha/year of carbon in farmers with high adherence to the practices, along with a 756 kg CO₂e reduction in the carbon footprint, underscores the importance of initiatives to ensure food security (SDG 2) and mitigate the impacts of climate change (SDG 13).

PRO Carbono was created in 2020 and brings together a variety of solutions and tools into a single, cohesive portfolio that has become a standard in Latin American agriculture. With a pioneering vision in the market, PRO Carbono has set a new standard for monitoring, reporting, and verification (MRV) processes that are economically and operationally viable, scientifically grounded, and aligned with the realities of Brazilian agriculture. The program enhances, measures, and scales regenerative agricultural practices aimed at increasing soil carbon retention.



Stakeholder engagement

Bayer's leadership demonstrates a solid commitment to sustainability and innovation in agriculture, as evidenced by the initiatives and statements of its executives. Bayer CEO Bill Anderson emphasizes that sustainability is central to all of the company's operations, reflecting a commitment to achieving ambitious goals that contribute to food security and climate change mitigation. This includes supporting agricultural practices that promote soil regeneration and the reduction of greenhouse gas (GHG) emissions.

Bayer is focused on providing farmers and other stakeholders around the world with the skills, knowledge, or resources they need to improve their practices. Bayer's leadership is engaged in creating a positive impact through strategic partnerships and projects that integrate sustainability into its operations.

The program guarantees farmers access to the tools needed to drive practices that maximize yield while simultaneously enhancing sustainability over the long term, thus creating a more resilient and efficient farming ecosystem. Through PRO Carbono, farmers not only improve their productivity and profitability, but also contribute significantly to climate change adaptation and mitigation. The program exemplifies how agriculture can align with global sustainability goals, promoting a greener and more responsible future.

A prominent success story within PRO Carbono is that of Brazilian producer Vanessa Boom. She has implemented sustainable management practices on her property, resulting in a significant increase in productivity. Through the adoption of a management plan with regenerative agricultural practices, such as cover crops and crop rotation, Vanessa was able to increase the productivity of her crop by 22% compared to the average farm, even when dealing with climatic challenges during the harvest.

By implementing PRO Carbono, Bayer empowers producers to adopt methods that increase efficiency and productivity while promoting sustainable agricultural practices. This is crucial to the mission of 'Zero Hunger' as more productive and sustainable agriculture can meet the growing demand for food in a world where the population continues to increase. Through PRO Carbono, Bayer is contributing to the creation of a food system that not only produces more, but does so responsibly and sustainably.



Results

The Conecta PRO Carbono initiative is notable for its integrated MRV approach and the provision of tailored land management plans that align with diverse regional contexts. Our approach not only improves productivity and maximizes carbon sequestration, but also lowers emissions and optimizes the use of inputs. This provides producers with high adoption of practices an 11% increase in productivity, the removal of 928 kg CO₂e/ha/year of carbon from the atmosphere, and a 756 kg CO₂e reduction in their carbon footprint, contributing to ensuring food security (SDG 2) and combating climate change (SDG 13).

We have a robust MRV (Conecta PRO Carbono) system that allows end-to-end verification, which facilitates full transparency, security and traceability of information. This system not only makes monitoring and managing processes more effective, but also provides valuable data, ensuring the necessary scalability to meet the demands of the agricultural sector.

Bayer has also developed unique machine learning and remote sensing models to verify agricultural practices, such as no-till farming, the identification of cover crops and the detection of deforestation. These models are able to derive information about more than 43 variables related to the agricultural system, allowing large-scale monitoring and reducing operating costs.

Another important tool is the PROCS Predictive Model, created in partnership with Embrapa, which simulates the dynamics of carbon stocks in the soil of agricultural areas. This tool reduces costs and uncertainties in assessing carbon stocks and accelerates the implementation of large-scale carbon removal projects.

The Guided Recommendation Module enhances agronomic decision-making by assisting producers in boosting productivity and refining practices such as no-till farming, cover crop integration, crop rotation, and input efficiency.

Footprint PRO Carbono is a tool designed to address the specificities of the Brazilian agricultural system. It was developed in partnership with Embrapa and is based on an internationally recognized Life Cycle Assessment (LCA) methodology. This tool calculates the carbon footprint of agricultural products in production systems, including crops such as soybean, corn, and cotton, thereby supporting the most effective strategies for the decarbonization of the agricultural supply chain.

By integrating a suite of solutions, PRO Carbono positions itself as a holistic and forward-thinking initiative, driving the transition toward more sustainable and productive agricultural systems. Integrating cutting-edge technology (such as machine learning and remote sensing) with strategic partnerships, PRO Carbono provides farmers with the tools they need to optimize their operations and reduce carbon emissions.

Also, our partnership with Embrapa, the largest research institution in the country, reinforces our ability to innovate and implement solutions based on scientific evidence. Together, we are exploring new frontiers in regenerative agriculture and decarbonization in an effort to scale sustainable practices and positively impact the agricultural sector as a whole

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<https://youtu.be/4cbY3jYE8gk?si=-8AoPdxLb80eO006>



Lessons learned

To encourage farmers to adopt regenerative practices in their areas, we have developed tools to help producers in the decision-making process as the carbon market and its regulations continue to evolve. Carbon credit certification frameworks in global markets often lack alignment with agricultural realities and present heightened complexity when applied to tropical conditions. With this in mind, we have focused our efforts on validating new methodologies that will help address the monitoring, reporting, and verification (MRV) challenges of soil carbon and its emissions. The use of techniques such as CNH, LIBs, and NIR to compare soil test results with soil analyses has enabled the recognition for operationally and financially scalable methodologies by international certifiers.

Conecta PRO Carbono provides the capability to make an end-to-end verification, which helps ensure that all data is transparent, secure, and can be traced back if needed. Verified by organizations like Control Union and Bureau Veritas in both Brazilian and Argentinian programs, this data offers the crucial scalability required to address the agricultural sector's demands.

The key factors for the success of the PRO Carbono program are varied and include both internal and external aspects of the organization. The initiative relies on partnerships with research institutions, universities and companies in the agricultural sector, expanding its capacity to adapt and grow in new regions. Integrating robust information security systems

reinforces stakeholder trust and risk management, enabling long-term program continuity and growth. Moreover, PRO Carbono offers direct benefits to farmers, such as market recognition and appreciation of their sustainable practices, encouraging participation and continuation of the program.

The collaborative approach, the commitment of Bayer's leadership and the structured management of the program are elements that guarantee its continuity and the potential for replication in different contexts. In short, the success of PRO Carbono comes directly from the combination of technological innovation, strategic partnerships and a strong commitment to sustainability, both on the part of Bayer and the other stakeholders involved.

Main challenges:

- Acceptance of methodologies and models adaptable to the tropical region;
- Interruption or abandonment of sustainable practices for economic, technical or climate reasons;
- Incentives to support the producer in the transition and intensification of the process.

