



RADAR AGTECH

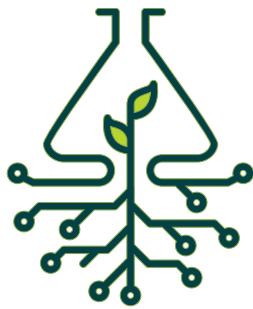
**STARTUPS, INNOVATION
ENVIRONMENTS AND INVESTORS
OF THE BRAZILIAN AGRICULTURAL ECOSYSTEM**

BRAZIL 2024



*Executive Board for Innovation, Business
and Technology Transfer*

*SP Ventures
Homo Ludens Innovation and Knowledge*



RADAR AGTECH

STARTUPS, INNOVATION ENVIRONMENTS AND INVESTORS OF THE BRAZILIAN AGRICULTURAL ECOSYSTEM

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Message from Embrapa

The role of innovation networks in the sustainable development of Brazilian agriculture

The Brazilian agri-food innovation ecosystem is constantly changing, driven by the synergistic interaction between research institutions, startups, universities, the productive sector and other players. Agriculture, which accounts for around 22% of Brazil's GDP, has benefited from this movement, in which open innovation and co-creation play key roles in accelerating digital transformation and the adoption of emerging technologies. At Embrapa, we understand that agri-food research is the backbone of this revolution, translating scientific knowledge into tangible solutions for the sector's challenges. The transformation is also taking place in the perception of the agri-food sector's role in sustainability, which, in addition to providing food, energy and fiber, is a fundamental pillar for securing a healthier planet and a better world for all. International commitments, such as the 2030 Agenda, and high-impact events, such as the United Nations Framework Convention on Climate Change, have shown that tropical agri-food science is an inseparable part of global solutions for mitigating environmental impacts.

As a historical protagonist in this discussion, Brazil will host COP30 in November 2025 in Belém/PA, reaffirming its commitment to a more sustainable future. Our journey is also marked by important milestones such as Eco-92 and Rio+20, which consolidated the contribution of national agri-food research in creating strategies for efficient, environmentally conscious production and an important part of the solutions for mitigating climate change and adapting to this scenario.

All of these relevant points are portrayed in the 2024 edition of the already renowned Radar Agtech Brasil. With regards to the new players in the agri-food innovation ecosystem, this report presents, for the first time, more in-depth data on innovation environments and investors, in addition to agtechs and foodtechs. Thus, it is possible to extract more powerful insights into the key factors for the success of new ventures.

Regarding sustainability, in light of COP 30, it is worth emphasizing the cases presented in chapter 1, many of which have a close and direct relationship with Embrapa. In this issue of Radar, it is clear that we are living in a moment when it is essential to create truly connected and lively networks in order to put into practice the development of the Brazilian agri-food sector for the sustainable transformation of the world.

Happy reading, everyone!

Silvia Maria Fonseca S. Massruhá
President of Embrapa

Message from SP Ventures

From the Field to Global Leadership: The Resilience Moves Brazilian Agriculture

In 2024, the Brazilian and global economies faced significant challenges, causing impacts in the financial markets and testing the resilience of several industries. However, Brazilian agribusiness remained a strategic pillar for the country, strengthening its position as one of the largest food producers and exporters in the world. Despite climatic distress, exchange rate volatility and an uncertain fiscal scenario, innovation in agribusiness has continued to advance, proving that investing in agribusiness in Brazil is different from investing in Brazil.

The adoption of technology in the field continues to expand, making Brazil the second country in the world in terms of digitalization of agriculture, second only to the United States. Brazilian rural producers have shown great capacity to adapt and are constantly seeking innovation, driving sectors such as biologicals, AgFintechs, agricultural digitalization and artificial intelligence applied to the field. The technological transformation of Brazilian agriculture is creating a new level of efficiency, traceability and sustainability, reinforcing the country's leading role on the global stage.

Investments in AgFoodTechs in Latin America grew by 25% in 2024, countering the downward trend seen in other technology sectors. However, the allocation of capital in agribusiness is still insufficient, with Latin America receiving less than 5% of global investments in AgFoodTechs, despite the sector representing 20-25% of Brazil's GDP. This misalignment highlights a clear opportunity for investors seeking sustainable, long-term returns in a sector with growing demand for innovation and efficiency.

Radar Agtech 2024 reflects the maturity of this ecosystem, expanding its scope beyond startups and including Venture Capital funds, Corporate Venture Capitals (CVCs) and strategic investors who are shaping the future of the industry. The unprecedented survey of investors provided valuable insights into the market's challenges and opportunities, emphasizing the importance of a more integrated and structured ecosystem to foster innovation in agriculture.

SP Ventures remains steadfast in its mission to strengthen this ecosystem. With over a decade of experience and more than 40 successful investments, we continue to drive the startups that are revolutionizing the way food is produced, distributed and consumed. We believe that Brazil has all the ingredients to be a major global hub for innovation in AgFoodTech and that, with the right support, the country can consolidate its role as a technological leader in agribusiness.

Radar Agtech 2024 continues to fulfill its role of mapping, connecting and fostering innovation in agribusiness. We are proud to be part of this movement and to support the entrepreneurs who, with vision and determination, are building an increasingly productive, sustainable and innovative agribusiness.

Felipe Guth & Francisco Jardim
SP Ventures

Message from Homo Ludens

Radar Agtech Brazil: 5 years expanding knowledge and strengthening agri-food innovation

Radar Agtech Brazil 2024 marks five years of partnership between Homo Ludens, Embrapa and SP Ventures, strengthening its position as the leading reference in strategic intelligence for the agri-food innovation sector in Brazil. Since its first edition in 2019, the study has followed the evolution of the Agtech ecosystem, identifying trends, highlighting the growth of regional innovation hubs and strengthening the connection between startups, investors and the productive sector.

The total number of mapped Agtechs grew from 1,125 in 2019 to 1,972 in 2024, evidencing the swift growth of the industry. In addition, the study shows greater geographical decentralization, with decrease in the state of São Paulo's share of the total number of startups, from 52.5% in 2019 to 43.5% in 2024.

Radar Agtech 2024: an expanded look at the agri-food ecosystem

In this edition, we have broadened the scope of the mapping beyond startups, incorporating two new essential pillars:

- **Innovation environments:** The survey identified 451 hubs, incubators, technology parks and accelerators that drive innovation in agribusiness. The Southeast concentrates 36.8% of these environments, followed by the South (31.2%) and Northeast (17.5%), highlighting the regional diversification of the ecosystem.
- **Investors in the sector:** The survey mapped venture capital funds, corporate ventures and other financial initiatives that enable Agtechs to scale and grow. The number of investors focused on Agtechs and Foodtechs has significantly increased in recent years, reflecting the maturity of the industry and providing new opportunities for startups.

With this new scope, Radar Agtech Brazil 2024 becomes an even more powerful tool to understand the connections between innovation, investment and impact in the agri-food chain.

Contributing to the entire ecosystem: from startups to the field

Innovation in agriculture is not just about startups. The impact of agtechs needs to reach rural producers, promoting efficiency, sustainability and competitiveness. Radar Agtech 2024 highlights this connection, exploring how the different players in the ecosystem (startups, investors and innovation environments) converge to transform the agri-food chain.

Despite the challenges, the sector continues to evolve strongly. The following advances stand out:

- Digitalization of the countryside: Technologies for farm management, remote sensing and agricultural automation are increasingly present, with the “Inside the Farm” segment accounting for 41.5% of Agtechs in 2024.
- Sustainability and climate change: The use of bio-inputs, traceability and regenerative agricultural practices has grown, driving sustainable innovation in the sector.
- Investment has matured: The number of investors and funds targeting Agtechs has increased, reflecting greater confidence in the potential for agri-food innovation.
- Internationalization: Brazilian agribusiness startups are connecting to global innovation hubs, expanding their market and access to advanced technologies.

Celebrating the future of agri-food innovation

Over five years, the partnership between Embrapa, SP Ventures and Homo Ludens consolidated Radar Agtech Brazil as a benchmark for the sector. With a broader scope in 2024, we emphasize our commitment to producing strategic knowledge, supporting innovation and contributing to a more digital, sustainable and globally connected agribusiness.

Let’s move forward together for the coming years, strengthening the ecosystem and ensuring that innovation reaches the entire agri-food chain, from the rural producer to the end consumer.

Luiz Ojima Sakuda

Co-founder and partner of Homo Ludens Innovation and Knowledge

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Cubo Itaú and its team, a partner in the launch event, creating a forum to discuss and present the data from this important study. We would also like to thank the Ministry of Foreign Affairs, represented by Minister Mauro Vieira, for the visibility and dissemination of the study internationally.

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Introduction

• *Aurelio Martins Favarin, Luiz Ojima Sakuda and Pedro Jábali*

The agtech startup segment¹ is a key element in the context of the revolution that the agri-food sector is undergoing, characterized by an unprecedented transformation, driven by growing demands for sustainability, productivity and efficiency. The opportunities generated by the Conference of the Parties - COP 30 (to be held in Belém-PA in November 2025) and the 2030 Agenda, signed by more than 190 countries in 2015, not only drive state commitments, but also reflect transformations in society.

In this context, the agri-food innovation ecosystem is an essential component in Brazil, with a special focus on agtechs. By developing cutting-edge technologies and establishing collaborative actions with other players in the ecosystem, such as universities, research institutes, large companies, innovation hubs and investors, agtechs play an important role in building a sustainable future for the agri-food sector, both nationally and globally.

Portraying this reality, we present the 5th edition of Radar Agtech Brazil, a consolidated report on the mapping of the Brazilian agri-food innovation ecosystem, with its first edition in 2019. Carried out through a partnership between Embrapa, Homo Ludens and SP Ventures, Radar Agtech continues to evolve and delve deeper into topics connected to the innovation ecosystem, acting as a bridge between the different players that make up the ecosystem.

The current edition of Radar Agtech broadens the scope of the analysis from its previous editions. In addition to mapping Brazilian agtechs, the study presents the results of a survey answered not only by startups, but also by innovation environments and investors in the industry. Specific forms with questions were applied to each audience in order to obtain a better characterization and survey their performance in the context of the agri-food innovation and entrepreneurship ecosystem.

The survey carried out in 2024 identified around **1,972 agtechs** operating along the production chain (before, inside and after the farm), in various technological categories and in all regions of the country.

Innovation-promoting environments play a strategic role in the development and growth of startups through an approach focused on experimentation and collaboration. These environments can have different models – accelerators, hubs, incubators and technology parks – which provide startups with ideal conditions for expanding beyond their local markets, such as infrastructure, training, robust networks of partners and the formation of international collaboration networks for innovation.

In this edition, more than 450 players have been identified as environments that promote innovation, in different contexts, with various offers, making an important contribution to the development of startups and to agricultural innovation in general. With regard to the investment scenario in the agtech segment in Brazil, challenges, trends and opportunities that shape the future of the sector are presented. In a year of macroeconomic instability and regulatory changes, Brazilian agribusiness has reaffirmed its resilience, driven by innovation and the growing interest of investors.

¹ The concept of agtech and agritech, acronyms for “agricultural technology”, is used broadly in the report, focusing startups that are related to the agricultural sector and/or the agri-food system. In this way, it includes foodtechs/agrifoodtechs and startups with theses connected to agribusiness.

With the strengthening of sector funds, Corporate Venture Capitals (CVCs) and new investment theses in biologics, the digitalization of agribusiness and agfintechs, the sector is moving towards an increasingly structured transformation. This report brings exclusive and unpublished data that outlines a promising horizon for technological development in agribusiness.

The 2024 edition seeks to provide its readers with a holistic view of the agri-food innovation and entrepreneurship ecosystem, with qualified information that can foster more connections between startups and mechanisms that generate new ventures, as well as expanding access to venture capital by surveying the players in the segment.

Thus, Radar Agtech Brazil is established as an important strategic platform for integrating the different players in the ecosystem, such as producers, entrepreneurs, investors, corporations and public policy makers.

In 2024, events were held as preparation to the current edition, in the form of webinars, with the aim of building a sense of community within the agricultural innovation ecosystem. These meetings covered topics such as the challenges of agtech startups in the innovation ecosystem and investments. New actions can be expected for 2025, such as the Radar Agtech Summit.

Radar Agtech Brazil 2024 is organized taking into account all of these elements, including an overview on the innovation ecosystem, highlighting actions, interactions and opportunities, as well as presenting the data from the mapping and the responses from the surveys regarding innovation environments, startups and investors, in addition to the methodology used. We wish you all an excellent read!

The Brazilian agri-food innovation ecosystem: actions, interactions and opportunities

• *Aurelio Martins Favarin*

The Brazilian agri-food innovation ecosystem, or rather the different agro-oriented ecosystems in the country, are full of successful cases, which are either already well-established or under construction. With this in mind, the first chapter of Radar Agtech Brazil 2024 presents the different actions, interactions, especially with other international ecosystems, and opportunities related to Brazilian ecosystems.

Initially, it is essential to ponder on all the opportunities created by COP 30, which can be reflected regionally, considering the territory of the Legal Amazon, but also for the country as a whole, taking into account the growing demand and supply of startups focused on sustainability. This is followed by a very interesting case study which positions the AgNest farm lab as a major international connection point. At the end of the chapter, we present cross-cutting and regional stories of success that demonstrate the richness and diversity of actions, with a strong focus on the players involved.

The innovation ecosystem in the year of COP 30

• *Ana Margarida Castro Euler and Daniel Trento do Nascimento*

The 30th Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) will take place this year, during November, in the city of Belém, in the state of Pará. This is an annual event when leaders, experts and activists from all over the world come together to discuss and make decisions about climate change and solutions for mitigation and adaptation to the new climate scenarios. Holding this global event in Brazil is a unique opportunity for the country to assert its vocation for sustainable agriculture and lay the foundations for a new economy based on natural resources, i.e. the bioeconomy.

As in other sectors, bringing research, society and the productive sector closer together is key to promoting innovation and, consequently, a cycle of sustainable development.

In recent COPs, countries have made commitments and defined targets to reduce greenhouse gas emissions, while also focusing on adaptive actions. An important point in recent discussions is the idea that agricultural activities, often seen as villains in gas emissions, should be part of the solution to climate change. Thus, adaptation becomes more prominent in the climate debate.

Therefore, it is evident that mechanisms to finance adaptation are needed, which, in turn, requires practices, technologies and processes that can be adopted by rural producers.

In this sense, numerous technologies and practices can be implemented to increase sustainability in the diversity of “agricultures” that exist in Brazil’s five biomes. The use of bio-inputs, such as biofertilizers and biopesticides, is a growing trend, promoting

the replacement of chemicals with more eco-friendly alternatives. Integrated crop–livestock–forestry (ICLF) is another innovative technology that can help increase productivity

while preserving the environment. In addition, low-carbon agricultural practices, such as precision farming and the adoption of digital technologies, have the potential to significantly reduce emissions, increase the efficiency of agricultural processes and improve the sustainability of production chains.

The segment of bio-inputs has stood out in terms of startup increase, in Brazil. These biological inputs replace traditional chemical products, such as pesticides and fertilizers, offering a more sustainable alternative with less impact on the environment. Bio-inputs include bio-pesticides, bio-fertilizers, inoculants and other products that help improve agricultural productivity and promote soil health, biodiversity and balance with the surrounding ecosystems.

The segment of startups dedicated to carbon and climate-related solutions has also seen significant growth in recent years. This movement reflects a growing transformation in the agricultural sector, which is seeking to reduce its greenhouse gas emissions, adopt more sustainable practices and align itself with growing global demands for more sustainable and efficient agriculture.

However, despite this phenomenon, the consolidation of these ventures and innovations relies on a number of factors, entrepreneurship and technological innovation. The culture of entrepreneurship in agribusiness, such as startups focused on sustainable technologies, plays an essential role in transforming the industry. Radar Agtech, a study carried out by Embrapa, by monitoring startups in the agricultural sector, is a key tool to identify the most promising initiatives.

For Brazil, a country that is both one of the world's largest agricultural producers and one of the most affected by climate change, COP 30 will have an even more special significance. The event will focus on crucial issues such as reducing greenhouse gas emissions, resilient food systems, the bioeconomy, the use of bio-inputs, Integrated crop–livestock–forestry (ICLF) and other low-carbon technologies.

In this context, Radar Agtech plays a key role. It provides a detailed X-ray of agribusiness startups in Brazil, tracking innovation, emerging technologies and the areas in which these companies operate. The relevance of this study for COP 30 is clear: Radar Agtech maps the agribusiness innovation ecosystem, allowing us to identify trends, solutions and technologies that can be used to promote agricultural practices with a lower environmental impact.

With the support of emerging technologies, Brazilian startups are developing solutions to mitigate greenhouse gas emissions, improve efficiency in the use of natural resources and optimize agricultural processes. Radar Agtech provides data on companies that are developing low-carbon solutions, such as regenerative agriculture, the use of bioinputs, precision agriculture technologies and other innovative solutions that can help meet the demands that will be presented at COP 30.

For example, the study can identify startups that are developing sensors and digital platforms to monitor methane emissions in livestock farming, or those that are creating biopesticides to replace chemicals in agriculture. Such data is important for building public policies that encourage the adoption of technologies that help agricultural sector meet its global climate commitments.

In addition, the low-carbon technologies being mapped by Radar Agtech can contribute directly to the COP 30 commitments to reduce greenhouse gas emissions and promote more sustainable practices in agriculture. Supporting these startups is essential to creating an innovation ecosystem that allows efficient and accessible solutions to be disseminated throughout the sector.

COP 30, which takes place in November 2025 in Belém, will be a unique opportunity for Brazil and the world to move towards a more sustainable future. The role of the agricultural sector will be central to this process, and innovation will be the key to transforming agricultural production into a more efficient, inclusive activity with lower environmental impacts.

Therefore, it is important to understand that startups are not born out of thin air. There is a whole set of elements that favor their emergence and one of them is the existence of mature innovation ecosystems.

Innovation ecosystems are spaces that aggregate infrastructure and institutional and cultural arrangements and attract entrepreneurs and financial resources, constituting places that enhance the development of society and knowledge, including, among others, science and technology parks, smart cities, innovation districts and technology hubs (MLCTI, 2018).

Since its first edition, Radar Agtech has shown the geographical distribution of the concentration of startups in Brazil and it is clear that these ventures are concentrated in the south and southeast, precisely because they have more mature ecosystems. This makes it clear how important it is to induce and support regional innovation ecosystems in the northeast and, when it comes to the bioeconomy and a nature-based economy, how important it is to strengthen ecosystems in the north of the country.

Supporting entrepreneurship in the areas of the bioeconomy, bioinputs, low-carbon technologies, adaptation to climate change and sustainable agricultural practices is essential not only for achieving global climate goals, but also for positioning Brazil as a leader in innovation for the bioeconomy. Thus, this study carried out by Embrapa and partners provides relevant data for COP 30, contributing to the creation of effective public policies and encouraging investment in technologies that will make Brazilian agribusiness a global example of sustainability and innovation.

Global connection as an innovation strategy: the potential innovation environments

● *Janaína Paula Marques Tanure and Mark Jarman*

The agricultural innovation sector is facing an unprecedented transformation, driven by growing demands for sustainability, productivity and efficiency. Agtechs are among the main drivers of this revolution, developing technologies that shape the future of agriculture. As economic, social and environmental challenges become more urgent, the need to work collaboratively, establish strategic partnerships and access global markets becomes even more relevant for shaping effective solutions to complex problems such as climate change and food insecurity.

Innovation-promoting environments, such as technology parks and innovation hubs, have stood out as catalyzing agents in this process. In the current interconnected and economically globalized world, in which institutions recognize the need for collaborative innovation beyond their internal talents, these spaces have taken on a strategic role, as they function as dynamic ecosystems that promote local interactions and facilitate inter-institutional and transnational connections. These environments create bridges between ecosystems in different regions, facilitating the flow of ideas, people, technologies and capital across geographical borders.

This chapter presents global connections as an innovation strategy and discusses how innovation environments can play a strategic role in the internationalization of startups and the creation of international collaboration networks for innovation. Equipped with state-of-the-art infrastructure, robust networks of partners and an approach geared towards experimentation and collaboration, these environments provide startups with ideal conditions for expanding beyond their local markets. Through global partnerships, startups have the opportunity to adapt their technological solutions to different agricultural contexts, opening up new commercial opportunities and expanding the adoption and impact of their solutions in the production chains in which they operate.

From local environments to global networks: the role of innovation environments

Innovation-promoting environments are spaces conducive to innovation and entrepreneurship. Typical of the knowledge-based economy, they articulate companies, government, Scientific, Technological and Innovation Institutions, development agencies and civil society organizations, and involve two dimensions (BRASIL, 2018):

- a) **Innovation ecosystems:** spaces that unite infrastructure and institutional and cultural arrangements that attract entrepreneurs and financial resources. These places enhance the development of the knowledge society and include, among others, science and technology parks, smart cities, innovation districts and technology hubs; and
- b) **Venture generation mechanisms:** mechanisms to promote innovative ventures and support the development of technology-based startups, which involve innovative businesses based on technological differentiators and seek to solve social and environmental problems or challenges. They offer support for transforming ideas into successful ventures and include, among others, business incubators, business accelerators, open spaces for cooperative work and open laboratories for prototyping products and processes.

Innovation-promoting environments are vibrant ecosystems that accelerate open and collaborative innovation. They play a central role in stimulating entrepreneurship, technology transfer and the transformation of good ideas into innovative, viable and scalable market solutions. They also foster business partnerships, collaborative networks in RD&I, access to infrastructure and the exchange of knowledge, promoting the development of shared solutions that drive the generation of value in production chains, meeting the demands of the market and society. Examples of these spaces are:

Business incubators: Organizations that support startups and entrepreneurs in the creation and development of new businesses. They usually provide physical offices, shared services, guidance and training for entrepreneurs and early-stage startups.

Their main objective is to prepare companies for success in the market by providing them with a solid foundation and well-planned business strategies (SEBRAE, 2023a).

Technology parks: Planned business and technological development sites that promote a culture of innovation, industrial competitiveness, business training and synergies in scientific research, technological development and innovation activities between companies and STIs (Scientific, Technological and Innovation Institutions) (BRASIL, 2016).

Technology hubs: Industrial and technological environments characterized by the presence of micro, small and medium-sized companies with related areas of activity in a given geographical space, with operational links to STIs, human resources, organized laboratories and equipment and with a predisposition to exchange between the entities involved for the consolidation, marketing and commercialization of new technologies (BRASIL, 2016).

Innovation centers: Physical facilities where coordinated actions are carried out to promote innovation, through governance, integration, qualification, investment attraction and entrepreneurial connection, and which can bring together startups, accelerators, incubators, companies of various sizes, anchor institutions, universities, research centers, investors and institutions that foster innovation and entrepreneurship in the same physical space (BRASIL, 2019).

Innovation hubs: Physical or virtual environments that promote connection and collaboration between various players in the innovation ecosystem, such as startups, companies, educational and research institutions, investors and others. They are spaces that encourage interaction and the development of innovative businesses, favoring networking and connections for strategic partnerships (SEBRAE, 2023b).

Farm Labs: Environments dedicated to developing, testing and validating innovative agricultural technologies in real-life conditions. They can be experimental farms or specialized facilities that integrate digital and precision technologies, such as drones, sensors, the Internet of Things (IoT) and artificial intelligence, to help producers make decisions (BRASIL, 2023). Farm Labs offer companies the opportunity to evaluate their solutions in practical environments, accelerating the adoption of innovations in the agricultural sector.

Each innovation-promoting environment has its own characteristics, strengths and weaknesses, according to regional demands and conditions. Interaction with other environments can promote an additional effect to their capacities, which adds value to startups wishing to scale up and access new markets, especially international markets. One example is the city of Tel Aviv, in Israel, which is ranked 4th in the TOP 40 global ecosystems, according to The Global Startup Ecosystem Report 2024, carried out by Startup Genome (STARTUP GENOME, 2024). Due to an extremely small and competitive domestic market, startups in this region are born with global ambitions. As such, connecting early on to innovation ecosystems and accessing international markets is a prerequisite to become well-established, obtain financing and achieve success. This type of behavior is characteristic of companies known as international new ventures (Oviatt & McDougall, 1994) or born globals (Knight & Cavusgil, 1996), which, from the start of their activities, seek to gain a competitive advantage by operating in different countries.

Another relevant point that can also be observed in the world of startups is government investment in the scale-up stage, so that they can overcome the initial development phase and move on to accelerated growth and market expansion. Governments around the world are aware that long-term investments in startup ecosystems will only be effective if these local companies reach global success (STARTUP GENOME, 2024). To achieve this, in addition to supporting startups in their initial phase, their growth must also be strengthened, ensuring their ability to compete and thrive in international markets and thus boosting the economic development of their countries of origin. In this context, it is essential to improve public policies aimed at stimulating and supporting innovative environments, including mentoring, commercialization and access to global markets. These actions must be integrated with initiatives that promote regional development in the economic, social, cultural and environmental spheres.

Additionally, innovation-promoting environments can act as platforms that facilitate internationalization and boost the global impact of startups, offering support for nascent companies and acting as bridges to new markets and sources of knowledge. Services include bureaucratic support, development of marketing strategies, market data collection, access to contact networks and support for overcoming cultural barriers. These environments also provide access to global networks of investors and strategic partners, facilitating financing and the expansion of operations into new markets, as well as acting as facilitators for startups entering new markets, connecting them with government agencies and trade organizations that provide crucial information on regulations and opportunities for collaboration. Finally, they can also act as testbeds, allowing startups to test their solutions in real or simulated conditions before large-scale implementation and to adapt their products to local needs before expanding globally.

Thus, initiatives that connect innovation-promoting environments in different countries are emerging as decisive strategies. An example that illustrates this scenario will be presented throughout this chapter: a case study involving AgNest Farm Lab, an innovation hub for agtechs coordinated by Embrapa. This hub is part of an international initiative funded by the British government, intended to promote connection, business opportunities and the exchange of knowledge and experiences between the agtech innovation ecosystems of the UK and Latin America. The initiative exemplifies how innovation-promoting environments can act as catalysts for technological innovation and international collaboration, broadening horizons for startups and establishing Brazil as a relevant player on the global agricultural innovation scene.

AgNest Farm Lab: innovation hub that promotes future agriculture

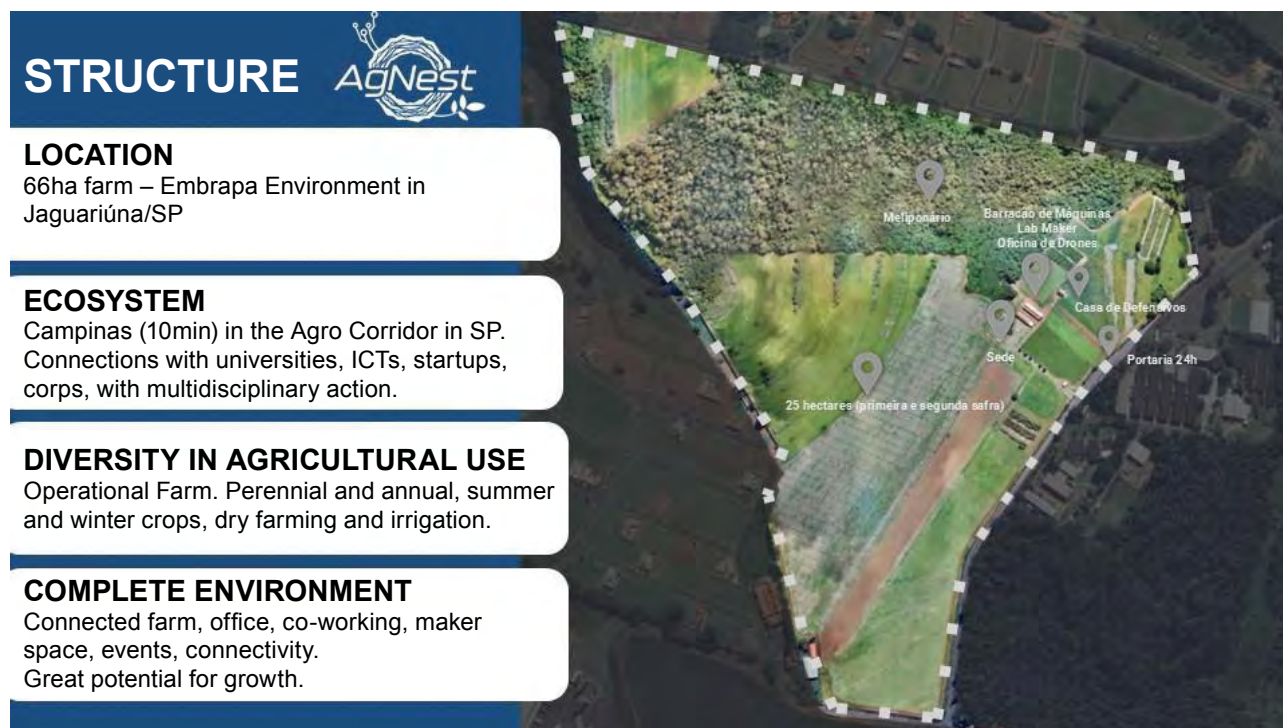


Figure 1. AgNest structure

AgNest is the first innovation hub developed and coordinated by Embrapa. Conceived by Embrapa Environment (Jaguariúna/SP) and Embrapa Digital Agriculture (Campinas/SP), the hub is located in Jaguariúna/SP and was formalized in 2022 with the creation of its Management Committee. Its governance and management model is based on a successful public-private partnership, established between Embrapa and companies from the public and private agribusiness sectors, selected as Founding Partners through a Public Call. Conceived as a hub for agtechs, AgNest operates as a farm lab, focusing on field experimentation to promote the sustainable and digital agriculture of the future. Its mission is to provide an ecosystem of innovation and entrepreneurship that drives the sustainability of tropical agriculture through digital agriculture, based on scientific knowledge. The hub is based on collaborative work, acting as an asset and activator of the agtech ecosystem. It also enhances synergistic action between the various players in the sector, such as incubators, accelerators, investment funds, startups, corporations, governments, academia and farmers, the latter being the main beneficiaries of the solutions developed.

Structured around eight main thematic verticals (figure 2), AgNest's main differential is its farm lab format, which provides agtechs with a model environment for carrying out proofs of concept, co-creation and validation of technologies in an integrated and systemic way, under real production conditions. To this end, the hub has a complete infrastructure, located on a 66-hectare operational farm, with connectivity and a wide range of agricultural uses, as well as a vast area of environmental preservation, intended for the development of solutions aimed at ecological restoration, biodiversity conservation, payment for environmental services, among other applications (figure 1).



Figure 2. AgNest thematic verticals

AgNest also stands out for its strategic location in the city of Jaguariúna/SP, less than two hours from the São Paulo capital and 15 minutes from Campinas, an important academic, innovation and entrepreneurship hub in the state of São Paulo. It is also the only farm lab located in the São Paulo State Agricultural Innovation Corridor (Agro Corridor), an important agtech innovation ecosystem in the countryside of São Paulo, which will be presented in the next chapter.

In the context of international networks, strengthening innovation-promoting environments in Brazil, such as AgNest, is essential for boosting open innovation and entrepreneurship, accelerating technological development and modernizing the Brazilian agricultural sector. This also creates strategic connection points for integration with global ecosystems, positioning Brazil as a benchmark in the generation and export of agricultural innovation and expanding the impact of Brazilian solutions on the world stage.

Internationalization of startups: challenges and opportunities

Innovation ecosystems have become increasingly global (STARTUPBLINK, 2024). The internationalization movement of startups has been taking place increasingly on the global stage, driven by a dynamic economic environment marked by decentralization and collaboration. It is a process directly related to improving the competitiveness of these companies and increasing their innovative capacity.

In this context, a startup's innovation process can be positively impacted by factors such as motivation for internationalization, choice of country, time entry, expansion strategy, what has been internationalized and the form of insertion into foreign markets (Vendruscolo & Galina, 2020). Expanding into new markets can mean not only broadening the customer base and increasing revenues, but also accessing advanced technologies, alternative sources of finance,

international partnerships, new business models, better management practices, among other benefits.

Vendruscolo and Galina (2020) also note that when internationalization is geared towards the search for knowledge and access to financial resources abroad, it has a greater impact on the innovation process of startups than the search for market expansion.

The reasons for a company to seek internationalization can be diverse. Cuervo-Cazurra *et al.* (2015) point to four main reasons: 1) To sell more: by accessing new markets, companies expand their revenue opportunities; 2) To buy better: internationalization allows the company to integrate its ability to manage resources with the advantages of the host country, improving its ability to face competitors; 3) To innovate: by internationalizing, companies seek to access the competitive advantage of the host country, incorporating them and improving existing operations in the country of origin; and 4) To escape limitations: operating in international markets decreases dependence on a single country, fleeing the limitations of the country of origin.

However, the road to internationalization presents significant challenges, especially those related to cultural, regulatory and financial barriers. Startups can face difficulties in terms of language differences, business practices and local legislation. Analyzing this context in the context of theories of company internationalization, it can be seen that startups are most often aligned with the Uppsala Model, as they expand foreign markets in stages and gradually, giving preference to operating in countries with less psychic distance (Severo, 2022), i.e. with fewer differences in cultural, institutional and linguistic aspects. However, there may be cases in which the internationalization process is accelerated by internal and external factors, such as the impact of contact networks. Contact networks, or networking, have proved essential to the internationalization process of startups, which, with limited resources compared to large corporations, benefit significantly from initiatives that promote interaction and collaboration.

Johanson and Mattsson (2015) developed a model on the internationalization of companies based on contact networks, considering that companies rely on resources and information controlled by other organizations and that contact networks provide access to these resources. The intermediation of these networks accelerates international expansion by facilitating access to investors, resources, clients and business partners. The importance of contact networks is so great that the traditional Uppsala Model of company internationalization (Johanson & Vahlne, 1977) has been revised to incorporate this factor (Johanson & Vahlne, 2009). The exchanges within these networks are valuable sources of learning and the formation of strategic alliances, contributing to the success of the internationalization process.

In this scenario, innovation-promoting environments play a key role. As promoters of relationship networks, they act as bridges to new international markets, enhancing the informal network of entrepreneurs through a more organized and articulated structure. This facilitates access to critical information and essential resources for the growth of startups, minimizing financial and cultural risks and reducing the time it takes to enter new markets, both for Brazilian startups in the process of internationalization and for foreign startups wishing to operate in Brazil. Thus, some of these environments offer support to foreign startups through structured programs, such as soft landing, which help companies enter the domestic market.

In Brazil, according to a survey carried out by the MCTI in the report *Parques Tecnológicos do Brasil* (BRAZIL, 2021), 62% of the country's technology parks said they offered support services for internationalization. These initiatives provide partnerships, mentoring, logistical support, access to funding and support for adapting to regulatory, commercial and cultural requirements. In

addition, there is a growing effort by these environments to establish international partnerships that facilitate the attraction of foreign startups and encourage Brazilian startups to expand their operations globally.

In short, the impact of a startup's internationalization goes beyond simple market expansion; it is a strategic vector for innovation and competitiveness. Access to new ecosystems makes it possible to incorporate knowledge, technologies and innovative business models. By fostering networks, innovation-promoting environments reduce barriers and speed up this process, driving global connections that expand opportunities and transform businesses.

Establishing successful international ecosystems to transform global agriculture

Collaboration across national borders is key to supporting agtech communities and ecosystems to thrive sustainably. The agri-food system is highly complex and producers are continually subject to influences from factors such as local and global politics, climate, corporate decisions and, increasingly, consumer trends.

Technological advances are accelerating exponentially as we move toward an increasingly connected and automated world. Both technological and biological innovations are being introduced into the agricultural sector, which remains traditional at its core. Ongoing support and collaboration are essential to help users, such as producers and entrepreneurs, embrace new ideas and innovations. Equally important is supporting the providers of these solutions, such as startups, in accessing markets and building trust within the community.

In this context, real ecosystems are flourishing around market- and innovation-oriented programs to stimulate entrepreneurship and strengthen user community trust through active engagement and collaboration. These programs and their respective ecosystems are increasingly crossing borders, driven by the need to view the agri-food system as a globally integrated ecosystem and to incorporate insights from diverse markets and sectors.

Initiatives such as the **UK-LATAM AgTech Innovation Ecosystem**, of which **AgNest** is a part, and the **Cultivar Network**, led by the city of St. Louis in the United States, serve as two case studies in the following sections. These examples illustrate how effective international networking can accelerate the transformation of agriculture.

UK-LATAM AgTech Innovation Ecosystem



Figure 3. Globally interconnected innovation ecosystems can create pathways for communities to collaborate, share knowledge, generate value and promote positive change to overcome the challenges facing agri-food systems.

The UK Agri-Tech Centre (ATC), based in the United Kingdom, through the support of AgriTIERRA, an AgFoodTech innovation consultancy bridging the UK and Latin America and located in Colombia, is working to accelerate agtech innovation and business opportunities between the UK and LATAM. This effort is part of a British government-funded initiative to launch the first activities of a UK-LATAM smart farm innovation ecosystem.

ATC is a government-funded center of excellence established to drive the growth of the agtech sector. As part of its international strategy, ATC has identified the opportunity to co-create interconnected agtech ecosystems with strategic global partners. These ecosystems promote farmer-led innovation and address both local and global challenges in agri-food systems (see Figure 3).

To build connections with key agtech innovation ecosystems in Latin America, ATC partnered with AgriTIERRA, which facilitated engagement in two strategic markets: Argentina and Brazil. In Argentina, ATC collaborated with CREA (Consortios Regionales de Experimentación Agrícola), and in Brazil, with Embrapa (Brazilian Agricultural Research Corporation). ATC, CREA, and Embrapa share core characteristics, such as market alignment, neutral and non-commercial institutional positioning, strong reputations, and access to local expertise and infrastructure that fosters innovation. These include initiatives like AgNest and support networks such as CREA Lab.

The interaction between ecosystems rapidly accelerates opportunities for innovation, science, business and knowledge exchange, firstly between the markets of the United Kingdom,

Argentina and Brazil; secondly throughout Latin America; and, finally, in wider international markets, considering the complexities and similarities of value chains and tropical/temperate agricultural systems. The initiative's main statistics include:

- 17 Latin American countries analyzed on 72 macroeconomic and agricultural sector variables
- 497 stakeholders mapped
- 44 stakeholders who responded to the survey
- 28 key stakeholders interviewed
- 6 countries prioritized and recommended for further engagement
- 1 UK/Argentina/Brazil agtech innovation program created with strategic regional partners (CREA - Argentina, Embrapa/AgNest - Brazil)
- 82 agtech market opportunities identified between United Kingdom, Argentina and Brazil for new commercial and research services
- 5 strategic funding relationships identified between regional funders (e.g. the Inter-American Development Bank) and British funders (e.g. Innovate UK)
- 4 two-week delegations for 12 startups from the UK/Argentina/Brazil, involving more than 140 stakeholders to validate market opportunities
- Several new business relationships and partnerships were established, including a new collaboration between the ATC and Embrapa under the international program Climate-Smart Agriculture Partnership: UK-Brazil-Africa funded by Innovate UK.

Cultivar Initiative

Launched at the end of 2023, Cultivar is an initiative aimed at building a dynamic agtech ecosystem connecting the city of St. Louis (STL), in the United States, with agtech communities across Latin America. Latin America and the U.S. Midwest are major players in global soybean and corn production, together accounting for more than half of the world's supply, which makes this a particularly strategic alliance.

Since 2017, organizations in STL, such as the Donald Danforth Plant Science Center, BioSTL and Global STL, Missouri Partnership, World Trade Center St. Louis, and the 39 North AgTech Innovation District, have been working collectively to position the city as an international hub for agtech and foodtech innovation. Their efforts focus on fostering global engagement and attracting foreign investment to strengthen the region's innovation capacity.



Figure 4. Cultivar event, held in 2023 in St. Louis, United States, where representatives of key Latin American institutions were invited to strengthen ties with the local ecosystem.

In 2022, these institutions began to accelerate relations with Latin America. The group created a unified regional brand, called *“The Future of Agri-food Tech is STLMADE”* (meaning that the Future AgFoodTech is made in St. Louis), and began building ties with organizations in Latin America, with a focus on Brazil and Argentina. Local support is led by Yield Lab LATAM, an AgFoodTech venture capital firm with extensive experience and a strong presence in Latin America. This work led, in 2023, to the creation of Cultivar (Figure 4). Its mission is to:

- support the creation and expansion of AgFoodTech ecosystems in Latin America;
- increase interaction and expand partnerships between organizations and companies in STL and Latin America;
- promote the development of regional agricultural innovations, equitable access and the adoption of sustainable solutions in the different markets;
- develop talent and promote training in Latin America and STL.

So far, the initiative has fostered the establishment of an international ecosystem with 63 member organizations in 10 countries and the participation of around 90 people.

Creating ecosystems: a Darwinian perspective

“It’s not the strongest of the species that survives, nor the most intelligent. It is the one that is most adaptable to change.” - Charles Darwin

Charles Darwin recognized the importance of ecosystems and the complex interactions between organisms and their environment. He believed that ecosystems were important for the survival of species and that human beings could damage them by exploiting land use.

Healthy international collaborations are essential to help agricultural systems thrive, become more resilient to natural, market and human pressures, embrace new sciences, technologies and innovations, and evolve in the face of political and ideological changes.

Working internationally is challenging, especially in a “foreign” ecosystem, with cultural, linguistic and political differences and biases to be understood and overcome. It’s easy to look at another market and see potential and opportunities, but there are many challenges to making the possibilities a reality.

Through a correlation with Charles Darwin’s characterization of nature and ecosystems, it can be seen that successful international innovation ecosystems thrive and accelerate agricultural transformation due to their ability to overcome three key variables: 1. Adapting and improving new environments; 2. Creating and evolving healthy partnerships; and 3. Establishing resilience in diversity.



Figure 5. A Darwinian perspective on evolution.

In doing so, successful international ecosystems provide a platform for organizations to move, successfully integrate, build relationships, share, collaborate, access the necessary resources, grow and prosper, delivering value both to native ecosystems and to new entrants.



Figure 6. Representatives from Embrapa and the UK Agri-Tech Centre discuss integrated production systems with dairy cattle and robotic milking to prospect market opportunities in Brazil for the UK.

Using the **UK-LATAM** and **Cultivar** initiatives as case studies, the following sections will draw on the knowledge and experience of the **AgriTIER- RA** consultancy in both efforts to examine how each of them is addressing these three variables in the development and growth of their respective international ecosystems.

Geographical bases

In nature, geography is a key determinant of the structure, dynamics, diversity and necessity of an ecosystem. When a species moves from its native ecosystem to a new one, it is altering its geography and needs to embrace diversity, learn and evolve quickly within the context of its new environment in order to ensure survival and success.

Agri-food systems are deeply shaped by their geographic context. Climate, geology, landscape, and proximity to natural resources are just a few of the variables that actors within these systems must navigate and leverage effectively in order to maximize production potential sustainably.

Geography also directly influences an organization's values, culture, labor practices, focus, knowledge and strengths, as well as its access to external resources such as funding, infrastructure and partnerships.

The complexity of agri-food systems requires comprehensive perspectives to deliver the science, policies and innovative solutions needed by the sector and its users. International networks and ecosystems that successfully consider and exploit geographical variables are key to helping accelerate the sector's transformation.

The work carried out through the **UK-LATAM** and **Cultivar** initiatives has embraced geography as a fundamental component of its design.

- **Cultivar** has focused on the geographical similarities of the grain and cereal production systems in Latin America and the US Midwest as a facilitator, so that the startups can take advantage of the network to advance more quickly in the markets of the new countries. This common agricultural context provides a solid basis for mutual collaboration and the exchange of knowledge and technologies.
- The **UK-LATAM** program used a different approach, given the difference in market size, scale of production and climate (temperate vs. temperate/tropical). Geographical variables, such as soil and climate, together with an analysis of the strengths and weaknesses of the respective production and market systems, in search of complementarities, were preponderant factors in defining the focus of the international ecosystem being built.

Resources to grow and thrive

Healthy natural ecosystems operate in balance, providing the resources that species need to survive and thrive, in equilibrium with the surrounding environment.

Successful international innovation ecosystems that generate positive impact are built on a balance between the resources offered (strengths) and those required (gaps) by the communities and entities involved. This distribution of resources ensures well-rounded support, enabling the growth of the organizations within the ecosystem.

International partnerships and ecosystems often fail due to resource imbalances caused by ill-defined or unilateral resource allocations between partners. This imbalance creates biases and obstacles at the heart of the ecosystem, leading some organizations to thrive while others fail due to a lack of access to the necessary resources.

Strong international collaborative ecosystems, which provide the resources for their actors to thrive, enable:

- access to funding for new collaborative research or innovation programs;
- a pool of investors to support and accelerate the scalability of startups;
- clear availability of solutions and market needs;
- partnership opportunities in the fields of research and scientific knowledge;
- access to facilities and innovation-friendly environments that can support foreign institutions in entering and integrating into the local ecosystem;
- support in overcoming local entry barriers (legal, cultural, political).

The **UK-LATAM** and **Cultivar** initiatives are committed to providing resources and support that foster interaction and facilitate the exchange of information and experiences among their members.

- **Cultivar** is based on a St. Louis strategy designed to attract Latin American startups, encouraging them to accelerate their growth by establishing operations in the city to gain access to resources such as funding, investments, and business support. This approach represents a market-pull strategy aimed at boosting the flow of startups from Latin America to the United States.
- The design of the **UK-LATAM** ecosystem is different and reflects the balance between the interest of the UK scientific and business communities in accessing Latin American markets and the interest of the Latin American scientific and business communities in exploring opportunities in the UK. Significant work has been done to map stakeholders and their offerings, and mini ecosystems have been created within the initiative, aligned with market themes such as connectivity and traceability, and sectoral interests such as livestock and regenerative agriculture.

Ecosystem engineers

Healthy natural ecosystems rely on species that play a vital role in controlling, maintaining and structuring them. Elephants, for example, are considered important ecosystem engineers. “Trusted” and respected within their habitat, they are not seen as a threat that could cause imminent shocks and imbalances. These animals help maintain natural environments, benefiting other species.

Similarly, successful international ecosystems are created and strengthened through collaboration between well-established local organizations (the “engineers”) in each ecosystem. These organizations are recognized as strategically important, trustworthy, neutral and with access to valuable resources for the community. Guided by aspects such as collaboration, common motivations, shared strategies, resource offering and identification of needs, combined with experience and knowledge of the local ecosystem and the provision of contact networks,

these organizations are able to identify and understand how resources can be used by ecosystems in different geographies to benefit the communities involved.

Thus, the international ecosystem that is being forged can provide:

- clarity on the dynamics of local markets and ecosystems, operating conditions and support network;
- mapping of strengths and needs in terms of resources, including technical market competencies, research programs, data availability and facilities;
- analysis of the needs and future strategic guidelines of the local market;
- the credibility and quality of local talent and solution providers, such as startups.

These principles underpin the **UK-LATAM** and **Cultivar** initiatives, which leverage strategic relationships to strengthen connections between ecosystems and build confidence in the potential of international partnership networks, exemplifying the concept of contact networks discussed earlier.

- In the case of **UK-LATAM**, efforts have focused on ecosystem development through partnerships with neutral, well-known, and respected organizations. **CREA** in Argentina, for example, is a collective of farmers dedicated to developing and sharing new technologies for rural areas, emphasizing sustainability, innovation, and experimentation. The CREA methodology has already been successfully implemented by agricultural organizations in Uruguay, Paraguay, Bolivia, and Georgia, offering UK-LATAM promising avenues for regional expansion.

In Brazil, the partnership with **Embrapa** stands out. Embrapa's mission is to provide research, development, and innovation solutions that promote agricultural sustainability and benefit Brazilian society. Beyond its prominent role in national agriculture, Embrapa has a long-standing tradition of collaboration with scientific organizations worldwide. The establishment of **AgNest**—an innovation hub founded on a public-private partnership with facilities for agricultural experimentation—introduces a fresh perspective within the smart farming context. This development opens new horizons for internationally focused innovation collaborations, perfectly aligning with the approach adopted by the UK Agri-Tech Centre.

- **Cultivar** has taken a different approach, focusing on partnering with a strategic organization with a commercial profile, **Yield Lab LATAM**, which brings a regional network and has an established reputation for driving startup growth through its investment portfolio. As Cultivar is very focused on creating opportunities for foreign startups to access the St. Louis ecosystem, Yield Lab LATAM is an attractive partner that generates security and interest from Latin innovation promoters in mechanisms internationalize their startups and access new investment routes.

Hierarchies within ecosystems

In any natural ecosystem, there is a hierarchy between organisms, which determines its structure, balance and success. This dynamic evolves over time and allows species to live in balance with the available resources. When an invasive species is introduced, it can have a

negative impact that creates an imbalance in the ecosystem's hierarchy, undermining its stability and viability.

Based on the strategic contribution of ecosystem “engineers”, who navigate the complexity of hierarchies and bring communities together in a harmonious way, successful international innovation ecosystems consider and understand the hierarchies present, creating strategies and governance structures to ensure that imbalances are not generated and that members feel valued rather than threatened. Ecosystems built in this way are inclusive, offer clear value to members and communities, and are accessible and adapted to geography, local needs and market requirements.

Using the **Cultivar** and **UK-LATAM** initiatives as examples, ecosystems that are best positioned to meet the needs of the agricultural sector include organizations such as:

Table 1. Roles, value propositions and challenges within ecosystems

Type of organization	Role	Value proposition	Main challenges
Government (e.g. Ministry of Agriculture, Embrapa)	Financing, Partnership, Infrastructure	· Co-financing of bilateral programs · Strategic alignment with the government · Connection and access to the local ecosystem · Access to data and infrastructure · Technical credibility	· Changes in the bureaucratic apparatus and internal policies · Operating speed · Public policies
Sectoral organization (Federations, Associations) (e.g. Coffee Federation)	Partnership, Infrastructure	· Strategic alignment with production chains · Connection and access to production chains · Access to data, users and infrastructure	· Bureaucracy · Access to finance · Operating speed
Private non-profit institution (e.g. Support Foundations)	Financing Partnership	· Connection and access to the local ecosystem · Governance and management · Neutrality	· Non-commercial focus · Internal motivational factors · Operating speed
Development organization (Development agencies, funding institutions) (e.g. Gates Foundation, FINEP)	Financing Partnership	· Co-financing of bilateral programs · Strategic alignment	· Non-commercial focus · Internal motivational factors

Continued

Type of organization	Role	Value proposition	Main challenges
Academia and Scientific Research (e.g. ESALq, Embrapa, Rothamsted Research)	Partnership, Infrastructure	· Access to scientific research, data and infrastructure · Funding through collaborations · Alignment between scientific programs · Scientific credibility	· Operating speed · Changes in internal policies · Non-commercial focus
Innovation-promoting environment (e.g. AgNest, UK Agri-Tech Centre)	Partnership, Financing Infrastructure	· Connection and access to the local ecosystem · Funding through participation, membership or collaboration · Governance and management · Access to data, users and infrastructure · Business acceleration and market entry support · Strategic alignment with the market	· Dependence on financing for operations · Competition for resources · Potential biases if not funded by the State
Financial Institution (e.g. Banco do Brasil, Itaú)	Partnership, Financing	· Co-financing for activities of interest · Funding through participation or membership · Access to data, users and infrastructure · Connection and access to the local ecosystem · Strategic alignment with the market	· Corporate influences · «Dilution» of the ecosystem (e.g. competitors reluctant to collaborate)
Venture Capital Funds, Investors (e.g. Yield Lab LATAM)	Partnership, Financing	· Co-financing for activities of interest · Funding through participation or membership · Investing in startups · Connection and access to the local ecosystem · Strategic alignment with the market · Business Acceleration Support	· Corporate influences · “Dilution” of the ecosystem (e.g. competitors reluctant to collaborate) · Internal motivational factors

Continued

Type of organization	Role	Value proposition	Main challenges
Academia and Scientific Research (e.g. ESALq, Embrapa, Rothamsted Research)	Partnership, Infrastructure	· Access to scientific research, data and infrastructure · Funding through collaborations · Alignment between scientific programs · Scientific credibility	· Operating speed · Changes in internal policies · Non-commercial focus
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Financial Institution (e.g. Banco do Brasil, Itaú)	Partnership, Financing	· Co-financing for activities of interest · Funding through participation or membership · Access to data, users and infrastructure · Connection and access to the local ecosystem · Strategic alignment with the market	· Corporate influences · «Dilution» of the ecosystem (e.g. competitors reluctant to collaborate)
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Produtores rurais	Usuários, Parcerias	· Alinhamento estratégico com as cadeias produtivas · Acesso a dados, usuários e infraestrutura · Compartilhamento de conhecimento e experiência	· Desgaste na relação com startups · Urgência dos prazos · Perspectivas locais vs. Perspectivas globais

Visibility and camouflage

In nature, visibility and camouflage are mechanisms used by species to survive, win and grow. Visibility can be used to attract or intimidate, while camouflage can be used to protect or deceive other species. When building international ecosystems, member organizations face a similar choice: they must choose between the visibility or camouflage strategies in relation to their image and participation within the ecosystem and in interaction with the community. This choice can influence and impact the characterization of the ecosystem in general, especially with regard to its inclusiveness and transparency, its potential for impact, value and relevance. All these variables affect the viability and sustainability of the ecosystem and, consequently, its potential to foster agricultural transformation.

Camouflaged ecosystems tend to be more agile and efficient in delivering results. They are usually smaller and driven by the specific needs of an organization that can quickly bring together others with similar interests or known competencies. On the other hand, visible ecosystems are often designed to be more inclusive and transparent in their image and structure, which nevertheless requires the implementation more complex operational and governance structures.

The balance between public and private sector stakeholders in the governance and management structures of international ecosystems can promote inclusiveness and transparency, while accelerating operations and results.

In this context, the **Cultivar** and **UK-LATAM** initiatives adopt very different approaches to visibility and engagement.

- The **UK-LATAM** ecosystem was started through public funding from the government, which allowed the ecosystem to carry out extensive mapping and design work, as well as testing and validating the value proposition by holding international delegations between the countries involved. However, this ecosystem still lacks an established identity and brand strategy, and its visibility has been lower than that of Cultivar.
- **Cultivar** initially focused on developing a well-defined brand and identity, ensuring that the emerging ecosystem could align with and reinforce this vision. Today, the initiative functions more as a movement than a structured program. To sustain its growth momentum and ensure long-term success, it will be essential to establish a formal governance structure and a robust business model to support its operations.

Establishing resilience in diversity



Figure 7. The nascent UK-LATAM smart farms innovation ecosystem, created to provide UK and Latin American stakeholders (farmers, businesses, researchers, policymakers, etc.) with support and access to markets and collaboration networks, and to test and deliver appropriate solutions to the challenges of local and global agri-food systems.

Laws of the Jungle

Thriving ecosystems operate in balance, with hierarchy and harmony between species and the resources upon which they rely. In these ecosystems, implicit principles of order and governance influence their dynamics, operational functions and success.

Agricultural ecosystems are similar, with government agencies, large agribusiness companies and financial institutions dictating and influencing policies and strategies that the rest of the ecosystem must follow. Changes in governments or the market can abruptly alter these parameters and rules, keeping systems in a constant state of flux and change. International ecosystems face these same variations, but are also impacted by global trade policies, value and supply chain dynamics, new market cultures, politics and language barriers.

Successful international ecosystems achieve success by defining a clear mission and an established governance structure from the outset, determining operational and strategic rules and parameters. This creates trust, understanding, shared value and a sense of belonging among the entities, enabling collective growth and support to overcome barriers and unlock the resources needed to sustain and expand the ecosystem.

The lack of governance structure can make the ecosystem dysfunctional, leading to a loss of timing and purpose. Initial enthusiasm and interest from the community and partner leaders can quickly disappear as institutional priorities and resources are reallocated elsewhere.

In this regard, **Cultivar** and **UK-LATAM** initiatives are defining their governance strategies:

- The **UK-LATAM** initiative is currently in the process of defining the parameters for its governance structure. A collaborative, hybrid governance model that balances revenue generation with participatory engagement among key stakeholders can serve as a strong enabler of growth. Key characteristics of this model include:
 - **multi-stakeholder governance board** composed of representatives from research institutions, the private sector, farmers' organizations, technology providers, and financiers, each with a clearly defined role in both strategic and operational decision-making;
 - **hybrid revenue structure**, integrating funding from grants, partnerships and the provision of services (e.g.: ecosystem access, consulting, training and technical support);
 - **decentralized governance**, featuring regional structures that implement and carry out operations, while a central body provides overarching supervision;
 - **revenue allocation and reinvestment** towards platform improvements, training and skills development, and expansion into new regions. Revenue-sharing mechanisms are designed to incentivize active organizational participation in the initiative's growth.
- **Cultivar** is beginning to explore potential governance models. The leadership of commercially-oriented institutions, such as Yield Lab LATAM may play a significant role in shaping this structure, given their connections to investment portfolio. In addition, the motivation of St. Louis stakeholders to expand their community will be a key factor. It remains to be seen where Cultivar's center of coordination and influence will ultimately reside—whether in St. Louis or in Latin America.

Survival of the Adaptable

As Charles Darwin said: "It is not the strongest species that survives, nor the most intelligent, but the one that best adapts to change."

Both **UK-LATAM** and **Cultivar** initiatives are positive examples of international collaboration that can foster ecosystems beyond national borders. Both have made significant progress since their creation, sparking stakeholder attention and generating impacts such as partnerships and business agreements. However, neither has its survival guaranteed. Given their synergies, active collaboration networks between the two could even become a decisive factor in achieving transformative and disruptive outcomes for global agriculture.

The agricultural sector is subject to local and global policies, climate change, market dynamics, and cultural influences. Today's priorities may shift tomorrow. Therefore, collaboration is essential to help organizations and the sector navigate these challenges.

The two initiatives presented as case studies in this chapter have strengths and weaknesses that, if shared, could foster the advancement of other transformative innovation ecosystems with multiple international borders. The following elements must be observed in the formation of international agtech innovation ecosystems:

- **Governance** - Clear structure, management, finances and value proposition.
- **Resources** - Clarity on strengths and needs.
- **Visibility** - Common identity with a clear mission.
- **Engineers** - Respected local partners with aligned values.

- **Farmers** - Innovation and strategy led by farmers.
- **Science** - Scientific programs that strengthen institutional relations.
- **Impact** - Ecosystems oriented towards and long-term impacts.

✓ For more information, visit: AgNest, UK AgriTech Centre and Cultivar

Open innovation actions to promote sustainability in Brazilian agriculture

• *Aurelio Martins Favarin, Daniela Ferraz Bacconi Campeche and Martha Delphino Bambini*

Since the 1980s, academia has been exploring the theme of collaboration in science, technology, and innovation through various approaches, such as sociotechnical networks, innovation networks, and national innovation systems (Bambini; Bocelli, 2014). However, it was in the early 2000s that the term “open innovation” was coined by Chesbrough (2003), becoming the dominant paradigm for referring to technological innovation and collaboration among diverse actors (Van Lancker *et al.*, 2020).

The innovation ecosystem approach, or open innovation ecosystems, emphasizes collaboration among various categories of actors, involving the sharing of infrastructure (such as laboratories and buildings), knowledge, and skills, while forming institutional arrangements with their own culture and governance. Among the actors involved are a variety of innovative environments, including technology parks, incubators, accelerators, hubs, coworking spaces, open labs, model farms, smart farms, demonstration units, open platforms, and virtual hubs, among others².

The Ministry of Agriculture, Livestock and Food Supply has made efforts to build and strengthen Innovation Ecosystems and Environments in all regions of the country, considering the importance of these arrangements for agricultural development and, above all, technology-based entrepreneurship.

In a country as vast and diverse as Brazil, the initiatives and levels of development across regional innovation ecosystems vary significantly in terms of thematic focus, composition, and the number of participating actors. This subsection presents, through eight case studies, the multiple facets and different approaches of ecosystems and initiatives developed around the theme of agricultural sustainability in various regions of Brazil, taking into account regional contexts, sectors, and cross-cutting actions.

It is important to note that the cases presented here are experience-based accounts that offer different perspectives on the Brazilian agricultural innovation ecosystem, without aiming to exhaust the topic.

From low-carbon soybean production to the *babaçu* nut breakers, the networked actions showcased combine and mobilize diverse actors in different contexts, yet yield results aligned with the understanding of agriculture and livestock as drivers of sustainable transformation.

² MAPA - Ministry of Agriculture, Livestock and Food Supply. Innovation Ecosystems. Available at: Innovation Ecosystems: <https://www.gov.br/agricultura/pt-br/assuntos/inovacao/ecossistemas-de-inovacao> Accessed on: February 17, 2025.

Low Carbon Soybean Program: sector coalition for a new concept in valuing the Soybean Production System

● *Carina Rufino, Hugo Kern, Henrique Debiassi and Roberta Carnevalli*

The Low Carbon Soy (*Soja Baixo Carbono* – SBC) Program was created in 2021 as an Embrapa initiative, with a focus on sectoral innovation. Its goal is to add value to soybeans produced in farming systems that adopt sustainable agricultural practices which contribute to reducing greenhouse gas (GHG) emissions, thereby helping to combat global warming. The SBC Program follows a sectoral innovation model and is supported by seven partner companies: Bayer, Bunge, Cargill, Coamo, Cocamar, GDM and UPL.

The concept behind the SBC label is based on the measurement of greenhouse gas (GHG) emissions and the analysis of carbon stocks in the soil and plant biomass (including tree components in integrated crop-livestock-forestry systems). These measurements are taken in production systems that adopt sustainable practices and are compared to corresponding regional benchmark systems. The process is followed by the reporting and certification of the volume of soy produced within the audited production system.

The methodology is being coordinated by Embrapa Soybean, with the participation of specialists from various Embrapa units and representatives from the production sector. The goal is to develop a certification program that can attest, through a Brazilian methodology, to the sustainability of Brazilian soybean production—making both qualitative and quantitative aspects tangible for soybeans produced using technologies and agricultural practices that reduce greenhouse gas emission intensity (GHGEI).

In the field of innovation management, the SBC Program is aligned with the concept of Sustainability-Oriented Innovation (SOI), which is gaining increasing relevance on organizational agendas. This concept goes beyond product and process innovation, embracing a systemic vision that seeks to transform economic sectors and business practices. Based on the understanding that sustainability is not the attribute of a single company, but rather the result of collective efforts by multiple actors and industry segments, the SBC Program is developing a voluntary third-party certification standard. This certification is based on a Brazilian methodology for calculating emissions, using data and technical coefficients specific to tropical agriculture.

As the soybean production chain becomes increasingly global and interconnected with other market segments, such as the food and processing industries, meal and protein sectors, the biofuel chain, and green chemistry by-products, the distance between the industrial sector and the production market demands greater alignment with new standards of quality and product differentiation. By establishing a set of production practices, certification guidelines, and measurement methodologies, the Program has the potential to play a key role in positioning agriculture within the decarbonization agenda, creating competitive advantages and new opportunities for Brazilian producers.

The SBC seal aims to differentiate soybean production systems with low GHG emissions through an MRV (measurable, reportable and verifiable) protocol, supported by private, third-party certification. This differentiation opens up opportunities to add value to

SBC, through mechanisms such as payment for environmental services, access to lower-interest financing, and entry into more restrictive markets, among others. Producer participation in the certification process will be voluntary and will require compliance with specific eligibility criteria. These include adherence to environmental and labor regulations, as well as the adoption

of good agricultural practices such as no-till farming systems, the use of nitrogen-fixing and growth-promoting bacteria, and integrated pest, disease, and weed management, among other standards.

✓ To find out more, visit: www.sojabaixocarbono.com.br.

ILPF Network Association: partnership to promote sustainable agriculture

• *Luiz Adriano Maia Cordeiro, Flávio Jesus Wruck and Gabriel Rezende Faria*

The ILPF Network Association³ is a public-private partnership established between Embrapa and various companies in the agribusiness sector with the aim of expanding the adoption of integration systems throughout Brazil. Therefore, this association aims to intensify the sustainability of Brazilian agriculture by adopting the systems and technologies of the Crop- Livestock-Forest Integration (CLFI) strategy⁴.

The association was formed by the joint efforts of Embrapa and partner institutions, established by signing a General Cooperation Agreement on April 25, 2012. It is currently made up of Embrapa, the Cocamar cooperative and the companies Bradesco, John Deere, Minerva Foods, Soesp, Suzano, Syngenta and Timac Agro. Each member company, with the exception of Embrapa, contributes funds every year which are used to carry out the association's activities.

Among the key areas of focus of the ILPF Network are the promotion of integrated farming systems, support for research and development, capacity building, technology transfer, institutional and governmental relations, and communication. To this end, the ILPF Network organizes events such as field days and training courses, and carries out projects across different regions of Brazil. Another strategic approach is the establishment of Technological Reference Units (URTs) on partner rural properties and reference farms that adopt ILPF systems.

Currently, some of Embrapa's Decentralized Units (UD) are developing eleven RD&I projects in partnership with the ILPF Network, with resources managed by the Arthur Bernardes Foundation (Funarbe). Another important joint action is the "ILPF Caravans", which are technical and scientific expeditions made up of Embrapa researchers and ILPF Network technicians, dedicated to promoting ILPF systems throughout the country, advancing the area of implemented systems and reducing the socio-environmental impacts of Brazilian agriculture. For example, in December 2024, a caravan was held in the states of Maranhão and Pará, with the participation of Embrapa Meio Norte, Embrapa Cacaos and Embrapa Amazônia Oriental.

There are other projects underway with the participation of Embrapa units: i) IntegraMTAgro, in the municipalities of Campos de Júlio and Campo Novo dos Parecis-MT; ii) SustentAgro, which operates in the states of Mato Grosso, Goiás and Mato Grosso do Sul; iii) IntegraSPAgro, a program designed to help restore degraded areas in the state of São Paulo, through ILPF; iv) Sustainable Rural Caatinga; and v) Sustainable Rural Cerrado. Other projects are under construction in the states of Goiás, Rio Grande do Sul and Minas Gerais.

Embrapa also coordinates two thematic chambers within the ILPF Network. The AgroDigital Thematic Chamber provides an environment for discussing new technologies and digital innovations aimed at adopting, monitoring production and managing farms that use ILPF

³ <https://redeilpf.org.br/>

⁴ Crop-Livestock Integration (CLI) or Agropastoral System; Livestock-Forest Integration (LFI) or Silvopastoral System; Crop-Forest Integration (CFI) or Silvopastoral System; and, Crop-Livestock-Forest Integration (CLFI) or Agrosilvopastoral System.

systems. The ILPF Network's Carbon Thematic Chamber aims to promote the decarbonization of agriculture through the ILPF strategy, evaluate the potential for mitigation and generation of carbon credits from different integration models, considering economic and environmental viability.

An e-learning course was also developed using the ILPF Network's distance learning platform, with lessons recorded by Embrapa researchers and professionals from member companies. The courses offer free classes and online activities.

✓ To find out more, visit <https://redeilpf.org.br/>.

Sustainable Soybean Program in the Cerrado (PSSC)

• *Carina Rufino, Hugo Kern, Marina Salles, Fernanda Cavalcante and Aline Amorim*

Launched in 2021, the Cerrado Sustainable Soybean Program (*Programa Soja Sustentável no Cerrado* – PSSC) aims to provide startups with a journey of experiences, supporting and encouraging entrepreneurs to develop and scale solutions that can foster sustainability through the preservation of natural resources and the restoration of green areas in the soybean production chain in the Cerrado region.

The initiative was carried out between 2021 and 2024 by the innovation consultancy PwC Agtech Innovation and the Land Innovation Fund (LIF), in strategic partnership with Cargill, the Telecommunications Research and Development Centre (CPQD), the Brazilian Industrial Research and Innovation Company (Embrapii) and the Brazilian Agricultural Research Corporation (Embrapa). Since 2023, Embrapa has been involved in activities related to the selection of startups, conducting technical meetings, mentoring and lectures with a focus on open innovation.

The purpose of the program is to foster entrepreneurship and innovation for deforestation-free production in the Cerrado region. Its scope includes fostering sustainability through the search for innovative solutions that generate value for the standing forest and contribute to the conservation of the biome's native vegetation.

In the 2024 cycle, the Program's guideline was the development of innovative products and services applicable to the soybean chain in Cerrado, involving technical and regulatory solutions for sustainable production. These solutions include soybean traceability, environmental suitability for producers, regenerative agriculture with a focus on recovering degraded areas, and reducing the use and application of pesticides and other chemical inputs that generate environmental imbalance.

In the last two cycles of the program, 22 rural products became part of the initiative, whose properties total more than 125,000 hectares, and in more than 90,000 hectares solutions from the program's startups were adopted, including technologies for climate monitoring, soil analysis, carbon and biodiversity, as well as methodologies that integrate conservation and production. Over the course of six cycles, the program received more than 320 applications from startups in 17 states and Distrito Federal (Federal District), and had 34 solutions integrated into its portfolio.

✓ To find out more, go to <https://www.pwc.com.br/pt/consultoria/agtech-innovation/programas/soja-sustentavel.html>.

Inova Amazônia: bioeconomy and innovation for the sustainable development of the region

• *Ana Rita Scozzafave*

The Inova Amazônia program has emerged as a strategic initiative to strengthen the bioeconomy in the Amazon region, promoting economic growth combined with open innovation and environmental conservation. The program's main guidelines were analyzed, as well as its impact on valuing sustainable natural resources and the challenges of implementing an economic model based on the rational use of local biodiversity. Based on a literature review and case studies, this research highlights the potential advances in the green economy, the regulatory challenges and the opportunities for startups and sustainable ventures in the region.

The Amazon represents one of the world's greatest environmental treasures, with unique biodiversity and vast potential for the development of innovative solutions that reconcile economic growth with environmental conservation. The Inova Amazônia program seeks to foster initiatives that transform regional biodiversity into a driver of development, promoting the bioeconomy as an alternative to predatory extractive activities.

This study investigates how open innovation and the valorization of natural resources can generate sustainable economic opportunities, boosting startups and projects that responsibly utilize Amazonian biodiversity.

The bioeconomy involves the sustainable use of renewable biological resources for the production of goods and services. In the Amazon, this approach is especially relevant as it offers viable economic alternatives to traditional models based on environmental degradation. The Inova Amazônia program encourages research and development of biodiversity-based products, promoting local industrialization and income generation for traditional communities.

Open innovation enables collaboration among companies, research institutions, startups, and local communities for the co-creation of innovative solutions based on Amazonian biodiversity. The development of innovation hubs and the integration of traditional knowledge with new technologies are essential strategies to increase the scalability of these projects.

Despite the opportunities, the implementation of the bioeconomy in the Amazon faces several challenges, such as:

- environmental regulations and bureaucracy;
- limited infrastructure for transporting production;
- the need to train the local workforce;
- funding for startups and innovative projects.

Overcoming these challenges requires effective public policies, investment in infrastructure and greater coordination between the public and private sectors.

Inova Amazônia represents a significant step towards consolidating the bioeconomy as the driving force behind sustainable development in the region. The integration of open innovation, scientific research and traditional knowledge is essential if the Amazon biome is to become a global benchmark in sustainability. Making this model a reality depends on joint

efforts between governments, companies, academic institutions and local communities, ensuring that the Amazon is exploited in an innovative, sustainable and economically viable way.

- ✓ To find out more, visit: <https://sebrae.com.br/sites/PortalSebrae/inovaamazonia>.

Networking for the socio-productive inclusion of babaçu breakers

- *Guilhermina Maria Vieira Cayres Nunes*

Social innovation and socio-productive inclusion initiatives led by Embrapa Maranhão — in collaboration with universities from Maranhão and Ceará, private sector partners, the state government, NGOs, community organizations of coconut breakers and other women working with babaçu, as well as Embrapa Agroindustry for the Tropics and Embrapa Food Agroindustry — have resulted in the development of new food products based on babaçu (*Attalea speciosa*). This native Brazilian species plays a vital role in the socio-biodiversity of the country and forms the backbone of the extractive economy for thousands of families, especially in the states of Maranhão, Tocantins, Pará, and Piauí. With growing national and international interest in food systems that recover traditional knowledge, offer origin recognition, and deliver nutritional and health benefits, babaçu has the potential to serve as the anchor of a territorially rooted food system. However, consumer unfamiliarity with the nutritional and sensory qualities of babaçu-based products makes their extraction and processing undervalued. This lack of awareness hampers the understanding of the products' pricing and their social, cultural, and environmental significance, especially considering that this fruit symbolizes the historic struggle of families to preserve babaçu forests in the region.

Maranhão is the leading state in Brazil for babaçu almond production. In the 1990s, women babaçu extractivists gained national visibility as a social movement through their self-identification as “babaçu coconut breakers” (*quebradeiras de coco babaçu*). They are recognized as a traditional community under Decree No. 6.040 of February 2007. However, there are now other groups of women and young people working in community agro-industries that process babaçu-based products who are not coconut breakers. These include family farmers, agrarian reform settlers, and small-scale producers, collectively recognized as women of babaçu (*mulheres do babaçu*).

Organized groups led by these women are producing a variety of babaçu-based foods, such as bread, cakes, cookies, and ice cream, using the almond and mesocarp flour. This local production supplies institutional programs like the Food Acquisition Program (PAA) and the National School Feeding Program (PNAE), and is also sold at municipal and regional markets. The projects developed by Embrapa, in partnership with institutional collaborators and *mulheres do babaçu* groups, aim to create new food products and processes by fully utilizing the edible parts of the babaçu coconut. The goal is to expand the diversity of the local “food basket” while increasing the added value of the sociocultural and historical identity of the coconut breakers and their production and commercialization practices..

Between 2011 and 2017, Embrapa held consultations with representatives of around 40 agro-extractivist groups, who identified the need for alternatives for the integral processing of babaçu.

These projects aim to meet this demand through new production processes and best practices in babaçu-based food products. The approach involves taking researchers, professors,

and other professionals to learn about the livelihoods and working conditions of women both in rural areas and in agro-industrial settings. After this initial engagement, technical staff present new food formulations, which are then adjusted by the women in ongoing collaboration with other professionals until a consensus prototype is reached. The formulations take into account the materials and equipment available in the agro-industries. The prototypes undergo laboratory testing, including microbiological, physicochemical, and nutritional analyses, followed by sensory analysis.

Within this process, gluten-free and lactose-free formulations of cookies, frozen desserts, burgers, plant-based milk, cheese analogues, and babaçu almond flour are in different stages of development. A key distinguishing feature of these technologies is the inclusion of babaçu women in the development of technological assets, ensuring they are co-authors of the new formulations, combining traditional knowledge with technical-scientific expertise. Simultaneously, visual identities and packaging tests are discussed and developed. Each activity has a specific institutional partner responsible for its implementation, with Embrapa coordinating and facilitating networked collaboration.

Currently, these babaçu women are invited or hired to train new groups and have become references in social innovation and the management of community enterprises that offer products for market niches that value the sociocultural identity and environmental importance of the coconut breakers in conserving a species of sociobiodiversity — the babaçu palm. In 2023 and 2024, two of the community agro-industries partnering with the projects were recognized by the government of Maranhão for achieving the highest sales volume in their respective years.

✓ To find out more, visit <https://www.embrapa.br/cocais>.

Sustainable Pantanal Farm as a network initiative for the development of multifunctional and efficient production systems in the Pantanal

● *Thiago Nery da Cunha Coppola and Sandra Aparecida Santos*

The Pantanal is the largest floodplain in the world and is made up of a mosaic of forest, savannah and grassland vegetation formations distributed according to topography and hydrology, forming various phytophysiognomies such as clean grassland, savannah grassland, floodplains, lake edges, among others. The dominant native pastures make the region naturally suitable for extensive cattle farming, its main economic activity. More than 90% of the large Pantanal plain is privately owned, hosting beef cattle ranches. However, in recent decades, this traditional system has faced economic and environmental challenges due to the fragmentation of land by inheritance, the cattle crisis, climate change with extreme drought events and large fires, the loss of native grasslands due to the invasion of woody species, the uncritical suppression of native vegetation with the introduction of exotic grasses, among others. Thus, the sustainable development of the Pantanal depends on the maintenance of livestock farming, which requires sustainable solutions that can reconcile environmental conservation and profitability with the socio-cultural appreciation of Pantanal people.

The Sustainable Pantanal Farm (*Fazenda Pantaneira Sustentável – FPS*) is a tool developed by Embrapa Pantanal and Embrapa Digital Agriculture, initially applied in partnership with the Mato Grosso Federation of Agriculture and Livestock (Famato), Senar MT, the Mato Grosso Institute of Agricultural Economics (IMEA), with the support of the Mato Grosso Government,

the Mato Grosso Legislative Assembly, Pantanal farmers and rural producers' unions. The initiative uses a platform based on Artificial Intelligence to assess the sustainability of Pantanal farms. A software called ASFP (*Análise de Sustentabilidade de Fazendas Pantaneiras*, or Sustainability Assessment of Pantanal Farms), registered on behalf of Embrapa, as well as of the Mixed Brand Fazenda Pantaneira Sustentável, analyzes environmental, economic and socio-cultural dimensions through 57 indicators, allowing for a systemic diagnosis of the property. Based on the indicators, strategies can be indicated for good agricultural practices that allow for an increase in production efficiency and environmental resilience of livestock, minimizing impacts on biodiversity and natural resources. ASFP also diagnoses the natural productive aptitude of the farm using four indicators and the viability of livestock farming using five indicators. The viability of livestock farming can help in the development of public policies for the Pantanal in relation to access roads, education, health and communication routes.

The project also aims to add value for producers through the commercialization of ecosystem services, sustainability certification, and the transfer of technologies and good agricultural practices tailored to the realities of the Pantanal production system. Although there has been progress in Mato Grosso, adoption in Mato Grosso do Sul is still incipient.

Main objectives of the FPS include: assessing the carrying capacity and productive aptitude of farms based on climate conditions and management practices; encouraging the adoption of good practices; supporting the search for solutions to meet demands, challenges, and problems; promoting the exchange of experiences and information; fostering environmental legislation; and creating opportunities for alternative income, such as beekeeping and agrotourism. The initiative also promotes ecosystem services and the development of multifunctional systems.

Through the FPS, a database is being created on the production systems in Pantanal, an area historically lacking in data, allowing for the systematization of information to support decision-making tools and public policy formulation. This, in turn, facilitates access to credit lines and economic incentives for producers committed to sustainability, through mechanisms such as payment for ecosystem services and the addition of value to sustainable production systems (farms), using science-based indicators.

The methodology includes data collection by field technicians, image analysis, productivity assessment, and the formulation of customized recommendations for each property. In its pilot phase, actions have already been implemented in the Pantanal region of Mato Grosso, covering more than 100,000 hectares, with the technology expected to reach over 1 million hectares soon, and further expansion planned for new farms in 2025.

The evolution of each property will be analyzed in relation to its own potential, due to the highly variable productive aptitude stemming from the complexity of landscapes, water bodies, and flood levels. In the implementation of the FPS in Mato Grosso, the tool served as a central element in addressing the actual needs for the sustainable development of the properties, including not only technologies, but also other necessities such as land regularization, contributing with knowledge to develop more specific and appropriate legislation for the region that supports sustainable production systems, access to credit lines, and the development of technologies in partnership with the private sector. It creates an integrated network of partners in pursuit of the region's sustainable development, delivering value to rural producers and society as a whole.

The expected results include improving the sustainability of the farms, systematizing management practices and optimizing production efficiency. The program also seeks to structure networks of sustainable farms, promoting the appreciation of the Pantanal in the national and

international markets. The knowledge base will make it possible to obtain subsidies for public policies based on sustainability and opening up markets for commodity and non-commodity products (payment for environmental services) and integration with the private (startups, unicorns, small, medium and large companies) which can partner with Embrapa to develop open innovation projects.

With the growth of the FPS, it is expected that there will be greater engagement of producers, investors, attraction of companies and institutions that operate or seek to operate in the region, strengthening the economic, socio-cultural and environmental sustainability of the region generating innovation and new business. Embrapa Pantanal reinforces its commitment to connecting science and technology to the productive sector, contributing to an integrated and innovative management model in the Pantanal.

✓ To find out more, visit: https://www.embrapa.br/web/portal/cultivos/busca-de-news/noticia/90837256/fazenda-pantaneira-sustentavel-e-destaque-durante-pantanal-tech-na-universidade-estadual-do-ms?p_auth=N31k8KcR.

Agro Corridor: global positioning of a Brazilian agricultural innovation and entrepreneurship ecosystem

● *Vitor Henrique Vaz Mondo*

Innovation Corridor is a globally recognized concept for the economic and social development of a specific territory through the integration of innovation hubs for the generation and adoption of high-impact technologies. It has been used worldwide for decades, but in Brazil, the first to be proposed and move towards implementation was the São Paulo State Agricultural Innovation Corridor, or Agro Corridor.

This innovation and entrepreneurship ecosystem was conceived in mid-2019, but only began to take solid steps towards its development from the end of 2021. The initiative was based on relevant institutions at federal and state level, initially with the participation of Embrapa, the São Paulo Agricultural Technology Agency (APTA) and Sebrae SP, as well as the fundamental support of the Ministry of Agriculture, Livestock and Food Supply (MAPA). As the initiative matured and its value became evident, other major institutions in Brazil joined the effort, such as the São José dos Campos Technological Innovation Park (PIT), the Ribeirão Preto Technological Innovation Park (SUPERA) and, more recently, the Piracicaba Technological Park and Onovolab based in São Carlos. Today, this group of institutions forms the governance foundation of the Agro Corridor.

The Agro Corridor spans roughly 400 kilometers, integrating the regions of Ribeirão Preto, São Carlos, Piracicaba, Campinas and São José dos Campos, as well as surrounding cities. These regions stand out for their agricultural tradition and the presence of relevant players for technological development, such as universities, science and technology institutes, innovation environments, companies linked to the sector and rural producers. To give you an idea of the size of this territory and its aptitude for innovation and agricultural entrepreneurship, these cities are consistently ranked among the 10 cities in the country with the highest number of startups in the agricultural sector, with more than 30 universities and science and technology institutions working directly on the subject, generating knowledge, technology and more than 1,000 new professionals in agricultural sciences every year.

It is worth noting that, despite the territorial delimitation of the Agro Corridor, the basis of the whole construction is the formation of networks. The five anchor cities involved are individually relevant and recognized ecosystems, which have their own resources, actors and networks. However, by connecting in a common context, they begin to share their resources, access others and expose their own networks to everyone, broadening the capillarity of their actions and strengthening the concept of networks.

One of the main objectives of consolidating the Agro Corridor is to position it globally as one of the most relevant agricultural innovation ecosystems in the world, with representative figures and the generation and sharing of value in a broad way with everyone present in this territory.

It is with this in mind that the Agro Corridor has been structured to boost open innovation and entrepreneurship, strengthening and expanding technological development and the growth of the agricultural sector in Brazil, based on a robust and vibrant ecosystem.

✓ To find out more, visit: www.corredoragrosp.com.br.

Agro Valley: agribusiness governance for Londrina and the region

• *Carina Rufino, Hugo Kern and Tatiana Fiuza*

Established in 2018, Agro Valley Londrina is Londrina's Agribusiness Innovation Ecosystem. It was the first Innovation Hub recognized by the Ministry of Agriculture in 2019, comprising an inter-organizational network through which people, companies and entities are encouraged and integrated to promote innovation in the agribusiness ecosystem in the Londrina region. The ecosystem is currently made up of 32 representatives from associations, trade associations, companies, cooperatives, startups, the government universities, innovation environments and research institutions.

Agro Valley Londrina focuses on planning, together with municipal, state and federal governments, policies and incentives for innovation, promoting the formation of business networks, fostering innovation, connecting new entrepreneurs and promoting actions that have innovation in agribusiness as a central theme.

Among the various results of the ecosystem, the Hackaton Smart Agro stands out, which has been held since 2016 as part of the ExpoLondrina program. Agro Valley currently has different environments to house startups in their various stages of maturation, such as GO SRP Agritech, a startup accelerator, and Cocriagro, an innovation hub. The ecosystem also promotes AgroBIT, one of the largest technology and innovation events in Brazil, supports editions of the Agribusiness Forum and, more recently, a macroeconomic study on agribusiness in the Londrina region.

✓ To find out more, visit <https://agrovalley.com.br/>

Climate Change, ESG, Diversity and Inclusion: the Impact on Agriculture and the Call for Transformation

Climate change is profoundly altering the balance of agri-food systems. The increase in average global temperatures, changes in rainfall patterns and the intensification of extreme events are affecting all stages of the agricultural production chain, from planting to marketing. Agriculture, which is responsible for feeding billions of people and sustaining economies, is both a victim and one of the main causes of climate change, contributing around 23% of global greenhouse gas (GHG) emissions, according to the UN (IPCC, 2019; FAO, 2016).

Climate Change: A New Reality for Agriculture

The impacts of climate change on the agricultural sector are wide-ranging and worrying, as described below (IPCC, 2019; FAO, 2016).

1. **Reduced Agricultural Productivity.** The rise in global temperatures, projected to reach between 2 °C and 5 °C by the end of the century, has a direct impact on crop yields. Sensitive crops such as soybeans, corn and wheat face a drop in productivity due to thermal and water stress. For example, in Brazil, grain-producing regions in the Cerrado suffer from longer periods of drought, which compromise both the volume and quality of production (AGFEED, 2024).
2. **Changes in the Distribution of Pests and Diseases.** Global warming alters the behavior of pests and pathogens, expanding their areas of occurrence, which creates greater pressure on farmers to control these threats, raising production costs and compromising food safety. Studies indicate that, with 1.5 °C rise in temperature, the occurrence of pests such as caterpillars and locusts could increase significantly in Latin America (UN BRAZIL, 2021).
3. **Climate Variability and Economic Impacts.** The unpredictability of rainfall and extreme events, such as floods and late frosts, makes agricultural planning difficult. Small producers, who represent the majority of farmers in Latin America, are particularly vulnerable, as they rely on limited resources to cope with these adversities. The lack of climate predictability increases operating costs, reduces productivity and causes significant economic losses (AS-PTA, 2018).
4. **Scarcity of water resources.** Agriculture is the largest consumer of fresh water in the world, accounting for around 70% of global use. Changes in the hydrological cycle, including more frequent and intense droughts, jeopardize the supply of water for irrigation. In Brazil, critical agricultural regions, such as the Northeast and parts of the Southeast, are already facing severe water availability challenges.
5. **Impacts on Agricultural and Natural Ecosystems.** Soil degradation, intensified by deforestation and inadequate land use, reduces agricultural support capacity and accelerates desertification processes. This phenomenon is evident in areas of the Cerrado, where the combination of intensive agricultural practices and climate change threatens the ecological balance of the region.

The Role of Agriculture in Climate Change

The agri-food sector is one of the main GHG emitters, mainly due to:

- **Changes in land use:** Deforestation for agricultural expansion is responsible large volumes of emissions, especially in tropical countries like Brazil.
- **Livestock production:** Livestock is one of the biggest sources of methane, a gas with a global warming potential 25 times greater than carbon dioxide.
- **Use of chemical inputs:** Synthetic fertilizers, when applied to the soil, release nitrous oxide, an extremely potent greenhouse gas.

However, agriculture also has a strategic role to play in mitigating climate change, with the potential to change from a villain into a climate hero, using regenerative practices, low-carbon technologies and circular production systems (ÉPOCA NEGÓCIOS, 2023).

Future Scenario: Resilient and Climate-Adapted Agriculture

The future of agriculture depends on the ability to adapt and innovate. To face climate challenges, integrated solutions are needed that align productivity, sustainability and social inclusion.

1. **Climate adaptation.** Practices such as regenerative soil management, agroforestry and integrated crop-livestock-forestry systems (ILPF) are key to reducing emissions and increasing the resilience of agricultural systems. These practices not only sequester carbon, but also improve soil health, water retention and biodiversity.
2. **Digitalization and Predictability.** Digital agriculture tools, such as IoT sensors, satellites and predictive modeling, help farmers predict climate change and adjust their strategies. Solutions such as Agrosmart, which provides real-time data on climate and soil conditions, are already helping producers to better plan their operations (EMBRAPA, 2023).
3. **Developing Resilient Crops.** Investment in genetic engineering to create plant varieties that are resistant to heat, drought and pests is essential. Companies such as BASF and Bayer are leading this field, developing seeds that offer greater stability in hostile environments (NASSAR; ORTOLANI, 2021).
4. **Financial and Sustainable Inclusion.** Agri-fintechs play a central role in offering credit and climate insurance to small farmers, allowing them to invest in resilient technologies without compromising their financial stability. Solutions such as Traive and Verqor facilitate access to financial resources for sustainable practices (CNN BRAZIL, 2023).

Climate change is already transforming global agriculture, jeopardizing the food safety and economic stability of millions of people. The agri-food sector faces a dilemma: adapting to the new climate realities or facing increasing losses. Transforming agri-food into a resilient, low-carbon sector requires coordinated efforts between governments, investors, researchers and farmers. Technological innovation, combined with robust public policies and strategic funding, can turn challenges into opportunities.

COP30, to be hosted in Brazil, is a unique opportunity for the country to lead this global movement, showing it is possible to produce food in a sustainable and climate-adapted way. This transition is essential for the survival of agriculture and to guarantee a more sustainable and inclusive future for generations to come.

COP29: Reflections and the Role of Agriculture in Global Climate Action

The 29th United Nations Climate Change Conference (COP29), held in Baku, Azerbaijan, highlighted the urgency of advancing global climate commitments, with a special focus on agriculture and natural ecosystems. The event reinforced that the agri-food sector, responsible for ensuring global food security, is on the front lines of climate vulnerabilities.

COP29 also emphasized the need to integrate innovation and climate financing into concrete solutions for the most affected sectors, such as agribusiness. One of the key messages was that without a deep transformation in agri-food systems, the goals of the Paris Agreement – limiting global warming to 1.5°C – will be out of reach.

At the event, Brazil played a significant role in presenting its updated *Nationally Determined Contributions* (NDCs), setting ambitious targets that reflect both the need for action and the country's potential as a leader in sustainability:

- **Emissions Reduction:** Commitment to reduce net greenhouse gas emissions by 67% by 2035.
- **Zero Deforestation:** Eradication of illegal deforestation by 2030, with an emphasis on protecting the Amazon and other critical biomes.
- **Promoting Sustainable Technologies:** Encouraging the use of bio-inputs, regenerative soil management practices and digital tools in agriculture.

These commitments position Brazil not only as one of the main emitters to implement significant changes, but also as a global benchmark in the integration of agricultural productivity and environmental preservation (GLOBO RURAL, 2024).

COP30: A Historic Opportunity for Brazil

COP30 to be held in Belém, in the heart of the Amazon, marks a strategic moment for Brazil. For the first time, the country will host the main global climate negotiation event, offering an unprecedented opportunity to demonstrate climate leadership and promote solutions that balance productivity, sustainability and social inclusion.

1. **The Amazon as the Center of Discussions.** Choosing Belém to host the event shines a light on the crucial role of the Amazon in global climate regulation. With its vast biodiversity and carbon sequestration capacity, the Amazon rainforest will be a central symbol of the negotiations. Brazil will be able to highlight initiatives to combat deforestation and promote sustainable chains linked to the preservation of Amazonian ecosystems (EMBRAPA, 2024).
2. **Brazil's NDCs and the Role of Agriculture.** COP30 will be an opportunity to present concrete advances in the goals of the Brazilian NDCs, especially in the agri-food sector, including the scaling up of regenerative practices, such as integrated crop-livestock-

forestry systems (ILPF), which have already shown potential to reduce emissions and increase climate resilience. In addition, the event will potentially highlight innovations already in practice in Brazil, such as the use of bio-inputs for soil regeneration and the development of digital technologies for climate monitoring, which are being applied on a commercial and small producer scale (EMBRAPA, 2023).

3. **Fostering Global Partnerships.** COP30 will be a stage for strengthening partnerships between governments, the private sector and academia, promoting an exchange of knowledge and innovation. For Brazil, this means not only attracting international funding, but also showing how local startups and technologies can be exported as models of climate resilience and sustainability (EMBRAPA, 2023).
4. **Relevance for Latin America.** Holding COP30 in Brazil also reinforces the importance of Latin America as a key region in the fight against climate change. With common challenges such as desertification, water scarcity and the vulnerability of small farmers, Latin American countries will be able to come together to present regional and integrated solutions (BRAZIL, 2024).

COP30 and the Transformation of Brazilian Agriculture

For the Brazilian agri-food sector, COP30 is a chance to reverse historical narratives that often associate agribusiness with deforestation and emissions. The event will allow Brazil to show how innovation and sustainability can coexist, presenting success stories that demonstrate how agribusiness can be an engine for climate solutions.

What Brazil can highlight at COP30:

- **Crop-Livestock-Forest Integration Programs (ILPF):** Already widely used in the country, these systems maximize the efficient use of land, promote biodiversity and sequester carbon, making them a global model for sustainable production.
- **Bioeconomy and Sustainable Value Chains:** Initiatives in the Amazon, such as the use of forest products for sustainable production chains, can be presented as examples of the union between preservation and income generation.
- **Digitalization in the Field:** Solutions such as Agrosmart and startups focused on digitalizing value chains can illustrate the impact of technology in making agriculture more resilient and efficient.

Leading the Future at COP30

COP30 will be more than a climate conference – it will be a milestone in Brazil's history as a global leader in the climate and agri-food agenda. By integrating technological innovation, ambitious public policies and global partnerships, the country may show that it is possible to produce food sustainably, protect ecosystems and lead the transition to a low-carbon economy.

This historic opportunity will require coordination and strategic vision, but the benefits go far beyond the climate negotiations, enabling Brazil to position itself as a global model for sustainable development and an example of how to turn climate challenges into future opportunities.

ESG and Impact: Two Fundamental Pillars for Agtech Startups

In today's business environment, terms such as ESG (Environmental, Social and Governance) and positive impact have gained prominence as essential strategic elements. Although they are interlinked, ESG and impact have different but equally important approaches and focuses. Understanding their differences and integrating them into operations is fundamental for startups, especially in the Agtech sector, which combines technological innovation and agriculture to solve global challenges.

What is ESG? Focus on Risk Management and Operational Excellence

ESG refers to the way companies operate, produce and manage their business practices, with a focus on minimizing risks and maximizing efficiency and sustainability. It covers three main dimensions (SEBRAE, 2023):

1. **Environmental:** This refers to how the company deals with environmental issues, such as natural resource management, carbon emissions, the circular economy and reducing climate impacts.
2. **Social:** This relates to labor practices, the impact on communities and social inclusion inside and outside the company.
3. **Governance:** This involves transparency, business ethics, diversity and strategic management policies.

ESG Risk Management

At the heart of ESG is risk management, which aims ensuring that the company is operating ethically, efficiently and in line with global best practices. For agtech startups, risk management involves the following aspects:

- **Policies and Governance:** Adopting compliance manuals, establishing diversified boards and promoting transparency in decision-making.
- **Resource Management:** Monitoring the use of resources such as water, energy and agricultural inputs to avoid waste and reduce environmental impacts.
- **Diversity on the Board:** Including different perspectives in leadership, promoting more innovative and equitable decisions.
- **Labor Practices:** Implementing policies that guarantee safe, fair and healthy conditions for employees.
- **Corporate Culture and Work-Life Balance:** Creating an environment that promotes work-life balance, reducing turnover and increasing productivity.

In addition to mitigating operational risks, robust ESG management improves the company's reputation, strengthens talent retention and attracts investors, who see ESG as a metric of long-term resilience and sustainability (RENOVA INVEST, 2023; MBA USP ESALQ, 2024).

What is Impact? Generating Positive Results for the Environment and People

While ESG focuses on “how” the company operates, impact refers to the “result” of these operations in the context in which the organization works. For agtech startups, impact lies in the potential to transform production chains, improve food safety, reduce emissions and generate tangible benefits for farmers, consumers and the environment.

Mapping Impact through the SDGs

Understanding and integrating the United Nations Sustainable Development Goals (SDGs) into business operations and strategies is essential for startups wishing to attract impact investors and multilateral banks. These stakeholders are increasingly attentive to the alignment of companies with global sustainability goals, considering SDGs as a reliable metric for assessing the resilience and social and environmental responsibility of potential investments. By adopting the SDGs as a framework, companies not only strengthen their impact narrative, but also increase their chances of accessing financial resources and establishing strategic partnerships.

The SDGs form a global framework with 17 interconnected goals, such as poverty (SDG 1), zero hunger and sustainable agriculture (SDG 2), and action against climate change (SDG 13). This alignment provides companies with a universal and standardized language to communicate their positive impact, strengthening engagement with investors and stakeholders.

Importance of mapping the SDGs

Mapping the SDGs is crucial for startups and companies that want to strengthen their ESG strategies and impact. This integration enables:

1. **Strategic Clarity:** Helps identify relevant impact areas and prioritize actions that generate environmental, social and economic value.
2. **Universal Language:** Allows the company’s results to be communicated in a standardized and understandable way to investors, multilateral banks and global stakeholders, facilitating fundraising.
3. **Stakeholder Engagement:** Demonstrates the company’s commitment to global challenges, strengthening relationships with partners, communities and impact investors.

Practical Examples of Alignment with the SDGs

Agtech startups can align their activities with specific SDGs to create measurable impact. Examples include:

- **Farm Management SAAS.** A farm management platform can directly contribute to SDG 2 (Zero Hunger and Sustainable Agriculture), SDG 12 (Sustainable Production and Consumption) and SDG 13 (Action Against Global Climate Change). This type of solution optimizes the use of resources, allowing farmers to increase their income by reducing operating costs, as well as promoting the responsible use of agricultural

inputs, improving soil health and reducing emissions by avoiding the unnecessary use of fertilizers.

- **AgFintechs.** Agfintechs directly impact SDG 2 because they often serve communities marginalized by the financial sector, such as small farmers. These solutions allow farmers to access credit and insurance, enabling them to invest in technologies that increase efficiency and promote the use of alternative inputs. This access to financial resources also encourages more modern and sustainable practices (FARMNEWS, 2024).
- **Technologies for Climate Resilience.** Startups that develop technologies such as IoT sensors, real-time climate monitoring and agricultural automation contribute to improving the climate resilience of farms. These technologies allow farmers to adopt more efficient and sustainable practices, reducing their vulnerability to climate change and promoting SDG 13 (TECMUNDO, 2023).

Using the SDGs to chart KPIs

SDGs provide a clear path for developing KPIs that demonstrate a company's impact. Examples of aligned KPIs include:

- **Operational Efficiency:** Decreased use of chemical fertilizers or increased use of bio-inputs, measuring impact on SDG 12.
- **Financial Inclusion:** Amount of small farmers served by agfintechs, promoting SDG 2.
- **Emissions Reduction:** Monitoring emissions avoided through agricultural management technologies, in line with SDG 13.

Benefits for Investor Relations

Impact investors and multilateral banks value companies that use the SDGs as part of their strategy, for various reasons.

1. **They facilitate fundraising:** Clear reports aligned with the SDGs strengthen transparency and trust, key factors in attracting sustainable funding.
2. **They increase resilience:** Companies aligned with the SDGs are perceived as being more prepared to face economic and climate challenges.
3. **Provides Market Differentiation:** Alignment with the SDGs demonstrates a clear commitment to global goals, setting the company apart from its competitors.

More than a strategic tool, alignment with SDGs is an opportunity for startups to position themselves as protagonists in sustainability and positive impact. Technological, financial and management solutions that promote sustainable practices create significant value, strengthen the resilience of the agribusiness sector and establish a solid bridge with investors who prioritize impact and sustainability (IDB, 2023; FASTER CAPITAL, 2023).

The Importance of ESG and Impact for Agtech Startups

For agtech startups, ESG and impact are more than just good practices – they are competitive advantages that open doors to customers, investors and markets.

1. **Attractiveness for Clients and Partners.** Companies that demonstrate a commitment to ESG and positive impact win the preference of corporate clients, who are looking for partners aligned with their values of sustainability and innovation.
2. **Fundraising and investment.** Investors, especially impact funds and Venture Capital, are increasingly interested in startups that integrate ESG and positive impact into their operations. These criteria signal mature management in line with global trends.
3. **Talent Engagement.** Startups with solid ESG policies attract and retain talent looking to work in companies with purpose. Diverse, inclusive environments that promote work-life balance increase team motivation and productivity.
4. **Scalability and Resilience.** Companies that integrate ESG from the outset build solid foundations to grow in a sustainable and resilient way, reducing operational risks and maximizing positive impact (STARTUPS, 2023; TDS COMPANY, 2023; ECONOMIA SP, 2024; EXAME,).

How to get started? Integrating ESG and Impact into Corporate Culture

Adopting an ESG strategy from the earliest stages of the business is no longer a differentiator, but a competitive imperative. Startups and innovative companies have stood out by incorporating sustainable and governance practices into their culture and operations, redefining the role of entrepreneurship in tackling today's social and environmental challenges (AMBITUS GLOBAL, 2023, SEBRAE, 2023). The following are key practices to achieve this:

- **ESG Strategy:** Start by implementing clear internal policies with a focus on governance, transparency and operational efficiency.
- **Impact Mapping:** Use the SDGs as a guide to identify how your products or services generate environmental and social value.
- **Measurement and Communication:** Establish metrics to track progress and report these results to stakeholders through ESG reports.
- **Culture and Engagement:** Engage the whole team in building an ESG culture, promoting training, campaigns and inclusive practices.

Building the Future of Sustainability in Agriculture

In addition to being an ethical commitment, the integration of ESG and impact is a differentiation and growth strategy for agtech startups. By creating a corporate culture that values sustainable practices and positive results, companies become aligned with global expectations and build a more resilient and promising future for the agri-food sector and society as a whole.

Diversity and Inclusion in Agribusiness: Essential for an Innovative and Sustainable Sector

Diversity and inclusion (D&I) are fundamental pillars for organizations seeking innovation, talent attraction and sustainable growth. In the context of , a sector responsible for 26.6% of Brazil's GDP, promoting racial and gender diversity is not only an ethical issue, but also a strategic necessity to ensure global competitiveness (IBGE, 2022). Despite its economic relevance, the

sector faces historical challenges racial inequality, low representation and structural barriers that limit its evolution (PwC, 2023).

What is Diversity?

Diversity is the recognition and appreciation of different characteristics, perspectives and experiences within a group, encompassing various aspects, such as those described below.

- **Ethnic-Racial Diversity:** The presence of people from different ethnic and cultural backgrounds.
- **Gender Diversity:** Equitable inclusion of men, women and people with other gender identities.
- **Generational Diversity:** Integrating different age groups, such as Generation Z, Millennials and Baby Boomers.
- **Diversity of Skills and Expertise:** Valuing varied professional and educational trajectories.
- **Diversity of Thought:** Encouraging different ways of solving problems and innovating.

In Brazilian agribusiness, however, diversity encounters deep historical and social barriers. As an example, in the ethnic-racial context we observe:

- **Land Concentration and Structural Racism:** The legacy of slavery and the unequal distribution of land perpetuate the low participation of black individuals in leadership positions in the sector. While 54.4% of family farming establishments are operated by black and brown people, only 16.2% of the directors of large farms belong to these groups (PwC, 2023; IBGE, 2022).
- **Low representation in agribusiness startups:** Only 15% of global startups have black leaders (PwC, 2023). In Brazil, this proportion is even lower, limiting diversity of thought and innovation in the sector.
- **Challenges in Accessing Resources:** Black and brown people face greater challenges in obtaining credit, financing and access to advanced technologies, which reduces their competitiveness (IBGE, 2022; PwC, 2023).

In agribusiness, diversity means racial and gender inclusion and valuing different cultural and socio-economic perspectives, which are fundamental for a sector seeking to modernize and serve global markets.

What is Inclusion and How Does It Transform Agriculture?

Inclusion is the creation of an environment where everyone, regardless of their differences, has equal access to opportunities, resources and benefits. In agribusiness, inclusion involves the following aspects:

- **Promoting Equity in Access to Land and Resources:** Small farmers, especially black farmers, face land insecurity and a lack of government support. Inclusive policies that ensure financing and technical assistance can transform this reality.

- **Inclusive Leadership:** Companies need to create strategies to increase racial and gender representation in leadership positions, promoting mentoring and development programs.
- **Culture of Respect and Appreciation:** Organizations in the agricultural sector must adopt practices that recognize the historical contributions of the black population and promote inclusion in corporate environments.

In agribusiness, diversity goes beyond racial and gender inclusion, encompassing the valuing of different cultural and socio-economic perspectives, which are essential driving innovation, strengthening competitiveness and meeting the demands of global markets.

Why is Diversity and Inclusion Strategic for Agriculture?

1. **Economic Performance and Innovation:** Research indicates that racially diverse companies are 36% more likely to outperform their competitors (PwC, 2023). In agriculture, a sector where sustainability is increasingly valued, diverse perspectives can drive innovative solutions in areas such as regenerative agriculture and low-carbon technologies.
2. **Reducing Inequalities:** Promoting D&I in agriculture is not only a matter of social justice, but also a strategy to reduce historical inequalities that limit the sector's growth (CRESWELL, 2014).
3. **Connecting with Global Markets:** Consumers and international partners are increasingly aware of companies' sustainability and inclusion practices. Integrating D&I into agribusiness strategies is essential to maintaining relevance on the global stage (PwC, 2023; COP29, 2024).

Agribusiness Challenges and How to Overcome Them

Although the benefits of D&I are clear, agribusiness faces specific challenges, such as a history of exclusion and concentration of power, a lack of effective public policies and cultural and institutional biases.

Brazil's colonial legacy and land ownership structure have created a highly exclusionary system, where the majority of land belongs to a small group. Due to these historical processes, structural racism and unconscious prejudices make it difficult for black and brown people to rise to prominent positions in the sector. Additionally, government support for black farmers and small producers is still insufficient.

To tackle the structural challenges of diversity and inclusion in agribusiness, it is essential to adopt a set of strategic and targeted actions, ensuring that small and large producers have equal access to opportunities, resources and technological innovation.

The following initiatives are key to transforming the sector into a more inclusive and competitive environment.

1. Implementing Affirmative Policies

- Establishing clear targets for racial and gender representation in leadership positions, management boards and development programs.

- Creating tax and regulatory incentives for companies in the agri-food sector that promote inclusion and diversity in their operations.
- Demanding transparency in the disclosure of diversity data, encouraging the adoption of metrics to monitor progress.

2. Investing in Education and Training

- Creating strategic partnerships with educational institutions and NGOs to train black professionals and women in areas such as agricultural management, agri-food technology and agri-entrepreneurship.
- Developing mentoring programs to connect underrepresented talent with industry leaders, expanding networks and growth opportunities.
- Expanding access to technical and digital courses on innovation in agribusiness, ensuring that farmers of different sizes can modernize their practices.

3. Facilitating Credit and Financing

- Expanding inclusive credit lines for small black producers and women farmers, with affordable rates and fair conditions.
- Creating investment funds and CVC (Corporate Venture Capital) aimed at startups and businesses led by black individuals and women in agribusiness.
- Implementing microfinance mechanisms and affordable agricultural insurance, ensuring greater financial security for small producers.

4. Expanding Access to Information and Technology

- Democratizing access to agricultural data and insights through digital platforms and free apps, reducing the information gap between small and large producers.
- Creating innovation hubs and accelerators focused on diversity, guaranteeing technical support and networking for entrepreneurs in the sector.
- Encouraging the adoption of low-cost technology, such as agricultural sensors and management software adapted for small producers.

5. Fostering Diversity in Innovation and Corporate Venture Capital (CVC)

- Directing CVC investments towards startups and inclusive technology projects that promote greater diversity in the agricultural sector.
- Establishing innovation forums focused on inclusion, connecting companies, universities and investors to develop accessible and sustainable solutions.
- Creating awards and incentives for agribusiness startups led by minorities, increasing the visibility and competitiveness of these ventures.

Promoting diversity and inclusion in agribusiness requires concrete and structured actions that guarantee equitable opportunities, drive innovation and strengthen the sector's competitiveness. Some strategic initiatives include:

1. Recruitment and Talent Attraction Strategies

- Adoption of inclusive selection processes, broadening recruitment channels to reach historically under-represented groups.
- Developing partnerships with universities and technical schools, promoting internship and trainee programs aimed at training diverse talents.
- Creation of diversity policies and inclusion targets, ensuring representation at different organizational levels.

1. Leadership Training and Development

- Implementation of mentoring and coaching programs, connecting black professionals and women to experienced leaders in the sector.
- Establishment of innovation hubs and sectoral meetings aimed at debating and disseminating good inclusion practices in agribusiness.
- Inclusion of diversity as a criterion in succession plans and corporate governance, guaranteeing a broad range of profiles in decision-making.

2. Inclusion of Small Producers and Entrepreneurs

- Expanding access to financing and microcredit, creating adapted solutions for small black and indigenous farmers.
- Investment in technological training and digitalization, allowing producers of different sizes to modernize their agricultural practices.
- Encouraging the formation of collaborative and cooperative networks to strengthen entrepreneurship and financial autonomy in the sector.

3. Governance, Monitoring and Transparency

- Creation of diversity and inclusion indicators, ensuring continuous measurement of progress in the sector.
- Publication of social impact and ESG reports, highlighting practices and progress in promoting racial and gender equity.
- Integrating diversity into ESG and compliance strategies, ensuring that inclusion guidelines are an essential part of corporate governance.

Adopting these good practices is key to make the agribusiness sector more inclusive and fair and to strengthen the sector's competitiveness and reputation in the global market, responding to growing demands for sustainability and social responsibility.

Diversity and Inclusion in Agriculture: A Competitive Advantage

Diversity and inclusion in agribusiness are not just ethical commitments, but strategic levers for innovation, sustainability and global competitiveness. Strengthening representation at all levels, from black and female leaders to small producers and rural entrepreneurs, broadens perspectives, drives innovation and strengthens more equitable and resilient production chains.

By integrating D&I into its practices, Brazilian agribusiness is positioning itself at the forefront sustainability and innovation, creating a competitive and inclusive environment in line with the UN's Sustainable Development Goals. Equity-oriented initiatives in the agri-food sector boost sustainable economic growth, promote a fairer working environment, strengthen social inclusion and make production chains more responsible and resilient.

To enable this transformation, it is essential to democratize access to opportunities, technology and knowledge, ensuring that producers of different profiles have the support to grow and innovate. A commitment to diversity and inclusion must be at the heart of business strategies, public policies and investments in the sector, making Brazilian agribusiness a global model for sustainable development and positive impact.

Method

- *Luiz Ojima Sakuda, Cleidson Nogueira Dias, Martha Delphino Bambini and Aurélio Martins Favarin*

This chapter describes the methodology used for Radar Agtech 2024 study, including:

(1) the collection process for the agtech mapping database; (2) the taxonomy; (3) the classification and validation of agtechs; and (4) the main changes in data collection compared to 2023.

A mapping of agtechs has different characteristics from other studies, such as a census and a survey, which have complementary objectives.

A census seeks to understand a population based on data collected from the population itself. Therefore, it uses research instruments, such as questionnaires, to conduct an active search. It depends on the willingness of the research subjects to provide answers. As it does not work with samples, but with the entire population, it is a process that requires a large budget and a long collection time, unless the population is very small.

Mapping, on the other hand, works with publicly available information and therefore does not depend on companies and individuals being willing to respond to a survey, nor on authorization to use the information identified, since it is public. On the other hand, it does not include very specific and detailed data, since it is only made available by the individuals and companies identified.

The term “survey” refers to a type of research that mainly employs quantitative instruments to describe a population in greater depth, but without intending to be a census. This type of research is quite common and complements previous approaches.

Since 2022, Radar Agtech has collected data on two fronts, in the form of a survey and a study, the results of which are presented in specific chapters.

Collection process for the agtech mapping database

This section describes the methodology used to build the database of startups operating in the agricultural sector and investments in agtechs, the criteria for inclusion and exclusion and the data fields included in each database.

Agtech database

The agtech database for Radar Agtech 2024 was built by updating and qualifying the databases collected in previous studies.

Qualifying/updating the agtech database involved the following activities:

- 1) Verification of the list of agtechs on Radar Agtech as active or inactive, based on the following publicly accessible virtual identifiers: active website, social media updates and CNPJ (National Registry of Legal Entity) status.

- 2) Updating the Population estimates, since the Brazilian Institute of Geography and Statistics (IBGE) database used was from 2021 and, in this edition, we have used the new database (IBGE, 2025) from 2024.
- 3) Updating, from stage 1, the descriptive data of each startup, as well as its area of activity.
- 4) Initiatives undertaken to expand the database, including new agtechs, from:
 - a) professional contacts and systematic monitoring of websites and news from players in the agricultural innovation ecosystem (government agricultural research bodies, state and federal research institutes, sources of funding for research, innovation and entrepreneurship, innovation hubs, incubators, accelerators and investors in entrepreneurial capital) made by the directors (Embrapa, SP Ventures and Homo Ludens);
 - b) analysis and comparison with other agtech reports published in Brazil;
 - c) voluntary registration of startups on the radaragtech.com.br website, which has the survey form;
 - d) dissemination by the press office to the media;
 - e) marking of agtechs identified in 2023 with a LinkedIn profile in the publication referring to the register;
- 5) Once the new agtechs had been identified, a new stage of data qualification was carried out, verifying the activity/inactivity of the new agtechs, taking into account the following publicly accessible virtual identifiers: active website, social media with updates and CNPJ status.
- 6) Consolidation of information, involving merging data from different sources on the same company, excluding duplicate data and excluding non-validated agtechs from digital identifiers.

From this process, according to the inclusion and exclusion criteria, presented below, 1,972 agtechs were validated.

Inclusion and exclusion criteria for the 2024 database of Agtechs

Radar Agtech is a mapping, therefore the study relies on public and open information to be carried out. When applying the criteria listed, the decision was made to keep the largest number of startups that met the inclusion criteria described in the following paragraphs (sufficient condition). Further analysis with new information may find that some of the startups in this edition of the mapping should have been excluded. In addition, as the context of startups is very dynamic, validated agtechs may have gone out of business after our analysis was completed. It is hoped that a new edition of the Radar will include the necessary adjustments and reflect, as close as possible, the current reality of innovation ecosystems in Brazil. The criteria for including agtechs in the database were an active digital presence (website and/or social media) associated with the availability of information about their location and area of activity listed in the CNPJ and/or digital presence.

Startups whose market is not related to the agribusiness chain, even if they have been listed in other studies and directories in the sector, were excluded.

With regard to the company's existence, we chose not to use the criterion set out in the legal framework for startups (10 years), since, for many categories of agtechs, the technology

development and adoption cycles are longer than those of startups in other sectors of the economy. Thus, up to 20 years of establishment were considered.

The turnover indicator was not taken into account when analyzing the startups, the criterion for classifying startups under the legal framework for startups, which considers turnover to be below 16 million Brazilian Reais, as it was not possible to collect public turnover information on all the agtechs mapped.

The following were also excluded: (i) agtechs that were acquired by other larger companies, regardless of whether or not they remained as autonomous companies within the acquiring company's group; (ii) companies that present themselves under different names but have the same CNPJ; (iii) agtechs without a CNPJ identification; (iv) agtechs with a closed or unfit CNPJ; and (v) foreign agtechs operating in Brazil.

Taxonomy

Since 2019, the analysis of agtech inclusion in the production chain has considered the traditional Agribusiness approach to analyze the production system, from suppliers to the end consumer.

This perspective considers segments upstream (before) and downstream (after) of the production activity. Within each segment, non-exclusive categories complement the classification of agtechs.

Minor adjustments were made to the taxonomy used by Radar Agtech Brazil 2020/2021 in relation to the 2019 edition, which are presented in the 2020/2021 edition. For this reason, it was not possible to make a longitudinal comparison of the behavior of all categories between the 2019 and 2020/2021 editions.

As the 2024 edition of Radar Agtech has maintained the taxonomy of the 2020/2021, 2022 and 2023 editions, it is possible to make comparisons both in regional terms and in terms of segments (before, inside and after the farm) and categories of activity.

The categories of agtechs included in Radar Agtech 2023 are described in the following tables.

Table 2. Description of the categories before the farm in Radar Agtech.

Category	Description
Laboratory analysis	Startups that commercialize and/or develop new methods for laboratory analysis of nutrient indexes, soil composition and plant and animal development.
Credit, barter, insurance, carbon credits and fiduciary analysis	Startups that provide financial services such as credit, barter, securitization and analysis, and marketing of carbon credits for rural producers and fiduciary analysis of rural properties.
Fertilizers, Inoculants and Plant Nutrition	Startups that market and/or develop new fertilizers, inoculants and nutrients to improve the development, growth and immune system of plants.
Genomics and Animal Reproduction	Startups working with applied genomics to increase the productivity, weight gain and health of farm animals and to increase the efficiency of the insemination process, using genetic testing, genotyping and other techniques.
Agribusiness Input Marketplace	Startups that develop and provide online platforms to commercialize production inputs, equipment and services for agricultural production.
Animal Nutrition and Health	Startups that market and/or develop new foods, drugs and care products to improve the development, weight gain and immune system of animals.
Seeds, Seedlings and Plant Genomics.	Startups that commercialize and/or develop disruptive methods, processes and technologies in the variety of seeds and seedlings, as well as in the methods of multiplying, germinating and distributing them. This category also includes startups that commercialize and/or develop genetic improvement of plants, develop technology for the scalable production of biological substances and define new uses for these biological substances.

Table 3. Description of the categories after the farm in Radar Agtech.

Category	Description
Beekeeping and pollination	Startups that develop beekeeping technologies, such as special foods and data-based management, pollination services, platforms to facilitate the connection between bee producers and breeders and producers and sellers of honey and honey products.
Connectivity and Telecommunications	Startups that sell and/or develop equipment and systems to bring and guarantee connectivity inside the farm.

Continued

Category	Description
Content, Education, Social Media	Startups that develop and make available online platforms to disseminate content, information and best agricultural, agronomic and livestock practices, and that provide consultancy with the purpose of empowering, technifying and bringing rural producers closer together.
Biological Control and Integrated Pest Management	Startups that commercialize and/or develop biochemical and biological variants (macroscopic or microscopic) aimed at combating pests and diseases, as well as startups that develop technologies for population control and optimizing the use of inputs, through agronomic intelligence, for effective and efficient control pests and diseases.
Drones, Machinery and Equipment	Startups that develop and provide aerial vehicles, machinery and equipment for use on the farm.
Sharing economy	Startups that make equipment and machinery available for rent and promote sharing among rural producers.
Agricultural waste management	Startups that market and/or develop equipment, methods and processes to improve waste management on the property.
Internet of Agriculture: pests, soil, irrigation	Startups that develop and provide equipment and sensors capable of communicating with each other.
Meteorology and Irrigation and Water Management	Startups that develop and make available equipment, methods and processes to improve the predictability of rainfall, as well as to enable better management and efficiency to the irrigation process, in addition to better efficiency in the farm's water management.
Systems, solutions and data integration platform	Startups that offer integrated solutions for monitoring agronomic and management variables or traceability in the production chain.
Remote Sensing, Diagnosis and Image Monitoring	Startups that develop and provide online platforms to help rural producers control, understand and define the boundaries of their farms using images, radars and algorithms to identify patterns.
Rural Property Management System	Startups that develop and provide online platforms to help rural producers manage, organize and make decisions.
Telemetry and Automation	Startups that market and/or develop equipment and algorithms for capturing, consolidating and automating processes.

Table 4. Table 4. Description of the categories inside the farm in Radar Agtech.

Category	Description
Innovative foods and new food trends	Startups that develop and make available foods with better nutritional indexes, use substitute ingredients and new uses for existing ingredients.

Continued

Category	Description
Warehousing, Infrastructure and Logistics	Startups that develop and make available new processes, methods and technologies for storing and transporting commodities and food.
Biodiversity and Sustainability	Startups that develop and make available new sustainable processes, methods and technologies and/or for the protection and/or responsible use of biodiversity.
Bioenergy and Renewable Energy	Startups that develop and make available new processes, methods and technologies for the production of bioenergy and/or renewable energy.
Cloud cooking and ghost cooking	Startups that offer shared kitchens for the production of meals for delivery.
Industry and food processing 4.0	Startups that develop and make available new processes, methods and technologies to increase efficiency in the use of inputs, energy, water, and other resources in the food industry.
Marketplaces and platforms for trading and selling agricultural products	Startups that develop and provide online platforms for marketing commodities and products produced by agribusiness at scale, with a focus on internationalization.
Online grocery store	Startups that develop and make available online platforms for the commercialization of unprepared products and food, with the possibility of a monthly subscription focused on the end consumer.
Urban planting: plant factory and new forms of planting	Startups that develop and make available new processes, methods and technologies for crop production in urban or indoor areas.
Online restaurants and meal kits	Startups that develop and provide online platforms for the sale of products (meals, snacks, sweets) and food that is prepared and ready for consumption or just needs to be heated, with the possibility of a monthly subscription, with a focus on the end consumer.
Food safety and traceability	Startups that develop and make available technologies that work to increase the quality and durability of food, as well as helping with the traceability of ingredients used in companies operating in the production chain.
Autonomous management system for stores and food services	Startups that develop and provide processes, methods and technologies for automating stores and helping retail management.
Packaging, environmental and recycling systems	Startups that develop and make available new processes, methods and technologies for packaging in order to mitigate negative impacts on the environment and facilitate recycling.

Classification and validation of agtechs

In the survey questionnaire, participants were asked about the agtech's main category and whether there were any secondary categories in which the company operates. The main category indicated by the respondent was considered when it existed.

If the agtech itself did not classify itself in the 2023 or 2024 survey, the classification of each agtech was made by a person from the team, and was revised in the following cases:

- When the first classifier suggested excluding the agtech due to lack of data, a second classifier tried to find the data in other ways;
- When the first classifier suggested that the agtech should be excluded because it did not meet the exclusion criteria, a second classifier confirmed this;
- When the first classifier was in doubt about the main category; and
- When there was no consensus between the first and second classifiers, a third classifier also gave his opinion and the discussion continued until a consensus was reached.

Changes in data collection compared to 2023

The main change in the 2024 survey compared to the 2023 survey was the broadening of the scope of the study to include three actors: agtechs, innovation environments and investors.

The mapping of Innovation Environments in the agricultural sector followed the classification of documents such as the reports of the National Association of Entities Promoting Innovative Enterprises (ANPROTEC) with the Mapping of Mechanisms for Generating Innovative Enterprises in Brazil and the Incubators and Parks, as well as environments that interact or are in direct connection with Embrapa Units scattered throughout the country. The following categories were highlighted: i) accelerators; ii) ecosystems with governance; iii) hubs; iv) incubators; and v) technology parks. This mapping was accompanied by a specific questionnaire to survey innovation environments and investors in the Brazilian agri-food sector.

With regard to investors, the mapping was based primarily on the VC Radar Latam 2024 mapping of venture capital investors, maintained by Emerging Venture Capital Fellows (2025), supplemented by information from the SP Ventures, Embrapa and Homo Ludens databases. In this mapping, both specialist funds (primarily focused on agtechs) and generalist funds that invest in agtechs were considered. In addition, specialist investors were consulted to base a qualitative analysis of the sector.

Analysis of the Mapping of Agtechs

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This chapter presents two categories of analysis of the mapping of Brazilian agtechs:

(i) geographic and (ii) by segments of the agri-food production chain and by categories of activity.

The analysis is also available at the radaragtech.com.br website.

Analysis of the geographical distribution of agtechs

The distribution of agtechs in Brazil reflects the dynamics of the agri-food innovation sector and its relationship with factors such as production structure, the presence of research institutions and regional development policies. This section examines the location of startups in terms of the country's regions, its federative units and, at a local level, the main municipalities that are consolidating themselves as hubs in the sector.

The geographical analysis of agtechs makes it possible to assess the degree of maturity of the agribusiness innovation ecosystem in different locations. In addition to highlighting the main centers of concentration, it also highlights regions with less representation, pointing out opportunities for expansion and policies to encourage technological entrepreneurship in the field.

By Regions and Federative Units

The distribution of Agtechs by region in Brazil between 2019 and 2024 reveals significant trends in the sector's growth. The Southeast has maintained its position as the main hub of innovation, concentrating more than half of the startups over the years, although it has seen a slight reduction in percentage, from 65.7% in 2019 to 57.7% in 2024. The South showed stable growth over the period, varying between 23.2% in 2019 and 25.3% in 2024, although decreasing from 26% in 2023. The Center-West region was practically stable in its share, from 6.2% in 2019 to 6.1% in 2024. The Northeast and North, historically less represented, have gained ground over the years. The Northeast grew from 3.5% in 2019 to 5.9% in 2024, and the North grew significantly, especially between 2022 and 2023, reaching 5.9%, before falling back to 5.0% in 2024. The data shows a diversification of the agri-food innovation ecosystem, with a greater distribution of startups beyond the major traditional centers, indicating the strengthening of new regions on the national scene.

Table 5. Active Agtechs by Region

Region	2019	2020/21	2022	2023	2024
Southeast	738	983	1046	1112	1137
South	261	397	436	508	499
Center-West	70	94	106	114	121
Northeast	39	72	89	103	116
North	17	28	26	116	99
Total	1125	1574	1703	1953	1972
Southeast	65,7%	62,5%	61,4%	56,9%	57,7%
South	23,2%	25,2%	25,6%	26,0%	25,3%
Center-West	6,2%	6,0%	6,2%	5,8%	6,1%
Northeast	3,5%	4,6%	5,2%	5,2%	5,9%
North	1,5%	1,8%	1,5%	5,9%	5,0%
Total	100%	100%	100%	100%	100%

The following figure illustrates the distribution of agtechs by region and federative unit. To facilitate analysis, the colors of the regions have been kept for the states and municipalities in all the figures in this edition of Radar Agtech: for example, the state and municipality of São Paulo will always be in red, in the Southeast region.

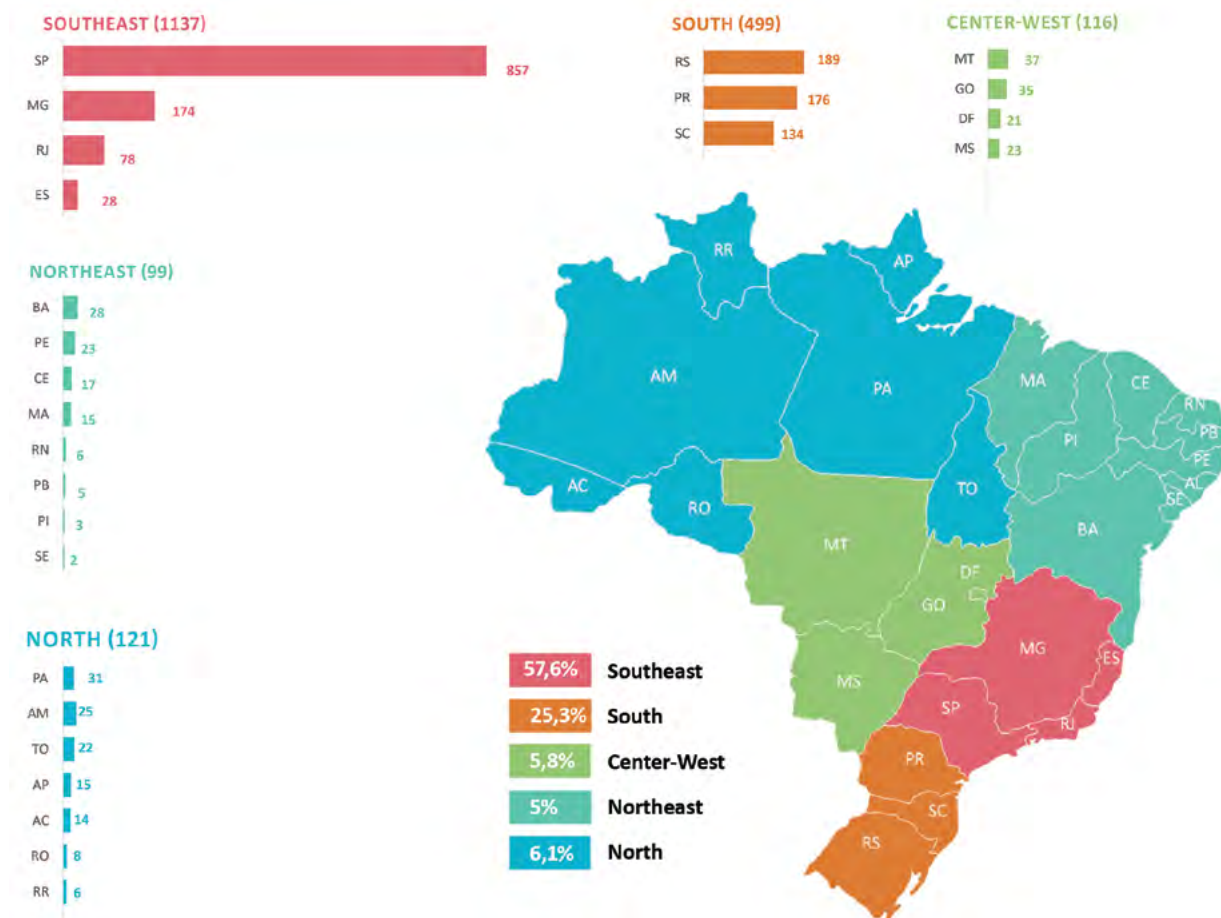


Figure 8. Distribution of agtechs by region and Federative Unit

Table 6 shows, in detail, the evolution of Agtechs by Federative Unit (FU) from 2019 to 2024, enabling the analysis of regional trends and the concentration of startups in agribusiness. The main trends are:

- São Paulo remains the absolute leader, but its share fell from 52.5% in 2019 to 43.5% in 2024, indicating a slight decentralization of the industry.
- Significant growth in Rio Grande do Sul, which went from 7.9% in 2019 to 9.6% in 2024, overtaking Paraná.
- Paraná and Minas Gerais consolidated their positions, holding 8.9% and 8.8% respectively of the agtechs in the total number of agtech startups in 2024.
- Notable expansion in the North and Northeast, with Pará, Amazonas and Maranhão registering an increase in the number of startups.
- Ceará and Pernambuco also grew, reaching 1.0% and 1.2% of the total number of agtechs in 2024.

The decentralization of agtechs indicates an expansion of agricultural innovations to new regions of Brazil, while the traditional hubs, such as São Paulo and the South of the country, remain relevant.

Table 6. Distribution of Agtechs in Radar Agtech by Federative Unit 2019-2024

	Federative Unit	2019	2019%	2020/ 21	2020/ 21%	2022	2022%	2023	2023%	2024	2024%
1	São Paulo	590	52,5%	757	48,1%	800	47,0%	845	43,2%	857	43,5%
2	Rio Grande do Sul	89	7,9%	124	7,9%	133	7,8%	194	9,9%	189	9,6%
3	Paraná	102	9,1%	151	9,6%	176	10,3%	182	9,3%	176	8,9%
4	Minas Gerais	99	8,8%	143	9,1%	154	9,0%	169	8,6%	174	8,8%
5	Santa Catarina	70	6,2%	122	7,8%	128	7,5%	132	6,8%	134	6,8%
6	Rio de Janeiro	41	3,6%	63	4,0%	69	4,1%	71	3,6%	78	4,0%
7	Mato Grosso	18	1,6%	30	1,9%	36	2,1%	39	2,0%	37	1,9%
8	Goiás	22	2,0%	30	1,9%	32	1,9%	35	1,8%	35	1,8%
9	Pará	6	0,5%	15	1,0%	15	0,9%	29	1,5%	31	1,6%
10	Bahia	12	1,1%	25	1,6%	34	2,0%	33	1,7%	28	1,4%
11	Espírito Santo	9	0,8%	20	1,3%	22	1,3%	27	1,4%	28	1,4%
12	Amazonas	4	0,4%	4	0,3%	4	0,2%	23	1,2%	25	1,3%
13	Distrito Federal	13	1,2%	17	1,1%	21	1,2%	19	1,0%	23	1,2%
14	Pernambuco	8	0,7%	11	0,7%	17	1,0%	20	1,0%	23	1,2%
15	Tocantins	4	0,4%	8	0,5%	8	0,5%	19	1,0%	22	1,1%
16	Mato Grosso do Sul	17	1,5%	17	1,1%	15	0,9%	21	1,1%	21	1,1%
17	Ceará	7	0,6%	13	0,8%	17	1,0%	20	1,0%	17	0,9%
18	Amapá	0	0,0%	1	0,1%	1	0,1%	15	0,8%	15	0,8%
19	Maranhão	0	0,0%	1	0,1%	1	0,1%	14	0,7%	15	0,8%
20	Acre	0	0,0%	0	0,0%	0	0,0%	16	0,8%	14	0,7%
21	Roraima	1	0,1%	0	0,0%	0	0,0%	7	0,4%	8	0,4%
22	Rio Grande do Norte	3	0,3%	9	0,6%	6	0,4%	5	0,3%	6	0,3%
23	Rondônia	2	0,2%	0	0,0%	0	0,0%	7	0,4%	6	0,3%
24	Paraíba	4	0,4%	7	0,4%	7	0,4%	5	0,3%	5	0,3%
25	Piauí	2	0,2%	4	0,3%	5	0,3%	4	0,2%	3	0,2%
26	Sergipe	1	0,1%	2	0,1%	2	0,1%	2	0,1%	2	0,1%

By municipality

Radar agtech 2024 identified 23 municipalities with 14 or more active agtechs, totaling 1,100 agtechs (55.8% of the total mapped). This profile is similar to that obtained by Radar Agtech 2023, which identified 22 municipalities with 16 or more active agtechs, totaling 1,102 agtechs (56.4% of the total).

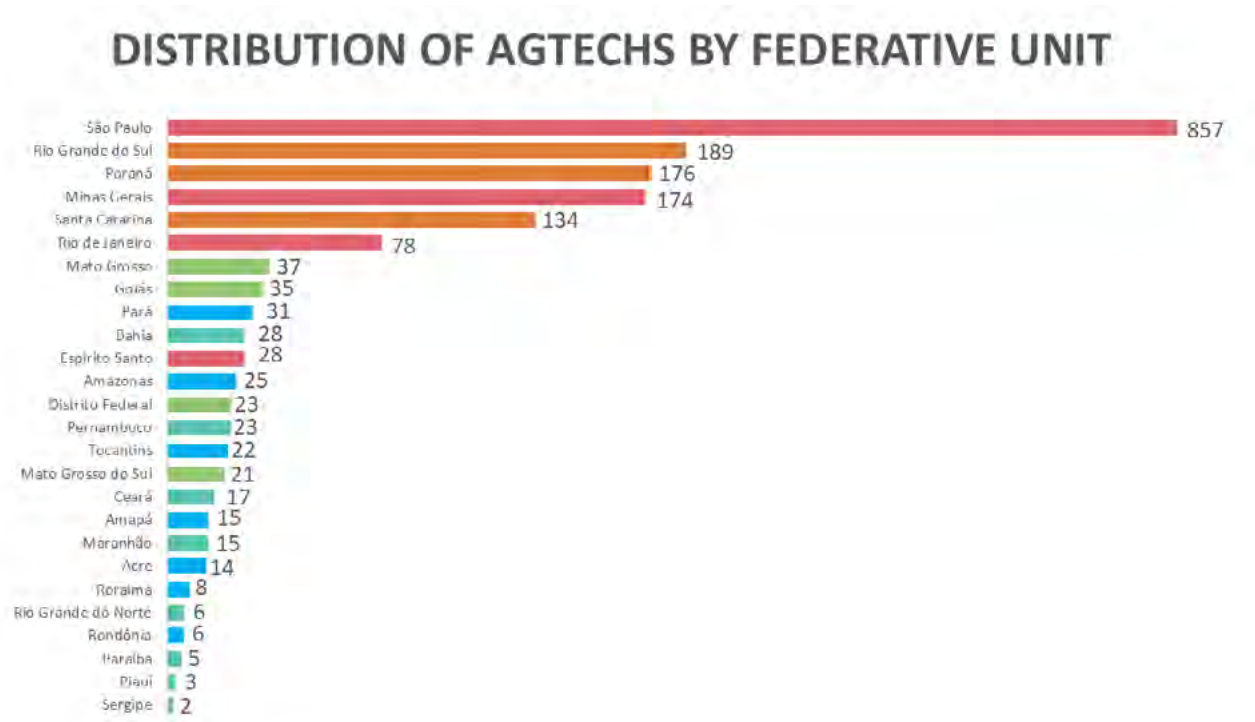


Figure 9. Distribution of agtechs by Federative Unit

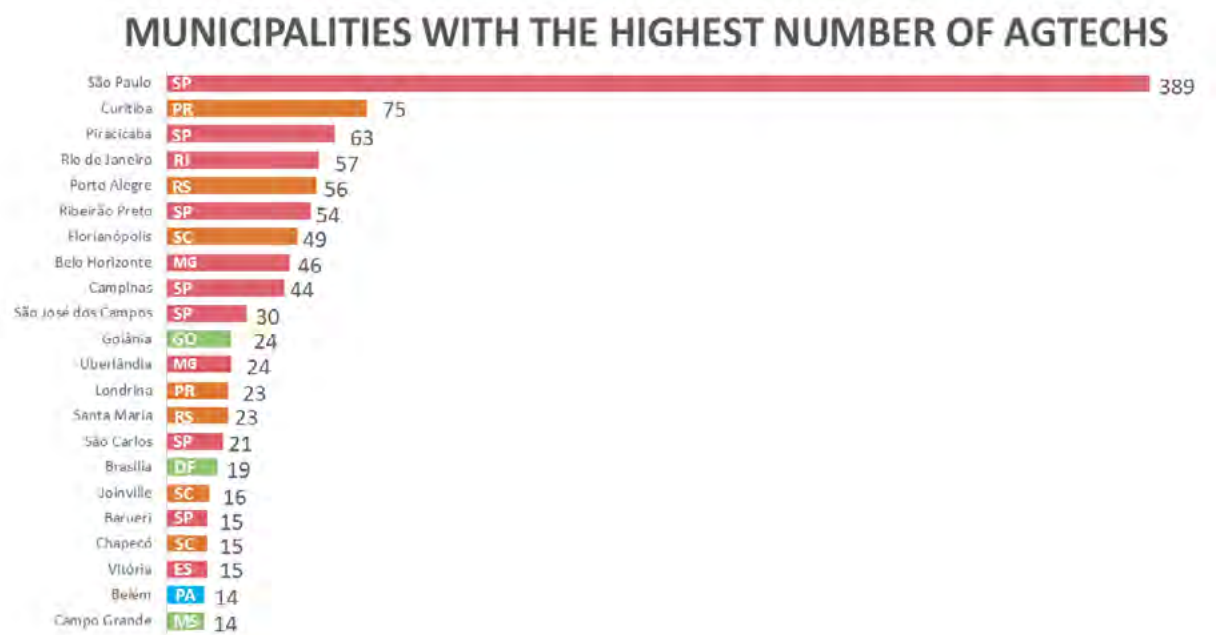


Figure 10. Municipalities with the highest number of agtechs in Radar Agtech 2024

Table 7 shows the evolution of the number of Agtechs and the position in the ranking of the main cities from 2019 to 2024. The main findings are listed below.

- São Paulo remained the absolute leader throughout the period, with 389 Agtechs in 2024.
- Curitiba grew significantly, rising from 5th place in 2019 to 2nd in 2022, where it has remained.
- Piracicaba remained stable in 3rd place, with a slight increase in the number of startups.
- Ribeirão Preto and Porto Alegre advanced in the ranking, establishing their position among the 5 cities with the highest number of Agtechs.
- The São Paulo Agri-Food Innovation Corridor, or Agro Corridor, a territory that stretches for nearly 400km and includes the regions of Ribeirão Preto, São Carlos, Piracicaba, Campinas and São José dos Campos, has established itself as the second agri-hub, second only to the metropolitan region of São Paulo.

Table 7. Distribution of Agtechs in Radar Agtech and position in the ranking by Municipality 2019-2024

Municipality	FU	Number of Agtechs					Ranking position				
		2019	2020/21	2022	2023	2024	2019	2020/21	2022	2023	2024
São Paulo	SP	262	347	368	385	389	1	1	1	1	1
Curitiba	PR	36	59	69	73	75	5	3	2	2	2
Piracicaba	SP	41	60	61	65	63	2	2	3	3	3
Rio de Janeiro	RJ	35	55	57	53	57	6	4	4	6	4
Porto Alegre	RS	29	42	48	55	56	7	6	6	5	5
Ribeirão Preto	SP	37	39	36	60	54	4	8	9	4	6
Florianópolis	SC	21	36	43	48	49	9	9	8	7	7
Belo Horizonte	MG	24	40	44	44	46	8	7	7	9	8
Campinas	SP	38	48	51	47	44	3	5	5	8	9
São José dos Campos	SP	17	21	25	28	30	11	14	11	10	10
Goiânia	GO	17	21	21	23	24	12	12	13	14	11
Uberlândia	MG	19	26	24	31	24	10	11	12	13	12
Londrina	PR	15	28	30	26	23	13	10	10	12	13
Santa Maria	RS	8	11	16	27	23	20	23	18	11	14
São Carlos	SP	14	21	20	19	21	15	13	15	16	15
Brasília	DF	13	16	21	19	19	16	16	13	15	16
Joinville	GO	8	11	21	23	16	19	22	13	14	17

The 12 municipalities with the highest number of mapped agtechs represent 46.8% of the total, a decrease compared to 50.9% in 2020/2021 and 50.3% in 2022. This suggests that new cities are becoming relevant in the agri-food innovation ecosystem.

Among the 22 cities with 16 or more Agtechs, the state of São Paulo stands out with six cities, followed by Rio Grande do Sul (three cities), while the states of Minas Gerais, Santa Catarina and Paraná have two cities each. Additionally, in five states (Goiás, Amazonas, Pará, Espírito Santo and Acre), as well as the Distrito Federal, only the capital has 16 or more agtechs, showing that, in these cases, agro-innovation is still more concentrated in the main urban centers.

Concentration of Agtechs in the Regions

The concentration of agtechs in relation to the inhabitants of a given location is an important indicator. By calculating the agtech index per 100,000 inhabitants for federative units and municipalities, it is possible to better understand the relative importance of agtechs in the local ecosystem, complementing the information on the absolute number of mapped agtechs.⁵

Table 8. Concentration of Agtechs in Radar Agtech by region 2023-2024

Region	Agtechs 2024	2024%	Population	Agtechs/ 100 thousand inhab. 2024	Agtechs 2023	2023%	Agtechs/ 100 thousand inhab. 2023
South	499	25,30%	31.113.021	1,60	508	26,00%	1,67
South East	1137	57,70%	88.617.693	1,28	1112	56,90%	1,24
Brazil	1972	100,00%	212.583.750	0,93	1953	100,00%	0,92
Center-West	121	6,10%	17.071.595	0,71	114	5,90%	0,68
North	99	5,00%	18.669.345	0,53	116	5,90%	0,61
North East	116	5,90%	57.112.096	0,20	103	5,20%	0,18

According to the data, the Southeast continues to lead with 1,137 agtechs (57.7%), registering a slight increase compared to 2023. The highest density of agtechs is still in the South, with 1.60 startups per 100,000 inhabitants, although there has been a slight decrease in the total number of agtechs. The Center-West went from 114 to 121 agtechs, increasing its density to 0.71 startups per 100,000 inhabitants. The Northeast grew from 103 to 116 agtechs, but remains the region with the lowest concentration. The North was the only region to register a drop, falling from 116 to 99 agtechs, which impacted on its share of the national total.

It is worth remembering that the IBGE has updated the population base, but the differences do not affect the results significantly.

⁵ The indexes considered the population estimated by the IBGE for 2021, made available by the Research Directorate - DPE - Population and Social Indicators Coordination - COPIS.

Table 9. Difference between the estimated population in 2023 based on 2021 and the IBGE base population 2024

Region	Population (base 2024)	Population 2023 (base 2021)	Difference	Agtechs/ 100,000 inhab. base 2024	Agtechs/ 100,000 inhab. 2023, base 2021	Difference
South	31.113.021	30.402.587	710.434	1,60	1,64	-0,04
South East	88.617.693	89.632.912	-1.015.219	1,28	1,27	0,01
Brazil	212.583.750	213.317.639	-733.889	0,93	0,92	0,01
Center-West	17.071.595	16.707.336	364.259	0,71	0,72	-0,01
North	18.669.345	18.906.962	-237.617	0,53	0,52	0,01
North East	57.112.096	57.667.842	-555.746	0,20	0,2	0,00

Concentration of Agtechs by Federative Unit

An analysis of the concentration of agtech startups in Brazil, measured by the number of companies per 100,000 inhabitants, reveals important insights that go beyond absolute figures and shed light on regional dynamics of innovation diffusion.

Amapá leads the national ranking with 1.87 agtechs per 100,000 inhabitants, despite having only 15 mapped startups. Acre follows a similar pattern, with 14 agtechs and a density of 1.59. While these states still account for a small share in absolute terms, their high relative concentrations signal the emergence of innovation ecosystems in regions traditionally less central within the Brazilian agri-food tech landscape.

Among the states that combine both high density and a large absolute number of agtechs, São Paulo stands out with 845 startups and a ratio of 1.84 agtechs per 100,000 inhabitants. It is followed by Rio Grande do Sul (194 agtechs, 1.73), Santa Catarina (132 agtechs, 1.64), and Paraná (182 agtechs, 1.54). These results reflect the maturity of their regional innovation ecosystems, driven by strong research institutions, robust infrastructure, and supportive public policies for agri-entrepreneurship.

The national average is 0.93 agtechs per 100,000 inhabitants, highlighting a still concentrated and unequal distribution across the country. Heavily populated states like Minas Gerais (0.79) and Rio de Janeiro (0.45) show below-average densities. Several states in the North and Northeast—such as Piauí, Sergipe, and Rio Grande do Norte—are among the lowest, with fewer than 0.15 agtechs per 100,000 inhabitants.

These findings reinforce the importance of fostering regional innovation ecosystems and promoting greater access to agri-startups, especially for small and medium-sized producers. Targeted strategies are needed to support a more balanced development of the agtech sector throughout the Brazilian territory.

Table 10. Concentration of Agtechs in the Federative Units

FU	Population	Agtechs	Agtechs/100,000 inhabitants
Amapá	802.837,00	15	1,87
São Paulo	45.973.194,00	845	1,84
Rio Grande do Sul	11.229.915,00	194	1,73
Santa Catarina	8.058.441,00	132	1,64
Acre	880.631,00	14	1,59
Paraná	11.824.665,00	182	1,54
Tocantins	1.577.342,00	19	1,20
Mato Grosso	3.836.399,00	39	1,02
Roraima	716.793,00	7	0,98
Minas Gerais	21.322.691,00	169	0,79
Mato Grosso do Sul	2.901.895,00	22	0,76
Espírito Santo	4.102.129,00	28	0,68
Distrito Federal	2.982.818,00	19	0,64
Amazonas	4.281.209,00	23	0,54
Goiás	7.350.483,00	35	0,48
Rio de Janeiro	17.219.679,00	78	0,45
Alagoas	3.220.104,00	14	0,43
Rondônia	1.746.227,00	7	0,40
Pará	8.664.306,00	29	0,33
Bahia	14.850.513,00	33	0,22
Ceará	9.233.656,00	20	0,22
Maranhão	7.010.960,00	15	0,21
Pernambuco	9.539.029,00	20	0,21
Rio Grande do Norte	3.446.071,00	5	0,15
Paraíba	4.145.040,00	5	0,12
Piauí	3.375.646,00	4	0,12
Sergipe	2.291.077,00	2	0,09
BRASIL	212.583.750,00	1975	0,93

Concentration of Agtechs in Municipalities

In order to analyze the concentration of Agtechs in Brazilian municipalities, the 386 municipalities identified as home to at least one startup were considered. Of these, 36 cities with 10 or more active Agtechs were selected. To facilitate analysis, these cities were grouped into three population groups: cities with up to 100,000 inhabitants (3 cities), cities with between 100,000 and 1 million inhabitants (18 cities) and cities with more than 1 million inhabitants (13 cities). The ranking by population size makes it possible to visualize differences in the distribution and concentration of Agtechs per inhabitant, identifying where the main agribusiness innovation hubs are.

The table below shows Brazilian municipalities with a population of less than 100,000 inhabitants that have 10 or more Agtechs, highlighting the density per 100,000 inhabitants. Main findings:

1. Jaboticabal (SP) is the municipality with the highest density, with 17.70 Agtechs/100,000 inhabitants, showing its strong vocation for the agri-food sector.
1. Viçosa (MG), known for its academic center in the agricultural area, maintains a high concentration, with 13.89 Agtechs/100,000 inhabitants.
2. Lajeado (RS) completes the list, with 11.38 Agtechs/100,000 inhabitants, demonstrating the relevance of innovation in agribusiness even in smaller cities.

These municipalities stand out for their specialization in the agri-food sector and strong links with research centers and universities, factors that favour development and attraction of Agtechs.

Table 11. Concentration of agtechs in municipalities with more than 10 agtechs and less than 100,000 inhabitants in Radar Agtech 2024.

Municipality	Federative Unit	Agtechs	%	Population	Agtechs/100,000 inhabitants
Jaboticabal	SP	13	0,7%	73.467	17,70
Viçosa	MG	11	0,6%	79.221	13,89
Lajeado	RS	11	0,6%	96.651	11,38

The table below shows Brazilian municipalities with a population of between 100,000 and 1 million inhabitants that have 10 or more Agtechs, highlighting the density per 100,000 inhabitants. Key observations:

- Piracicaba leads the concentration, with 14.36 Agtechs/100,000 inhabitants, maintaining its position as one of the most important hubs for innovation in agribusiness, with a rate well above the other medium and large cities.
- Florianópolis, Santa Maria, São Carlos and Ribeirão Preto also have a high density of Agtechs, with values between 7.5 and 9 Agtechs/100,000 inhabitants.
- Chapecó and Vitória appear in the range between 4 and 5.5 Agtechs per 100,000 inhabitants, establishing themselves as cities with relevance in the industry. Barueri, in

the metropolitan region of São Paulo, illustrates the importance of cities in the region of a hub.

- Medium-sized cities such as São José dos Campos, Londrina and Indaiatuba show a density of between 3 and 4.5 Agtechs/100,000 inhabitants, maintaining their position the agricultural innovation scene.
- Capitals and larger cities, such as Campo Grande, Cuiabá and Joinville, have a density below 2.5 Agtechs per 100,000 inhabitants, despite the sheer number of startups.

Table 12. Concentration of agtechs in municipalities with more than 10 agtechs and more than 100,000 inhabitants and less than 1 million inhabitants in Radar Agtech 2024.

Municipality	FU	Agtechs	%	Population	Agtechs/100,000 inhabitants
Piracicaba	SP	63	3,3%	438.827	14,36
Florianópolis	SC	49	2,6%	576.361	8,50
Santa Maria	RS	23	1,2%	282.244	8,15
São Carlos	SP	21	1,1%	265.294	7,92
Ribeirão Preto	SP	56	2,9%	728.400	7,69
Chapecó	SC	15	0,8%	275.959	5,44
Vitória	ES	18	0,9%	342.800	5,25
Barueri	SP	15	0,8%	330.339	4,54
São José dos Campos	SP	31	1,6%	724.756	4,28
Londrina	PR	23	1,2%	577.318	3,98
Indaiatuba	SP	10	0,5%	267.796	3,73
Uberlândia	MG	24	1,3%	754.954	3,18
Uberaba	MG	11	0,6%	354.142	3,11
Cascavel	PR	11	0,6%	364.104	3,02
Maringá	PR	11	0,6%	425.983	2,58
Joinville	SC	16	0,8%	654.888	2,44
Caxias do Sul	RS	11	0,6%	479.256	2,30
Cuiabá	MT	11	0,6%	682.932	1,61
Campo Grande	MS	14	0,7%	954.537	1,47

The table below shows Brazilian municipalities with more than 1 million inhabitants that host 10 or more Agtechs, considering the density of startups per 100,000 inhabitants. Main findings:

- Only 7 municipalities in this group have a higher average than the national average (0.93 Agtechs/100,000 inhabitants).

- Porto Alegre and Curitiba lead the way in terms of Agtech density among large cities, with 4.03 and 3.99 Agtechs/100,000 inhabitants, respectively.
- Campinas stands out among non-capital cities, with 3.71 Agtechs/100,000 inhabitants.
- São Paulo has the highest absolute number of Agtechs (392), but with a lower density (3.30/100,000 inhabitants) due to its large population.
- Belo Horizonte, Goiânia and Belém have intermediate densities of between 1 and 2 Agtechs/100,000 inhabitants.
- Large capitals in the North and Northeast (Recife, Manaus, Salvador, Fortaleza and Brasília) have a density of less than 1 Agtech/100,000 inhabitants, indicating a lower concentration of startups in these places.
- Brasília, despite being an innovation hub, has only 0.64 Agtechs/100,000 inhabitants, below the average for large cities.

Table 13. Concentration of agtechs in municipalities with more than 10 agtechs and more than 1 million inhabitants in Radar Agtech 2024.

Municipality	FU	Agtechs	%	Population	Agtechs/100,000 inhabitants
Porto Alegre	RS	56	2,9%	1.389.322	4,03
Curitiba	PR	73	3,8%	1.829.225	3,99
Campinas	SP	44	2,3%	1.185.977	3,71
São Paulo	SP	392	20,4%	11.895.578	3,30
Belo Horizonte	MG	46	2,4%	2.416.339	1,90
Goiânia	GO	24	1,3%	1.494.599	1,61
Belém	PA	14	0,7%	1.398.531	1,00
Recife	PE	14	0,7%	1.587.707	0,88
Rio de Janeiro	RJ	58	3,0%	6.729.894	0,86
Brasília	DF	19	1,0%	2.982.818	0,64
Manaus	AM	11	0,6%	2.279.686	0,48
Salvador	BA	12	0,6%	2.568.928	0,47
Fortaleza	CE	11	0,6%	2.574.412	0,43

According to the data, the concentration of startups is not directly related to the size of the city, but rather to the presence of universities, research centers and local agri-food demand. Smaller cities, such as Piracicaba (SP), Jaboticabal (SP) and Viçosa (MG), have a higher density of Agtechs than some Brazilian capitals, reflecting their strong connection with the agricultural and academic sectors. Large urban centers, such as São Paulo and Rio de Janeiro, concentrate the largest absolute number of startups, but have a lower relative density due to their large populations. These differences suggest opportunities for the expansion of Agtechs in less explored regions and emphasize the importance of regional technology hubs for the development of the sector.

Evolution 2019-2024

The analysis of the evolution of the 15 municipalities with more than 20 Agtechs in 2024 in the period from 2019 to 2024 may reveal some trends, as described below,

- São Paulo remains the absolute leader, with 389 Agtechs in 2024, remaining in 1st place in all the years analyzed.
- Curitiba (PR) has established itself as the second largest Agtech hub, increasing from 36 in 2019 to 75 in 2024, overtaking Piracicaba in 2022.
- Piracicaba (SP) remains the third largest Agtech center, although it showed a slight drop in 2024, from 65 to 63 Agtechs.
- Rio de Janeiro (RJ) recovered positions, rising to 4th place in 2024, with 57 Agtechs, after falling to 6th place in 2023.
- Porto Alegre (RS) showed continuous growth, reaching 56 Agtechs by 2024, maintaining 5th place.
- Ribeirão Preto (SP) experienced significant growth between 2022 and 2023, but lost some positions in 2024, going from 60 to 54 Agtechs.
- Florianópolis (SC) has consolidated its position as one of the sector's main hubs, reaching 49 Agtechs by 2024, maintaining its 7th place.
- Belo Horizonte (MG) recorded stable growth, going from 24 to 46 Agtechs between 2019 and 2024, but remained in 8th place.
- Campinas (SP) showed a slight decline in the number of Agtechs in 2024, falling from 47 to 44, which took it to 9th place.
- São José dos Campos (SP) recorded a steady increase, rising from 17 to 30 Agtechs in 2024, maintaining its 10th position.
- Cities on the rise: Goiânia (GO) and Uberlândia (MG) continue to grow and are approaching the top 10 Agtech hubs. Santa Maria (RS) showed significant growth, rising from 8 Agtechs in 2019 to 23 in 2024, climbing 6 places in the ranking.

The growth of agtechs in the cities analyzed reflects a movement towards decentralization of agri-food innovation in Brazil, with some hubs emerging and others strengthening their position as benchmarks in the industry.

Table 14. Evolution of cities in terms of number of agtechs and position in the ranking

City	FU	Number of Agtechs					Ranking position				
		2019	2020/21	2022	2023	2024	2019	2020/21	2022	2023	2024
São Paulo	SP	262	347	368	385	389	1	1	1	1	1
Curitiba	PR	36	59	69	73	75	5	3	2	2	2
Piracicaba	SP	41	60	61	65	63	2	2	3	3	3
Rio de Janeiro	RJ	35	55	57	53	57	6	4	4	6	4
Porto Alegre	RS	29	42	48	55	56	7	6	6	5	5
Ribeirão Preto	SP	37	39	36	60	54	4	8	9	4	6
Florianópolis	SC	21	36	43	48	49	9	9	8	7	7
Belo Horizonte	MG	24	40	44	44	46	8	7	7	9	8
Campinas	SP	38	48	51	47	44	3	5	5	8	9
São José dos Campos	SP	17	21	25	28	30	11	14	11	10	10
Goiânia	GO	17	21	21	23	24	12	12	13	14	11
Uberlândia	MG	19	26	24	31	24	10	11	12	13	12
Londrina	PR	15	28	30	26	23	13	10	10	12	13
Santa Maria	RS	8	11	16	27	23	20	23	18	11	14
São Carlos	SP	14	21	20	19	21	15	13	15	16	15

The data shows a gradual process of decentralization of agtechs in Brazil. Although the states in the Southeast and South regions still concentrate most of the startups, there is significant growth in other regions, especially in the Center-West and Northeast, where agribusiness plays a strategic role in the economy. This movement suggests an increasingly favorable environment for the diversification of agri-food innovation, with new hubs emerging in states that have historically been less represented in the sector.

The internalization of innovation is also noticeable in the municipal mapping. Medium-sized cities, often associated with academic institutions and research centers, have excelled in the density of Agtechs per inhabitant, surpassing some capitals. This phenomenon underscores the importance of policies aimed at regional innovation and strengthening the entrepreneurial ecosystem in the agri-food sector.

Analysis of the Mapping of Agtechs based on Categories

Mapping Agtechs in Brazil makes it possible to understand the distribution of the innovation ecosystem along agribusiness production chains. This section presents an analysis of the startups identified in Radar Agtech Brazil 2024, classifying them into segments and categories, providing a strategic view of growth trends, areas of innovation and challenges in the industry.

The analysis considers the industry's historical evolution between 2019 and 2024, highlighting the impact of technological transformations and the consolidation of emerging categories. Methodological changes have been made throughout the editions to improve segmentation, ensuring a more accurate view of the sector's dynamics.

As detailed in the method, Radar Agtech Brazil 2024 classifies agtechs according to the segment of the agri-food production chain in which they operate, using the Agribusiness approach, which divides the chain into three main stages:

- Before the Farm: encompasses all the activities and solutions that rural producers need before production begins, such as access to credit, purchasing inputs (seeds, seedlings, fertilizers, agrochemicals), purchasing machinery and agricultural implements, irrigation equipment and packaging, among other products and services that are essential for preparing the crop.
- Inside the farm: covers agri-food production itself and its operational management. This segment involves solutions for farm management, water use monitoring, input control, agricultural automation and production planning, and is directly related to the activities carried out within the farm to optimize production efficiency.
- After the farm: refers to the activities that take place after production, when agricultural products leave the hands of the producer, including logistics, distribution, processing, packaging, wholesale and retail marketing, as well as final consumption. Foodtechs, startups that work with innovation in food, are also part of this segment.

The data from the 2024 mapping is contextualized in the historical perspective from 2019 to 2024, allowing an analysis of the evolution of the Agtech ecosystem over the years. It is worth noting that methodological changes and adjustments to the categorization of Agtechs have been implemented throughout the editions of Radar Agtech Brazil, reflecting the maturity of the sector and the need for refinement in the segmentation.

Despite these evolutions in the method, the data mapped illustrates clear trends in the growth, consolidation and diversification of startups in the agri-food industry in Brazil, allowing for a strategic reading of the areas of greatest innovation and the gaps that still exist within the production chain.

This segmented approach allows mapping the areas where agtechs are most concentrated and growing, as well as identifying opportunities for innovation, contributing to a more efficient, technological and sustainable sector.

Distribution of Agtechs by segment

In 2024, the distribution of agtechs by segment shows a stabilization in the growth of “Inside the Farm” agtechs, which represent 41.5% of the total, remaining the largest group in absolute numbers, with 818 agtechs. The “Before the Farm” segment continues its growth trajectory, reaching 18.6% of the total, with 366 agtechs, consolidating the advance of solutions for credit, inputs, biotechnology and support for agri-food production. On the other hand, the “After the Farm” segment saw a further drop in relative share, falling to 40%, with 788 agtechs.

DISTRIBUTION OF AGTECHS BY SEGMENT

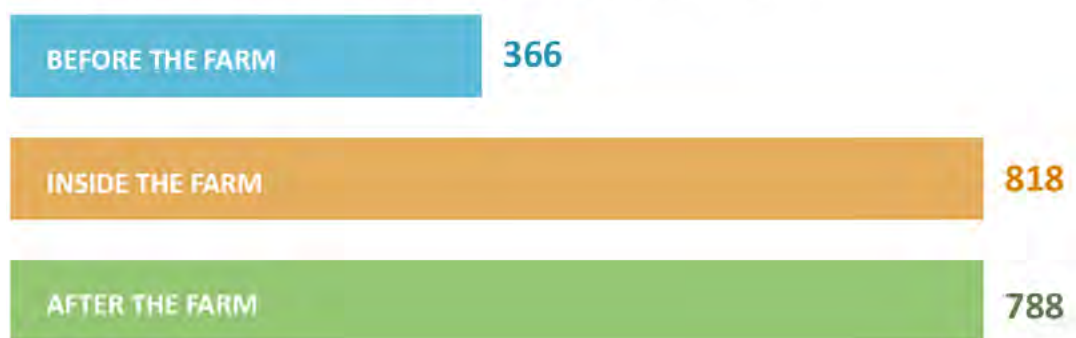


Figure 11. Distribution of agtechs by segment and category

Tables 15 and 16 show the distribution of agtechs by segment of activity in relation to the total amount mapped, as well as data from previous editions of Radar Agtech Brazil.

Table 15. Distribution of agtechs by operating segment in Radar Agtech 2019-2024 (quantity)

Segment	2019	2020/2021	2022	2023	2024
Before the farm	197	198	242	331	366
Inside the farm	396	657	705	815	818
After the farm	532	717	756	807	788
TOTAL	1125	1572	1703	1953	1972

Table 16. Distribution of agtechs by operating segment in Radar Agtech 2019-2024 (%)

Segment	2019	2020/2021	2022	2023	2024
Before the farm	17,5%	12,6%	14,2%	16,9%	18,6%
Inside the farm	35,2%	41,8%	41,4%	41,7%	41,5%
After the farm	47,3%	45,6%	44,4%	41,3%	40,0%
TOTAL	100%	100%	100%	100%	100%

The evolution of the participation of Agtechs by segment between 2019 and 2024 reveals significant changes in the distribution of startups along the agri-food chain. The main trends are described below.

- The “Before the Farm” segment has grown steadily in recent years, rising from 17.5% of the total in 2019 to 18.6% in 2024. In absolute numbers, this segment almost doubled in the period, from 197 to 366 startups, reflecting increased digitalization in financial management, biological inputs and production support technologies. The digitization of financial services and the adoption of biotechnology have boosted the “Before the Farm” segment, allowing the growth of startups providing solutions such as credit, rural insurance and bioproducts.
- “Inside the farm” has established itself as the largest segment, accounting for 41.5% of agtechs in 2024. The absolute number of startups has grown from 396 to 818 in five years, indicating a strong expansion in the supply of technologies for monitoring, automation and agricultural management. This segment is stable as the largest in the ecosystem, reflecting the demand for greater production efficiency, automation and solutions based on data intelligence.
- “After the Farm” was the largest segment in 2019, but it has been losing share year after year, falling from 47.3% to 40.0%. Despite the absolute growth of startups (from 532 to 788), this relative loss suggests a more mature and competitive market in areas such as logistics, traceability and agro-marketing. The proportional reduction in this segment may be linked to market consolidation, in which established companies dominate sectors such as agri-food distribution and agricultural logistics, making it difficult for new startups to enter.

These data indicate a trend towards balance between the segments, with steady growth of startups focused on pre-production and inside the farm, while the post-production sector is beginning to mature and stabilize its participation in the agri-food innovation ecosystem.

Distribution of Agtechs by Category Before the Farm in Radar 2024

The “Before the Farm” segment represents 18.6% of the total number of Agtechs mapped in 2024, comprising 366 startups distributed across seven main categories. The category “Credit, barter, insurance, carbon credits and fiduciary analysis” stands out, leading with 97 startups, representing 26.5% of the segment and 4.9% of all agtechs. This increase reflects the growing demand for financial solutions in agribusiness, including new financing models, insurance and the carbon market.

The “Fertilizers, Inoculants and Plant Nutrition” category second, with 84 startups (23% of the segment and 4.3% of the total), highlighting the search for biological and sustainable solutions to improve agricultural productivity. The “Seeds, Seedlings and Plant Genomics” (12.3%) and “Animal Nutrition and Health” (12%) categories follow, demonstrating the importance of genetic and nutritional innovation for improving agri-food production.

The categories “Laboratory Analysis” (10.7%) and “Agribusiness Input Marketplace” (9.6%) indicate progress in the digitization and qualification of the sector, with startups focused on digital commerce platforms and specialized services to support decision-making in the field.

Finally, “Genomics and Animal Reproduction”, although it is the smallest category in terms of number of startups, is also the largest.

In absolute terms, it still represents 6% of the segment, demonstrating advances in genetic improvement and biotechnology applied to livestock.

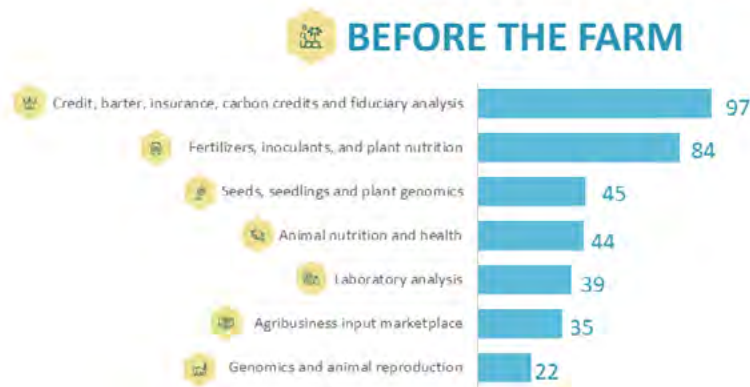


Figure 12. Distribution of agtechs “Before the Farm” by category

Table 17. Distribution of agtechs by category in the Before the Farm segment in Radar Agtech 2024 mapping.

Category	Agtechs	% of segment	% of Total
Credit, barter, insurance, carbon credits and fiduciary analysis	97	26,5%	4,9%
Fertilizers, Inoculants and Plant Nutrition	84	23,0%	4,3%
Seeds, Seedlings and Plant Genomics	45	12,3%	2,3%
Animal Nutrition and Health	44	12,0%	2,2%
Laboratory analysis	39	10,7%	2,0%
Agribusiness input marketplace	35	9,6%	1,8%
Genomics and Animal Reproduction	22	6,0%	1,1%
Total	366	100,0%	18,6%

This data indicates that “Before the Farm” innovation is increasingly focused on financial solutions, biotechnology and digital platforms, reflecting a trend towards modernization of pre-production processes and greater adoption of technologies aimed at efficiency and sustainability in the agri-food sector.

Distribution of Agtechs by Category Inside the Farm in Radar 2024

The “Inside the Farm” segment represents 41.5% of the Agtechs mapped in 2024, totaling 818 startups.

The “Rural Property Management System” category concentrates 157 startups (19.2% of the segment and 8% of the total), followed by “Systems, solutions and data integration platform” with 144 startups (17.6%) and “Drones, Machinery and Equipment” with 110 startups (13.4%).

“Remote Sensing, Diagnostics and Image Monitoring” is represented by 88 startups (10.8%), while “Content, Education and Social Media” accounts for 81 startups (9.9%).

Other categories include “Internet of Things for Agriculture” with 58 startups (7.1%), “Biological Control and Integrated Pest Management” with 48 startups (5.9%), “Telemetry and Automation” and “Meteorology, Irrigation and Water Management”, both with 38 startups (4.6%). The categories “Agricultural Waste Management” and “Connectivity and Telecommunications” have 17 startups each (2.1%), while “Beekeeping and Pollination” and “Sharing Economy” have 11 startups each (1.3%).



Figure 13. Distribution of agtechs “Inside the Farm” by category

Table 18. Distribution of agtechs by category in the Inside the Farm segment in Radar Agtech 2024 mapping.

Category	Agtechs	% of segment	% of Total
Rural Property Management System	157	19,2%	8,0%
Systems, solutions and data integration platform	144	17,6%	7,3%
Drones, Machinery and Equipment	110	13,4%	5,6%
Remote Sensing, Diagnostics and Image Monitoring	88	10,8%	4,5%
Content, Education, Social Media	81	9,9%	4,1%
Internet of Things for Agriculture: detecting pests, soil, climate and irrigation	58	7,1%	2,9%
Biological Control and Integrated Pest Management	48	5,9%	2,4%
Telemetry and Automation	38	4,6%	1,9%

Continued

Category	Agtechs	% of segment	% of Total
Meteorology, Irrigation and Water Management	38	4,6%	1,9%
Agricultural waste management	17	2,1%	0,9%
Connectivity and Telecommunications	17	2,1%	0,9%
Beekeeping and pollination	11	1,3%	0,6%
Sharing economy	11	1,3%	0,6%
Total	818	100,0%	41,5%

The data shows predominance of solutions aimed at managing, automating and monitoring agri-food production, with growth in digital technologies, connectivity and sustainable practices.

Distribution of Agtechs by Category After the Farm in Radar 2024

The “After the Farm” segment represents 40% of the Agtechs mapped in 2024, totaling 788 startups.

The “Innovative foods and new food trends” category leads the way with 275 startups (34.9% of the segment and 13.9% of the total). “Marketplaces and platforms for trading and selling agricultural products” follows with 94 startups (11.9%), while “Biodiversity and sustainability” appears with 84 startups (10.7%). “Storage, Infrastructure and Logistics” has 64 startups (8.1%) and “Online Grocery” has 49 startups (6.2%).

Other categories include “Autonomous management system for stores and food services” (44 startups, 5.6%), “Online restaurants and meal kits” (43 startups, 5.5%), “Food industry and processing 4.0” and “Bioenergy and renewable energy” (34 startups each, 4.3%). “Packaging, environmental and recycling systems” has 29 startups (3.7%), while “Urban planting: plant factory and new ways of planting” (18 startups, 2.3%) and “Food safety and traceability” (17 startups, 2.2%) have a smaller share. “Cloud cooking and ghost cooking” accounts for 3 startups (0.4%).



Figure 14. Distribution of agtechs “After the Farm” by category

Table 19. Distribution of agtechs by category in the After the Farm segment in Radar Agtech 2024 mapping.

Category	Agtechs	% of segment	% of Total
Innovative foods and new food trends	275	34,9%	13,9%
Marketplaces and platforms for trading and selling agricultural products	94	11,9%	4,8%
Biodiversity and Sustainability	84	10,7%	4,3%
Warehousing, Infrastructure and Logistics	64	8,1%	3,2%
Online grocery store	49	6,2%	2,5%
Autonomous management system for stores and food services	44	5,6%	2,2%
Online restaurants and meal kits	43	5,5%	2,2%
Industry and food processing 4.0	34	4,3%	1,7%
Bioenergy and Renewable Energy	34	4,3%	1,7%
Packaging, environmental and recycling systems	29	3,7%	1,5%
Urban planting: plant factory and new forms of planting	18	2,3%	0,9%
Food safety and traceability	17	2,2%	0,9%
Cloud cooking and ghost cooking	3	0,4%	0,2%
Total	788	100,0%	40,0%

The segment is dominated by startups focused on food innovation, marketing platforms and sustainable solutions, with a significant presence of initiatives focused on food logistics, processing and traceability.

Evolution of Before the Farm Agtech Categories

The evolution of the categories in the “Before the Farm” segment between 2019 and 2024 demonstrates important trends in the growth of agtechs focused on the initial phase of agri-food production. The main highlights are listed below.

- “Credit, barter, insurance, carbon credits and fiduciary analysis” was the category that grew the most, from 24 startups in 2019 to 97 in 2024. In percentage, its share of the segment increased from 14.7% to 26.5%, reflecting the growing demand for financial and sustainable solutions in agribusiness leveraged by the accumulated knowledge of fintechs.
- “Fertilizers, inoculants and plant nutrition” remained one of the most relevant categories, growing from 41 to 84 startups and reaching 23% of the total. This progress demonstrates the continued interest in technologies that optimize the use of agricultural inputs and promote sustainable productivity.
- “Seeds, seedlings and plant genomics” grew significantly, from 24 to 45 startups, increasing its percentage share from 10.7% to 12.3%. This increase indicates the appreciation of biotechnology applied to the development of new agricultural varieties.
- “Animal nutrition and health” expanded its presence, increasing from 19 to 44 startups, reflecting the pursuit of innovative solutions for the well-being and productivity of livestock.
- “Agribusiness input marketplace” registered a significant increase between 2022 and 2023, reaching 36 startups, and remained stable in 2024, falling to 35. This behavior suggests the beginning of a consolidation phase in the digital trade of agricultural inputs.
- “Laboratory analysis” showed moderate growth, going from 20 to 39 startups, but lost percentage share over the period, indicating faster growth in other areas of the segment.
- “Genomics and animal reproduction” has remained stable in recent years, with 22 startups in 2024, representing 6% of the segment, which may indicate the difficulty of entering this category or the maturing of the sector and greater consolidation of existing companies.

Table 20. Evolution of Agtechs by Category in the Before the Farm Segment in Radar Agtech mapping 2019-2024 (Number of Agtechs)

Category	2019	2020/2021	2022	2023	2024
Credit, barter, insurance, carbon credits and fiduciary analysis	24	61	61	85	97
Fertilizers, inoculants and plant nutrition	41	53	53	73	84
Seeds, seedlings and plant genomics	24	26	26	36	45
Animal nutrition and health	19	27	27	42	44
Laboratory analysis	20	36	36	37	39
Agribusiness input marketplace	17	18	18	36	35
Genomics and animal reproduction	18	21	21	22	22
Total	163	242	242	331	366

Table 21. Evolution of Agtechs by Category in the Before the Farm Segment 2019-2024 (%)

Category	2019	2020/2021	2022	2023	2024
Credit, barter, insurance, carbon credits and fiduciary analysis	14,7%	25,2%	25,2%	25,7%	26,5%
Fertilizers, inoculants and plant nutrition	25,2%	21,9%	21,9%	22,1%	23,0%
Seeds, seedlings and plant genomics	14,7%	10,7%	10,7%	10,9%	12,3%
Animal nutrition and health	11,7%	11,2%	11,2%	12,7%	12,0%
Laboratory analysis	12,3%	14,9%	14,9%	11,2%	10,7%
Agribusiness input marketplace	10,4%	7,4%	7,4%	10,9%	9,6%
Genomics and animal reproduction	11,0%	8,7%	8,7%	6,6%	6,0%
Total	100%	100%	100%	100%	100%

The significant growth of the “Before the Farm” segment shows a solid move towards digitalization and innovation in strategic areas, especially in the agro-financial market, biological inputs and plant genetics. At the same time, some categories, such as animal genomics and laboratory analysis, showed more moderate growth, possibly due to regulatory barriers or market maturation.

This scenario underscores the importance of innovation in agricultural pre-production, with solutions increasingly focused on sustainability, production efficiency and digitalization of the sector.

Evolution of Inside the Farm Agtech Categories

Between 2019 and 2024, the “Inside the Farm” segment in the Brazilian agtech ecosystem showed robust growth, rising from 423 to 818 startups – a 93.4% increase. It has become the segment with the highest number of agtechs.

The most consolidated categories were “Rural Property Management System” and “Systems, Solutions and Data Integration Platform”, which totaled 301 startups in 2024, despite showing a slight reduction from the peak observed in 2022. The former, for example, fell from 173 in 2022 to 157 in 2024, signaling a possible process of consolidation or maturation of the solutions already available on the market.

At the same time, the categories linked to mechanization and remote monitoring stood out. The “Drones, Machinery and Equipment” category almost tripled over the period, jumping from 43 startups in 2019 to 110 in 2024, while “Remote Sensing, Diagnostics and Image Monitoring” grew from 29 to 88 over the same period. These areas reflect the expansion of precision agriculture in Brazil, with the intensive use of images, sensors and embedded technologies to collect and analyze data in real time. Also noteworthy is the progress of “Internet of Things for Agriculture”, which quadrupled its presence from 15 to 58 startups, showing a strengthening of integrated solutions for pest detection, soil analysis, climate and irrigation.

Despite the overall growth, some categories showed stabilization or slight retraction, such as “Agricultural Waste Management” (which fell from 22 in 2022 to 17 in 2024) and “Sharing Economy” (from 15 in 2019 to 11 in 2024). Emerging areas, such as “Beekeeping and Pollination”, showed significant growth, from just 2 startups in 2019 to 11 in 2024. Overall, the increase in the number of startups in more advanced technological categories indicates a qualitative evolution of the ecosystem, with greater penetration of solutions aimed at automation, sustainability and connectivity in Brazilian agri-food operations.

Table 22. Evolution of Agtechs by Category in the Inside the Farm Segment in Radar Agtech mapping 2019-2024 (Number of Agtechs)

Category	2019	2020/2021	2022	2023	2024
Rural Property Management System	122	154	173	170	157
Systems, solutions and data integration platform	95	111	122	146	144
Drones, Machinery and Equipment	43	79	78	98	110
Remote Sensing, Diagnostics and Image Monitoring	29	70	76	84	88
Content, Education, Social Media	20	58	51	79	81
Internet of Things for Agriculture: detecting pests, soil, climate and irrigation	15	39	40	58	58
Biological Control and Integrated Pest Management	34	34	36	45	48
Telemetry and Automation	32	32	42	37	38

Category	2019	2020/2021	2022	2023	2024
Meteorology, Irrigation and Water Management	20	20	38	40	38
Agricultural waste management	6	15	22	18	17
Connectivity and Telecommunications	6	6	9	16	17
Beekeeping and pollination	2	2	3	10	11
Sharing economy	15	15	15	14	11
TOTAL	423	635	705	815	818

Table 23. Evolution of Agtechs by Category in the Inside the Farm Segment in Radar Agtech 2019-2024 mapping (% of the segment)

Category	2019	2020/2021	2022	2023	2024
Rural Property Management System	28,1%	23,4%	24,5%	20,9%	19,2%
Systems, solutions and data integration platform	21,9%	16,9%	17,3%	17,9%	17,6%
Drones, Machinery and Equipment	9,9%	12,0%	11,1%	12,0%	13,4%
Remote Sensing, Diagnostics and Image Monitoring	6,7%	10,7%	10,8%	10,3%	10,8%
Content, Education, Social Media	4,1%	8,8%	7,2%	9,7%	9,9%
Internet of Things for Agriculture: detecting pests, soil, climate and irrigation	4,6%	5,9%	5,7%	7,1%	7,1%
Biological Control and Integrated Pest Management	7,8%	4,9%	5,1%	5,5%	5,9%
Telemetry and Automation	4,8%	5,6%	6,0%	4,5%	4,6%
Meteorology, Irrigation and Water Management	4,8%	5,2%	5,4%	4,9%	4,6%
Agricultural waste management	4,8%	3,0%	3,1%	2,2%	2,1%
Connectivity and Telecommunications	0,0%	0,9%	1,3%	2,0%	2,1%
Beekeeping and pollination	0,0%	0,3%	0,4%	1,2%	1,3%
Sharing economy	2,3%	2,3%	2,1%	1,7%	1,3%
TOTAL	100,0%	100,0%	100,0%	100,0%	100,0%

The data indicates that innovation inside the farm is increasingly focused on data integration, operational efficiency and sustainability, consolidating itself as the largest segment of the agtech ecosystem.

Evolution of After the Farm Agtech Categories

Table 24. Evolution of Agtechs by Category in the After the Farm Segment in Radar Agtech mapping 2019-2024 (Number of Agtechs)

Category	2019	2020/ 2021	2022	2023	2024
Innovative foods and new food trends	246	293	281	275	277
Marketplaces and platforms trading and selling agricultural products	95	100	124	94	103
Biodiversity and Sustainability	35	35	37	84	83
Warehousing, Infrastructure and Logistics	29	56	73	64	68
Online grocery store	29	45	48	49	51
Autonomous management system for stores and food services	-	38	40	44	44
Online restaurants and meal kits	-	39	39	43	40
Industry and food processing 4.0	-	26	25	34	36
Bioenergy and Renewable Energy	-	22	26	34	35
Packaging, environmental and recycling systems	-	26	24	29	27
Urban planting: plant factory and new forms of planting	-	22	21	18	19
Food safety and traceability	-	12	13	17	21
Cloud cooking and ghost cooking	-	3	5	3	3
TOTAL	434	717	717	788	807

Table 25. Evolution of Agtechs by Category in the After the Farm Segment in Radar Agtech mapping 2019-2024 (%)

Category	2019	2020/ 2021	2022	2023	2024
Innovative foods and new food trends	56,7%	40,9%	39,2%	34,9%	34,3%
Marketplaces and platforms for trading and selling agricultural products	21,9%	13,9%	17,3%	11,9%	12,8%
Biodiversity and Sustainability	8,1%	4,9%	5,2%	10,7%	10,3%
Warehousing, Infrastructure and Logistics	6,7%	7,8%	10,2%	8,1%	8,4%
Online grocery store	6,7%	6,3%	6,7%	6,2%	6,3%
Autonomous management system for stores and food services		5,3%	5,6%	5,6%	5,5%

Category	2019	2020/ 2021	2022	2023	2024
Online restaurants and meal kits		5,4%	5,4%	5,5%	5,0%
Industry and food processing 4.0		3,6%	3,5%	4,3%	4,5%
Bioenergy and Renewable Energy		3,1%	3,6%	4,3%	4,3%
Packaging, Environmental and recycling systems		3,6%	3,3%	3,7%	3,3%
Urban planting: plant factory and new forms of planting		3,1%	2,8%	2,3%	2,4%
Food safety and traceability		1,7%	1,7%	2,2%	2,6%
Cloud cooking and ghost cooking		0,4%	0,7%	0,4%	0,4%
TOTAL	100,0%	100,0%	100,0%	100,0%	100,0%

The “After the Farm” segment showed important changes in the distribution of Agtechs between 2019 and 2024, underscoring the advance of innovation in food marketing, logistics and processing. It is worth noting that some categories emerged after 2020, such as “Autonomous management system for stores and food services”, “Industry 4.0” and “Cloud cooking”.

The “Innovative foods and new food trends” category leads the segment, but its share fell from 56.7% in 2019 to 34.3% in 2024, in line with the reduction in the absolute number of startups from 246 to 277. The growth of the other categories contributed to this decentralization.

“Marketplaces and platforms for trading and selling agricultural products” fluctuated over the period, falling from 21.9% in 2019 to 12.8% in 2024, with the number of startups ranging from 95 to 103. “Biodiversity and Sustainability” gained relevance, growing from 8.1% to 10.3%, reaching 83 startups in 2024.

“Warehousing, Infrastructure and Logistics” saw a significant increase in its share, rising from 6.7% to 8.4%, with the number of startups growing from 29 to 68. “Online Grocery” remained relatively stable, hovering around 6.3%, with 51 startups in 2024.

The categories “Autonomous management system for stores and food services” (5.5%) and “Online restaurants and meal kits” (5.0%) maintained a constant presence in the segment. “Food industry and processing 4.0” and “Bioenergy and renewable energy” grew slightly, reaching 4.5% and 4.3% of the segment, respectively.

Among the smaller categories, “Packaging, environmental and recycling systems” fluctuated slightly, reaching 3.3% in 2024. “Urban planting” and “Food safety and traceability” grew, reaching 2.4% and 2.6% respectively. The category “Cloud cooking and ghost cooking” remained a small niche, representing 0.4% of the segment over the years.

The data indicates that while innovative foods remain the main focus, there is growing diversification into logistics, sustainability and food traceability, consolidating new opportunities within the agtech ecosystem.

Evolution of the Categories with the highest volume of Agtechs

The analysis of the evolution of agtech categories between **2019 and 2024** shows relevant trends in the sector, with growth in specific areas and reorganization of the percentile share of each category in the total number of agtechs mapped. Of the 10 categories with the most agtechs, 2 are before the farm, 5 inside the farm and 3 after the farm.

EVOLUTION OF CATEGORIES WITH THE HIGHEST VOLUME OF AGTECHS



Figure 15. Evolution of categories over the years

Among the trends identified by the evolution in the number of Agtechs, the following stand out:

- “Innovative foods and new food trends” remained the largest category, despite the drop in relative share (24.1% in 2019 to 13.9% in 2024), reflecting the diversification of the sector.
- “Rural Property Management System” grew until 2022 and then stabilized in 2023 and 2024, rising from 122 to 157 agtechs.
- “Systems, solutions and data integration platform” increased from 79 to 144 agtechs, consolidating their importance in the digitalization of the agricultural sector.
- “Drones, Machinery and Equipment” doubled in number, from 43 in 2019 to 110 in 2024, driven by the advance of mechanization and automation in the field.

Table 26. Evolution of the Categories with the highest number of Agtechs in Radar Agtech mapping 2019-2024 (Number of Agtechs)

Category	2019	2020/2021	2022	2023	2024	Segment
Innovative foods and new food trends	246	293	281	277	275	After
Rural Property Management System	122	154	173	170	157	Inside
Systems, solutions and data integration platform	79	111	122	146	144	Inside
Drones, Machinery and Equipment	43	79	78	98	110	Inside
Credit, barter, insurance, carbon credits and fiduciary analysis	24	61	61	85	97	Before
Marketplaces and platforms for trading and selling agricultural products	95	100	124	103	94	After
Remote Sensing, Diagnostics and Image Monitoring	29	70	76	84	88	Inside
Biodiversity and Sustainability	35	35	37	83	84	After
Fertilizers, inoculants and plant nutrition	41	53	53	73	84	Before
Content, Education, Social Media	20	58	51	79	81	Inside

In relation to the percentage share of the total number of agtechs in the categories shown in the previous table:

- “Marketplaces and trading platforms” lost share, falling from 9.3% to 4.8%, following an adjustment in the digital agricultural market.
- “Credit, barter, insurance and fiduciary analysis” grew in importance, increasing its share from 2.4% to 4.9%, with the expansion of financial solutions for agriculture.
- “Biodiversity and Sustainability” grew significantly, from 3.4% in 2019 to 4.3% in 2024, demonstrating the greater attention paid to environmental preservation and new sustainable technologies.
- “Content, Education and Social Media” rose from 2% to 4.1%, showing the growing demand for digital information in the sector.
- “Storage, Infrastructure and Logistics” has remained stable at around 3.2% to 4.4% of all agtechs over the years.
- “Internet of Things for Agriculture” grew progressively, from 1.5% in 2019 to 2.9% in 2024, emphasizing the importance of connectivity in the field.

Table 27. Evolution of the Categories with the highest number of Agtechs in Radar Agtech mapping 2019-2024 (%)

Category	2019	2020/2021	2022	2023	2024	Segment
Innovative foods and new food trends	24,1%	18,4%	16,9%	14,2%	13,9%	After
Rural Property Management System	12,0%	9,7%	10,4%	8,7%	8,0%	Inside
Systems, solutions and data integration platform	7,7%	7,0%	7,3%	7,5%	7,3%	Inside
Drones, Machinery and Equipment	4,2%	5,0%	4,7%	5,0%	5,6%	Inside
Credit, barter, insurance, carbon credits and fiduciary analysis	2,4%	3,8%	3,7%	4,4%	4,9%	Before
Marketplaces and platforms for trading and selling agricultural products	9,3%	6,3%	7,5%	5,3%	4,8%	After
Remote Sensing, Diagnostics and Image Monitoring	2,8%	4,4%	4,6%	4,3%	4,5%	Inside
Biodiversity and Sustainability	3,4%	2,2%	2,2%	4,2%	4,3%	After
Fertilizers, inoculants and plant nutrition	4,0%	3,3%	3,2%	3,7%	4,3%	Before
Content, Education, Social Media	2,0%	3,6%	3,1%	4,0%	4,1%	Inside
Warehousing, Infrastructure and Logistics	2,8%	3,5%	4,4%	3,5%	3,2%	After
Internet of Things for Agriculture: detecting pests, soil, climate and irrigation	1,5%	2,4%	2,4%	3,0%	2,9%	Inside

Deepening the analysis: survey of agtechs

In addition to the mapping, Radar Agtech also conducts a survey to better understand the profile and demands of agtechs. In 2023, the main change from the previous survey was the inclusion of a section on talent management and diversity, with segmentation of the diversity items to better map Brazilian conditions. In 2024, we also sought to better understand demands in order to better identify points of convergence and divergence in relation to the offerings of the innovation ecosystem, especially innovation environments.

This analysis initially presents the characteristics of the sample, such as age, location, turnover, category and the performance of these agtechs. This is followed by an analysis of how agtechs fit into the ecosystem, their sources of public and private funding, their business models, their impact on the Sustainable Development Goals (SDGs), the profile of the talents who work in agtechs and their perceptions of challenges for agtechs, technological and market trends, as well as points for improvement in the ecosystem.

Sample profile

The sample consisted of 143 agtechs, corresponding to 7.3% of the mapped agtechs (1,972).

Year of establishment

Most of the agtechs analyzed have existed for up to six years and are relatively young startups compared to the total population mapped. According to the data presented in the table below, 65.7% of the participating agtechs were founded after 2018, while in the general mapping this percentage is 45.6%. This pattern was also observed in previous editions of the survey, with 66% of startups founded in the last six years in 2023 and 70% in 2022, demonstrating a continued predominance of emerging companies in the sector.

Table 28. Year of establishment of the agtechs in Radar Agtech 2024 survey and Radar Agtech 2024 mapping.

Date of establishment	N sample	% sample	Cumulative %	% mapping	% cumulative mapping
Until 2017	36	25%	25,20%	58,0%	
2018	13	9,10%	34,30%	10,0%	68%
2019	13	9,10%	43,40%	9,5%	77%
2020	22	15,40%	58,70%	8,8%	86%
2021	14	9,80%	68,50%	6,7%	93%
2022	24	16,80%	85,30%	4,6%	98%
2023	10	7,00%	92,30%	1,7%	99%
2024	11	7,70%	100,00%	0,8%	100%
Grand Total	143	100,00%			

This characteristic may further reinforce the challenges faced by younger companies, but it does not detract from the objective of delving deeper into the characteristics and perceptions of agtechs.

Location

Most of the agtechs in the sample and mapping are in the Southeast (52.1% of the sample, 56% of the mapping) and South (21% of the sample, 18% of the mapping). Although there are percentage differences, especially for the states of São Paulo (33% of the sample, lower than the 43% of those mapped) and Rio Grande do Sul (13% of the sample, higher than the 9% of those mapped), the overall composition is quite similar, as shown in Table 29.

Table 29. Federative units of the Agtechs in the Radar Agtech 2024 survey and the Radar Agtech 2024 mapping.

FU of company headquarters	Region	Agtechs in the Sample	Sample%	Mapped	% Mapped
SP	Southeast	47	33%	857	43%
MG	Southeast	23	16%	174	10%
RS	South	18	13%	189	9%
SC	South	12	8%	134	9%
PR	South	10	7%	176	7%
GO	Center-West	6	4%	35	4%
RJ	Southeast	5	3%	78	2%
MT	Center-West	3	2%	37	2%
AM	North	3	2%	25	2%
PE	Northeast	3	2%	23	1%
MS	Center-West	3	2%	21	1%
BA	Northeast	2	1%	28	1%
CE	Northeast	2	1%	17	1%
MA	Northeast	2	1%	15	1%
TO	North	1	1%	22	1%
PA	North	1	1%	31	1%
DF	Center-West	1	1%	23	1%
RN	Northeast	1	1%	6	1%
ES	Southeast	-	-	28	1%
AP	North	-	-	15	1%
AC	North	-	-	14	0%
RR	North	-	-	8	0%
RO	North	-	-	6	0%
PB	Northeast	-	-	5	0%
PI	Northeast	-	-	3	0%
SE	Northeast	-	-	2	0%
Total Geral		143	100%	1972	100%

The main cities in the sample are also included in the mapping ranking. The differences can be explained by greater or lesser effectiveness and engagement in each location, which reinforces the importance of having complementary methods for understanding the ecosystem.

Table 30. Host cities of the most frequent Agtechs in the Radar Agtech 2024 survey.

City	Sample	% Sample	Mapped	% Mapped
São Paulo	13	9%	389	20%
Porto Alegre	11	8%	56	3%
Florianópolis	6	4%	49	3%
São José dos Campos	6	4%	30	2%
Curitiba	5	3%	75	4%
Goiânia	4	3%	24	1%
Piracicaba	4	3%	63	3%
Uberlândia	4	3%	24	1%
Belo Horizonte	3	2%	46	2%
Manaus	3	2%	11	1%
Recife	3	2%	14	1%
Grand Total	143	100%	781	41%

Agtechs from the following cities also took part in the sample:

Cities with 2 agtechs: Campinas, Campo Grande, Campos dos Goytacazes, Franca, Joinville, Juiz de Fora, Primavera do Leste, Rio de Janeiro, São João da Boa Vista, Uberaba.

Cities with 1 agtech: Abadia dos Dourados, Adamantina, Alegrete, Araraquara, Astorga, Barueri, Belém, Biguaçu, Botucatu, Bragança Paulista, Brasília, Brusque, Campo Bom, Cantagalo, Cascavel, Catanduva, Cerro Largo, Chapadinha, Cuiabá, Curitiba, Dourados, Fortaleza, Goiatuba, Governador Valadares, Guaraciaba do Norte, Horizontina, Indaiatuba, Itajubá, Iturama, Januária, Jataí, Lages, Lajeado, Lauro de Freitas, Londrina, Luís Eduardo Magalhães, Manhuaçu, Nanuque, Natal, Palmas, Pará de Minas, Passo Fundo, Paulínia, Pirajuba, Ribeirão Preto, Santa Branca, Santo André, São Carlos, São José do Rio Preto, São José dos Pinhais, Raimundo das Mangabeiras, Seropédica, Sertãozinho, Sete Lagoas, Taboão da Serra, Taubaté, Três Marias, Vale Verde, Vargem Grande do Sul, Viçosa, Vinhedo.

Turnover

Table 4 shows the distribution of Agtechs according to their turnover, with a total of 147 companies analyzed. It can be seen that most of the Agtechs (44.2%) have an annual turnover of up to R\$81,000, showing a predominance of small businesses in the sector.

As the turnover ranges increase, the number of companies decreases. Only 6.1% of Agtechs make between R\$81,100 and R\$130,000, while 2% are in the R\$130,100 to R\$180,000 range. The intermediate segments, between R\$180,100 and R\$16 million, represent a significant portion of the total, with emphasis to the ranges of R\$180,100 to R\$360,000 (8.8%), R\$ 360,100 to R\$720,000 (8.8%) and R\$1.81 million (8.8%) to R\$ 3.6 million (8.2%).

In the group of companies with the highest turnover, few of them reach significant figures. Only 2 (1.4%) have a turnover of between R\$ 30.1 million and R\$ 90 million, and only 1 company (0.7%) exceeds the R\$ 90 million mark, reaching up to R\$ 300 million.

The data suggests that the agtech sector is still mostly made up of small and medium-sized companies, with few achieving high turnover. This may hint to challenges related to the growth and scalability of these businesses, as well as potential market and investment barriers to their expansion.

Table 31. Turnover of the agtechs in the Radar Agtech 2024 survey.

Turnover	Agtechs	%
Up to R\$ 81 thousand	65	44,2%
From R\$ 81,100 to R\$ 130,000	9	6,1%
From R\$ 130.1 thousand to R\$ 180 thousand	3	2,0%
From R\$ 180,100 to R\$ 360,000	13	8,8%
From R\$ 360.1 thousand to R\$ 720 thousand	13	8,8%
From R\$ 720.1 thousand to R\$ 1.8 million	11	7,5%
From R\$ 1.81 million to R\$ 3.6 million	12	8,2%
From R\$ 3.61 million to R\$ 4.8 million	7	4,8%
From R\$ 4.81 million to R\$ 16 million	11	7,5%
From R\$ 30.1 million to R\$ 90 million	2	1,4%
From R\$ 90.1 million to R\$ 300 million	1	0,7%
Grand Total	147	100,0%

The question about growth in turnover had only 12 answers: 1 company answered 0, 2 answers were up to 30%, 5 between 30% and 80%; and 4 answered more than 80%.

Performance of the agtechs in the sample

In terms of operations, the most mentioned segment was Inside the Farm (54.1%), followed by Before the Farm (29.7%) and After the Farm (16.2%). This distribution shows some differences in relation to the general profile of the agtechs mapped and the respondents in 2023 and 2022, when the percentages were Inside the Farm (58.1% in 2023 and 59.7% in 2022), Before the Farm (21.9% in 2023 and 24.3% in 2022) and After the Farm (19.0% in 2023 and 15.9% in 2022).

Table 32. Agtechs' activities by segment from Radar Agtech 2024 survey and Radar Agtech 2024 mapping.

Segment	Categories mentioned		Mapping	
	agtechs	%	agtechs	%
Before	43	29,7%	366	18,6%
Inside	77	54,1%	818	41,5%
After	23	16,2%	788	40,0%
Total	143	100%	1.972	100%

The most mentioned categories in the Inside the Farm segment were Rural Property Management System (15.0%) and Systems, solutions and data integration platform (6.1%), followed by Biological Control and Integrated Pest Management (6.1%) and Drones, Machinery and Equipment (4.8%). In the After the Farm segment, Biodiversity and Sustainability (4.1%) and Marketplaces and Platforms for trading and selling agricultural products (3.4%) stood out, as well as Food Industry and Processing 4.0 (3.4%). In the Before the Farm segment, the most representative categories were Fertilizers, Inoculants and Plant Nutrition (10.2%) and Seeds, Seedlings and Plant Genomics (8.2%), followed by Credit, Barter, Insurance, Carbon Credits and Fiduciary Analysis (6.8%).

Table 33. Category mentioned by agtechs in the Radar Agtech 2024 survey and mapping.

Segment and Category	Survey		Mapping	
	agtechs	%	agtechs	%
Inside - Rural Property Management System	21	15,0%	157	8,0%
Before - Fertilizers, Inoculants and Plant Nutrition	15	10,2%	84	4,3%
Before - Seeds, Seedlings and Plant Genomics	12	8,2%	45	2,3%
Before - Credit, barter, insurance, carbon credits and fiduciary analysis	10	6,8%	97	4,9%
Inside - Biological Control and Integrated Pest Management	9	6,1%	48	2,4%
Inside - Systems, solutions and data integration platform	9	6,1%	144	7,3%
Inside - Drones, Machinery and Equipment	7	4,8%	110	5,6%
Inside - Content, Education, Social Media	6	4,1%	81	4,1%
Inside - Internet of Things for Agriculture: detecting pests, soil, climate and irrigation	6	4,1%	58	2,9%
Inside - Telemetry and Automation	6	4,1%	38	1,9%
After - Biodiversity and Sustainability	6	4,1%	84	4,3%
Inside - Connectivity and Telecommunications	5	3,4%	17	0,9%
After - Food industry and processing 4.0	5	3,4%	34	1,7%

Continued

Segment and Category	Survey		Mapping	
	agtechs	%	agtechs	%
After - Marketplaces and platforms trading and selling agricultural products	5	3,4%	94	4,8%
Before - Animal Nutrition and Health	4	2,7%	44	2,2%
Inside - Meteorology, Irrigation and Water Management	4	2,7%	38	1,9%
Before - Agribusiness Input Marketplace	3	2,0%	35	1,8%
After - Storage, Infrastructure and Logistics	3	2,0%	64	3,2%
Inside - Agricultural waste management	2	1,4%	17	0,9%
Inside - Remote Sensing, Diagnostics and Image Monitoring	2	1,4%	88	4,5%
After - Food safety and traceability	2	1,4%	17	0,9%
After - Packaging, environmental and recycling systems	2	1,4%	29	1,5%
Inside - Beekeeping and Pollination	1	0,7%	11	0,6%
After - Bioenergy and Renewable Energy	1	0,7%	34	1,7%
Before - Laboratory analysis			39	2,0%
Before - Genomics and Animal Breeding			22	1,1%
Inside - Sharing economy			11	0,6%
After - Innovative foods and new food trends			275	13,9%
After- Online grocery store			49	2,5%
After - Autonomous management system for stores and food services			44	2,2%
After - Online restaurants and meal kits			43	2,2%
After - Urban planting: plant factory and new ways of planting			18	0,9%
After - Cloud cooking and ghost cooking			3	0,2%
Total	143	100%	1.972	100%

Performance was detailed in the 2024 edition, emphasizing that the respondent could indicate multiple items. Soybean, corn and coffee continued to be the main crops served, while oranges and bananas remained the main fruits in the same order as in 2023. As there was greater detail, the “other” categories of grains, fruits, vegetables and animals cannot be compared directly with 2023.

Table 34. Performance of the agtechs in the Radar Agtech 2024 survey.

Performance	agtechs	%
Soybean	67	46,9%
Corn	65	45,5%
Coffee	64	44,8%
Sugarcane	57	39,9%
Wheat	51	35,7%
Cotton	49	34,3%
Rice	47	32,9%
Orange	45	31,5%
Horticulture	44	30,8%
Forestry	41	28,7%
Banana	40	28,0%
Cassava	38	26,6%
Cattle (Oxen and Cows)	36	25,2%
Fish	18	12,6%
Pigs	18	12,6%
Chickens	16	11,2%
Other Vegetables	32	22,4%
Other Grains	51	35,7%
Other Fruits	44	30,8%
Other Animals	16	11,2%
ALL / INDIFFERENT	36	25,2%
Grand Total	143	100,0%

When specifying others, the following were mentioned: Strawberry (5 times), Açaí (4 times), Potato, Cocoa, Barley and Sheep (3 times each); Bees, Goats, Dendê, Horses, Passion fruit, Melon, Cattle nutrition, Ornamentals, Sorghum, Tobacco, Tomato and Grape (2 times each); Avocado, Seaweed, Plum, Peanut, Blackberry, Oats, Babaçu, Bacuri, Sweet potato, Vanilla, Berry, Bioactives native to the Cerrado, Shrimp, Persimon, Carnauba, Brazil nut, Onions, Carrots, Winter cereals, Coconut, Mushroom, Medicinal and aromatic plant species, Eucalyptus, Forest, Red berries, Tobacco, Sesame, Guarana, Vegetables, Milk, Lemon, Hops, Apple, Papaya, Mango, Olericulture, Olive, Pasture, Cucumber, Peach, PETs, Pistachio, Pitaya, Plants and microorganisms, Urban pruning, Recovery of degraded areas, Vegetables (1 time each).

The business models most adopted by agtechs are B2B (Business to Business), in 85.3% of companies, followed by B2C (Business to Consumer), with 42.0%, and B2B2C (Business to

Business to Consumer), with 38.5%. Compared to 2023, there was an increase in the share of the B2B model (from 75% to 85.3%) and B2B2C (from 33% to 38.5%), while B2C showed a slight drop (from 43% to 42%). This underscores the predominance of business aimed at companies, highlighting the strong connection between agtechs and the corporate sector.

Table 35. Business models of the agtechs in the Radar Agtech 2024 survey

Business Model	2024		2023
	Quantity	%	%
B2B (Business to Business)	122	85,30%	75%
B2C (Business to Consumer)	60	42,00%	43%
B2B2C (Business to Business to Consumer)	55	38,50%	33%
B2G (Business to Government)	21	14,70%	4%
D2C (Direct to Consumer)	6	4,20%	4%
B2E (Business to Employee)	2	1,40%	1%
C2C (Consumer to Consumer)	0	0,00%	1%
Grand Total	143	100%	100%

Connecting with Innovation and Entrepreneurship Ecosystems and Networks

In the 2024 edition, there was a different question about the company's participation in an innovation ecosystem, asking about participation in different mechanisms for managing innovation ventures and ecosystems, referring to the Anprotec typology (<https://anprotec.org.br/site/sobre/incubadoras-e-parques/>). There was a total of 116 respondents. The agtechs reported participating in an average of 2.2 innovation support programs, indicating a high level of engagement with the ecosystem. The 2024 survey highlights the predominance of Technology Parks, cited by 47.9% of the participating startups. This was followed by Business Accelerators (42.7%) and Business Incubators (31.6%), demonstrating the importance of these environments in supporting the development of agtechs.

Open spaces for cooperative work or coworking also have a significant presence, being mentioned by 29.9% of agtechs. Other support models include Technology Hubs (17.1%), Innovation Areas (9.4%) and Innovation Centers (8.5%), highlighting the diversity of environments aimed at promoting innovation.

In addition, programs such as Venture Generation Spaces (7.7%) and Innovation Promotion Arrangements (6.0%) demonstrate their role in supporting startups. Less frequent but still relevant models include open product and processes prototyping laboratories (3.4%), Smart Cities (1.7%) and Innovation Districts (0.9%), underscoring the variety of initiatives that make up the agtech innovation ecosystem.

Table 36. Innovation and/or entrepreneurship programs most cited by agtechs.

Program	Agtechs	%
Technology parks	56	47,9%
Business accelerators	50	42,7%
Business incubator	37	31,6%
Open spaces for cooperative work or coworking	35	29,9%
Technology Center	20	17,1%
Areas of innovation	11	9,4%
Innovation Centers	10	8,5%
Spaces for generating business	9	7,7%
Innovation Centers	8	6,8%
Innovation Promotion Arrangement	7	6,0%
Open product and process prototyping labs (makerspaces)	4	3,4%
Smart cities	2	1,7%
Innovation districts	1	0,9%
Others	9	7,7%

Private and Public Financing

The questions on private and public funding were improved in 2023 with the inclusion of more options, which were retained in the 2024 edition. The survey shows that agtechs continue to resort to various private sources of funding, following similar patterns to those observed in previous years.

The main source cited continues to be Founders, Family, Friends and other individuals, mentioned by 67.6% of startups, showing a slight drop compared to 2023 (71.8%). This was followed by Loans, which grew to 15.2% (compared to 12.8% in 2023), and Angel Investing, which also came in at 15.2%, but with a reduction compared to the previous year, when it came in at 22.1%. Venture capital was cited by 11.0% of startups, down from 15.4% in 2023.

Other relevant sources include National Accelerators (9.7%), Private Technology Calls (8.3%) and Private Impact Business Calls (6.2%), reinforcing the diversity options accessed by agtechs. In addition, National Companies (6.2%), Private Agribusiness Technology Calls (6.2%) and International Companies (4.1%) were also mentioned as sources of funding.

Less recurrent, but still significant models include Virtual Collaborative Financing (2.8%), Venture Builders (2.8%) and International Accelerators (1.4%), showing the variety of mechanisms used by startups in the sector. Notably, 15.9% of agtechs indicated that they did not use any private sources, an increase compared to 2023 (12.0%), which may indicate challenges in accessing capital or a greater dependence on other forms of financing.

Table 37. Private sources of funding for agtechs in the Radar Agtech 2024 survey.

Private Source	Agtechs	2024	2023
Founders, Family, Friends and other individuals	98	67,6%	71,80%
Loans	22	15,2%	12,80%
Angel investing	22	15,2%	22,10%
Venture capital	16	11,0%	15,40%
National accelerator	14	9,7%	17,40%
Private technology tenders (not specific to agribusiness)	12	8,3%	9,20%
Private calls for impact businesses	9	6,2%	5,60%
National Company	9	6,2%	7,70%
Private tenders for agrotechnology	9	6,2%	7,20%
International Company	6	4,1%	4,60%
Virtual Collaborative Financing (crowdfunding)	4	2,8%	4,60%
Venture Builder	4	2,8%	4,10%
Private tenders in other areas	4	2,8%	1,00%
International accelerator	2	1,4%	3,10%
Other private sources	4	2,8%	5,60%
No Private Source	23	15,9%	12,00%

With regard to sources of public funding, it should be noted that most agtechs do not use this type of resource, with 52.7% of companies indicating that they have not accessed any public sources, a slightly lower figure than in 2023 (54.9%).

Among those that use public funding, Public Technology Calls not specific to agribusiness were cited by 25.2% of startups, down from 26.7% in 2023. This was followed by non-reimbursable research resources, used by 17.6% of agtechs, down slightly from 18.5% the previous year.

Other relevant sources include Public Calls for Technology for Agriculture (10.7%), Public Calls for Impact Business (9.2%), Public Loans (6.1%) and Public Calls for Other Areas (5.3%). It's worth noting that the share of Business Incubators fell to 3.8%, after registering 4.6% in 2023 and 10% in 2022.

Less accessed sources include Tax Incentives (1.5%) and Entrepreneurial Capital (0.8%), categories which, despite their low participation, generally involve higher financial contributions. In addition, 2.3% of agtechs turned to other public sources, compared to 3.1% the previous year.

The comparison with 2022 shows that public calls for proposals, which were previously considered as a single category (29%), were better segmented in the 2023 and 2024 surveys, allowing for a more detailed analysis of the use of public resources by agtechs. The proportion of startups that do not access public funding remained relatively stable, suggesting that there are still challenges in accessing this type of resource.

Table 38. Public sources of funding for the agtechs in the sample.

Public sources	Agtechs	2024%	2023%
No public source	69	52,7%	54,9%
Public calls for technology (not specific to agribusiness)	33	25,2%	26,7%
Non-refundable research resources	23	17,6%	18,5%
Public calls for agricultural technology	14	10,7%	7,2%
Public calls for impact businesses	12	9,2%	7,7%
Loans	8	6,1%	7,2%
Public notices in other areas	7	5,3%	4,6%
Business incubator	5	3,8%	4,6%
Tax incentives (e.g. innovation support laws)	2	1,5%	1,5%
Venture capital	1	0,8%	2,1%
Other public sources	3	2,3%	3,1%

Services used

Among the 98 responding companies that are part of an innovation-promoting space or environment, the most used resources include Acceleration, Incubation and Specialized Services (60.0%), Connections and Networking (60.0%), Coworking Spaces (60.0%), Financing (60.0%) and Various Resources (60.0%), standing out as the main benefits accessed by Agtechs in these environments. In addition, Connections with technology supply companies (44.0%), Connections with potential client companies (43.0%) and Participation in fairs and events in the sector (43.0%) are frequently mentioned, emphasizing the importance of these initiatives in expanding access to the market. Other relevant forms of support include Connections with research institutions (36.0%), Business rounds (34.0%), Connections with producers and rural cooperatives (31.0%) and Meetups and thematic workshops (31.0%).

In the field of innovation, Mentoring specialized in agribusiness and agrifoodtech (30.0%), Pilot project execution (29.0%) and Resources for R&D and Prototyping (24.0%) are widely used. Investment support also appears, with mentions of Access to investment networks in the sector (22.0%), Co-development of the solution (20.0%) and Specialized laboratories and equipment (20.0%).

Other benefits include Recognition and awards (17.0%), Experimental growing areas (16.0%) and Specialized software (16.0%), as well as Provision of innovative services or products (15.0%) and Marketing and sales support (14.0%).

Among the least accessed resources are service and technology vouchers (7.0%), support on regulatory issues (5.0%), support in finding loans (4.0%), equity investments (3.0%) and corporate buyouts (2.0%), indicating that some opportunities are still underexploited.

This survey reinforces the diversity of resources available to agtechs and the importance of the innovation ecosystem in supporting the growth of these companies.

Table 39. Services used by agtechs

Services used	Agtechs	%
Acceleration, Incubation and Specialized Services	60	60,0%
Connections and networking	60	60,0%
Coworking spaces	60	60,0%
Financing	60	60,0%
Resources	60	60,0%
Connections with technology suppliers	44	44,0%
Connections with potential client companies	43	43,0%
Participation in sector fairs and events	43	43,0%
Connections with research institutions	36	36,0%
Business rounds	34	34,0%
Connections with rural producers and cooperatives	31	31,0%
Meetups and themed workshops	31	31,0%
Mentoring specializing in agribusiness and agrifoodtech	30	30,0%
Running a pilot project	29	29,0%
Online communities (forums, discussion groups)	26	26,0%
Connections with industry associations	26	26,0%
High-speed Internet and Wi-Fi networks	26	26,0%
Connections with governments, Sistema S and state organizations	25	25,0%
Resources for R&D and Prototyping	24	24,0%
Access to a network of investors in the sector	22	22,0%
Co-development of the solution	20	20,0%
Laboratories and specialized equipment	20	20,0%
Recognition and Awards	17	17,0%
Experimental growing areas	16	16,0%
Specialized software (proprietary software, data analysis, modeling, development platform, etc.)	16	16,0%
Providing an innovative service or product	15	15,0%
Marketing and sales support	14	14,0%
Access to customer base and sales channels	13	13,0%
Support for the search for funding and subsidies	12	12,0%

Continued

Services used	Agtechs	%
Intellectual Property Licensing	12	12,0%
Specialized legal advice (intellectual property, regulation)	11	11,0%
Promotion and subsidies	8	8,0%
Service and technology vouchers	7	7,0%
Product development program	6	6,0%
Specialized libraries and databases (scientific bibliography, patents, market data, climate data and market information, etc.)	5	5,0%
Support on regulatory issues	5	5,0%
Support in finding loans	4	4,0%
Support for crowdfunding	3	3,0%
Assistance in obtaining certifications	3	3,0%
Equity investments	3	3,0%
Rapid prototyping	3	3,0%
Supporting the search for investment and equity	2	2,0%
Corporate purchasing	2	2,0%
Loans	2	2,0%
Crowdfunding	1	1,0%

Among the 107 respondents, who are part of spaces or environments that promote innovation, the main needs identified were the desire for access to Connections with technology supplier companies (45.0%) and Connections with potential client companies (45.0%), followed by Support in marketing and sales (44.0%) and Mentoring specialized in agribusiness and agrifoodtech (43.1%).

In addition, Connections with rural producers and cooperatives (41.3%), Access to a network investors in the sector (38.5%), Participation in fairs and events in the sector (38.5%) and Promotion and subsidies (36.7%) appear as highly desired resources for Agtechs. Interest in R&D and prototyping resources (35.8%) and business rounds (35.8%) also demonstrate the search for support in innovation and market opportunities.

Other services mentioned include Acceleration, Incubation and Specialized Services (33.9%), Access to customer base and sales channels (33.9%), Connections and networking (33.9%), Coworking spaces (33.9%) and Financing (33.9%), emphasizing the importance of structuring support for startups to grow.

Among the more specific services, Support in the search for funding and subsidies (29.4%), Connections with industry associations (28.4%), Support in the search for investments and equity (27.5%) and Specialized legal advice (24.8%) are some of the needs expressed by startups. Pilot project execution (23.9%), product development programs (23.9%) and recognition and awards (22.9%) also appear as strategic demands.

In terms of infrastructure and technical support, there is interest in Connections with governments and state organizations (22.0%), Meetups and thematic workshops (22.0%), Equity investments (21.1%) and Connections with research institutions (20.2%). Services such as Assistance in obtaining certifications (19.3%), Co-development of the solution (19.3%), Intellectual property licensing (19.3%) and Support in regulatory matters (19.3%) are also mentioned.

Other needs include Experimental growing areas (18.3%), Specialized laboratories and equipment (18.3%), Specialized software (18.3%), Online communities and forums (16.5%), Service and technology vouchers (16.5%), Specialized libraries and databases (15.6%) and Rapid prototyping 15.6%).

On the other hand, the least mentioned services include Support for finding loans (13.8%), High-speed Internet and Wi-Fi networks (12.8%), Loans (11.9%), Providing an innovative service or product (11.9%), Support for finding crowdfunding (10.1%), Crowdfunding (10.1%) and Corporate purchasing (2.8%), showing that these areas are still not a priority for most companies.

The survey shows that Agtechs are not only looking for financial and structural support, but they also need a greater connection with the innovation ecosystem, including networks of investors, clients and strategic partners to expand their growth opportunities.

Table 40. Services desired by agtechs

Desired services	N	%
Connections with technology suppliers	49	45,0%
Connections with potential client companies	49	45,0%
Marketing and sales support	48	44,0%
Mentoring specializing in agribusiness and agrifoodtech	47	43,1%
Connections with rural producers and cooperatives	45	41,3%
Access to a network of investors in the sector	42	38,5%
Participation in sector fairs and events	42	38,5%
Promotion and subsidies	40	36,7%
Resources for R&D and Prototyping	39	35,8%
Business rounds	39	35,8%
Acceleration, Incubation and Specialized Services	37	33,9%
Access to customer base and sales channels	37	33,9%
Connections and networking	37	33,9%
Coworking spaces	37	33,9%
Financing	37	33,9%
Resources	37	33,9%
Support for the search for funding and subsidies	32	29,4%
Connections with industry associations	31	28,4%

Continued

Desired services	N	%
Supporting the search for investment and equity	30	27,5%
Specialized legal advice (intellectual property, regulation)	27	24,8%
Running a pilot project	26	23,9%
Product development program	26	23,9%
Recognition and Awards	25	22,9%
Connections with governments, S System and state organizations	24	22,0%
Meetups and themed workshops	24	22,0%
Equity investments	23	21,1%
Connections with research institutions	22	20,2%
Assistance in obtaining certifications	21	19,3%
Co-development of the solution	21	19,3%
Intellectual Property Licensing	21	19,3%
Support on regulatory issues	21	19,3%
Experimental growing areas	20	18,3%
Laboratories and specialized equipment	20	18,3%
Specialized software (proprietary software, data analysis, modeling, development platform, etc.)	20	18,3%
Online communities (forums, discussion groups)	18	16,5%
Service and technology vouchers	18	16,5%
Specialized libraries and databases (scientific bibliography, patents, market data, climate data and market information, etc.)	17	15,6%
Rapid prototyping	17	15,6%
Support in finding loans	15	13,8%
High-speed Internet and Wi-Fi networks	14	12,8%
Loans	13	11,9%
Providing an innovative service or product	13	11,9%
Support for crowdfunding	11	10,1%
Crowdfunding	11	10,1%
Corporate purchasing	3	2,8%

Talent and diversity

This is the second time that the survey has provided data on the talents working in agtechs. The section was organized into two blocks: the first, on the distribution of members and collaborators by gender and company area, and the second with other diversity indicators in agtechs.

Distribution of members and collaborators by gender and company area

The question about the distribution of members and collaborator by gender had 143 agtech respondents. The data shows a predominance of male members, accounting for 79.3% of the total, with a slight increase compared to 2023 (76.9%). Women make up 19.9% of the members, down on the previous year (22.4%). The number of non-binary members remained stable at 0.8%.

The total number of members and collaborators was 1,000, resulting in an average of approximately 7 members per agtech, which underscores the collaborative structure of these startups. There is still a majority of men, so there is a need for initiatives to promote greater gender diversity in the agtech ecosystem.

Table 41. Distribution of members by gender.

Gender	Members	2024%	2023%
Men	793	79,30%	76,90%
Women	199	19,90%	22,40%
Non-binary	8	0,80%	0,80%
TOTAL	1000	100,00%	100%

The distribution of members by area within agtechs reveals a predominance of business functions, which account for 59.2% of all members. This group includes the areas of Administration and Finance (31.2%), Marketing and Sales (15.3%) and Other Business Areas (12.7%).

The technical functions – Production and Operations (19.8%) and Research and Development (21.0%) – account for 40.8%, demonstrating the importance of innovation and optimizing production processes within startups in the sector.

This distribution suggests a greater concentration of members in strategic and co-market areas, reflecting the need for agtechs to structure their operations for growth, customer acquisition and financial viability, while maintaining a robust technical base for development and innovation.

Table 42. Distribution of members by area.

Area	Members	% in the area
Administration and Finance	312	31,20%
Production and Operations	198	19,80%
Research and Development	210	21,00%
Marketing and Sales	153	15,30%
Other areas of the business	127	12,70%

The distribution of members in the business areas by gender shows relative consistency in the proportions of men, women and non-binary people between the different areas, with the predominance of men varying between 75.6% and 85.8%, close to the general average of 79.3%. In the Administrative and Financial area, men account for 75.6%, while women make up 22.8% and non-binary men, 1.6%. In Production and Operations, the male presence rises to 77.8%, with 20.7% women and 1.5% non-binary.

The Research and Development area has the highest concentration of men, with 80.0%, while 20.0% of the members are women, and no non-binary people were registered in this category. In Marketing and Sales, 82.4% of the members are men, with 17.6% women and no non-binary people.

In Other Business Areas, the male presence is the highest at 85.8%, with 14.2% women and no non-binary people registered.

The average number of members per agtech in all areas varies between 0.1 and 0.2, emphasizing that the gender distribution within companies follows similar patterns in all functions, with a significantly greater male presence, while female and non-binary participation is still restricted in some areas.

Table 43. Distribution of members in business areas.

Area	Gender	People	% of total	% in the area	average per agtech
Administration and Finance	Men	236	23,60%	75,64%	0,2
	Women	71	7,10%	22,76%	0,1
	Non-binary	5	0,50%	1,60%	0,0
Production and Operations	Men	154	15,40%	77,78%	0,2
	Women	41	4,10%	20,71%	0,0
	Non-binary	3	0,30%	1,52%	0,0
Research and Development	Men	168	16,80%	80,00%	0,2
	Women	42	4,20%	20,00%	0,0
	Non-binary	0	0,00%	0,00%	0,0

Area	Gender	People	% of total	% in the area	average per agtech
Marketing and Sales	Men	126	12,60%	82,35%	0,1
	Women	27	2,70%	17,65%	0,0
	Non-binary	0	0,00%	0,00%	0,0
Other areas of the business	Men	109	10,90%	85,83%	0,1
	Women	18	1,80%	14,17%	0,0
	Non-binary	0	0,00%	0,00%	0,0

The question about the distribution of collaborators had 143 agtech respondents, which is less than the number of respondents about members. This decrease may be related to several factors, such as the absence of formal collaborators (since many agtechs operate only with partners and outsourced services), the questionnaire being abandoned, or the difficulty in providing this data accurately. In the next edition, an answer option will be added in order to differentiate these scenarios: “the agtech only has member, no collaborators”.

The distribution of collaborators by gender follows a similar pattern to that observed among partners, but with a remarkable difference: although men are still the majority (65.5%), this predominance is lower than among members (79.3%). Women represent 33.3% of collaborators, a significantly higher percentage than among members (19.9%), indicating greater gender diversity among agtech collaborators. The number of non-binary people is 1.3%, showing a timid presence of this group in the workforce.

The total number of collaborators was 1,549, resulting in an average of 15.2 collaborators per agtech. This data indicates that, despite the predominance of men, there is an increase in the presence of women in the workforce, which may reflect changes in the hiring profile and organizational structure of agtechs.

Table 44. Distribution of collaborators by gender.

Gender	People	%
Men	1014	65,46%
Women	515	33,25%
Non-binaries	20	1,29%
TOTAL	1549	100%

The distribution of collaborators by area follows a similar pattern to that of members, but with a more marked difference between the technical and business areas.

Production and Operations (34.4%) and Research and Development (20.8%) together account for 55.2% of all collaborators, underscoring the predominance of technical functions in agtechs. Business-related areas – Administration and Finance (8.4%), Marketing and Sales (14.7%) and Other Business Areas (21.8%) – account for 44.8%.

The “Other areas of the business” category stands out, accounting for 21.8% of collaborators, which is a high percentage that may encompass different functions within the agtechs. The proportion of collaborators in Marketing and Sales (14.7%) is similar to that observed among partners, while the Administrative and Financial area (8.4%) has a significantly lower share compared to members (25.9%).

The average number of collaborators per agtech varies according to the area, with 5.2 in Production and Operations, 3.1 in Research and Development, 3.3 in Other Business Areas, 2.2 in Marketing and Sales and 1.3 in Administration and Finance. This means that, despite the need for support in strategic and commercial areas, agtechs still show predominantly technical structure, with a greater number of collaborators directly involved in operations and the development of innovation.

Table 45. Distribution of collaborators by area.

Area	Collaborators	% in the area	average per agtech
Administration and Finance	211	8,40%	1,3
Production and Operations	508	34,40%	5,2
Research and Development	369	20,80%	3,1
Marketing and Sales	247	14,70%	2,2
Other areas of the business	214	21,80%	3,3

The gender distribution among the people who work in agtechs shows significant variations between the areas of activity. Overall, men represent 65.5% of all collaborators, a higher percentage than the participation of women (33.3%) and non-binary people (1.3%). However, there are remarkable differences between areas:

- In more technical areas, the proportion of men is higher than the general average:
 - Production and Operations: 69.7% of collaborators are men, while 29.1% are women and 1.2% are non-binary.
 - Research and Development: 79.1% of collaborators are men, while 19.8% are women and 1.1% are non-binary.
- Two areas have a proportion of men above 50%, but below the general average:
 - Marketing and Sales: 50.2% of collaborators are men, 47.8% are women and 2.0% are non-binary.
 - Other Business Areas: 71.0% of collaborators are men, 27.1% are women and 1.9% are non-binary.
- The Administrative and Financial area is the only one with female predominance, where 55.9% of collaborators are women, 43.6% are men and 0.5% are non-binary.

With regard to the average number of collaborators per agtech, the numbers vary between 3.6 in Production and Operations, 2.3 in Research and Development, 1.7 in Other Business Areas, 1.2 in Marketing and Sales and 0.6 in Administration and Finance, underscoring that the technical areas concentrate the largest number of professionals.

The data shows that although female participation is higher among collaborators than among members, it is still lower than male participation in most areas, with the exception of Administration and Finance, where women are the majority.

Table 46. Distribution of collaborators by area.

Area	Gender	People	% of total	% in the area	average per agtech
Administration and Finance	Men	92	5,94%	43,60%	0,6
	Women	118	7,62%	55,92%	0,7
	Non-binary	1	0,06%	0,47%	0
Production and Operations	Men	354	22,85%	69,69%	3,6
	Women	148	9,55%	29,13%	1,5
	Non-binary	6	0,39%	1,18%	0
Research and Development	Men	292	18,85%	79,13%	2,3
	Women	73	4,71%	19,78%	0,9
	Non-binary	4	0,26%	1,08%	0
Marketing and Sales	Men	124	8,01%	50,20%	1,2
	Women	118	7,62%	47,77%	1
	Non-binary	5	0,32%	2,02%	0
Other areas of the business	Men	152	9,81%	71,03%	1,7
	Women	58	3,74%	27,10%	1,6
	Non-binary	4	0,26%	1,87%	0

These differences require in-depth analysis. Historically, there has been male predominance among both members and collaborators of agtechs. The most recent data underscores this pattern, with 79.3% of partners being men, while women represent 19.9% and non-binary people only 0.8%.

In the workforce, men are still in the majority, but less so, accounting for 65.5% of the total, while 33.3% are women and 1.3% are non-binary. The breakdown by area shows that the biggest difference occurs in technical areas, where men make up 69.7% in Production and Operations and 79.1% in Research and Development.

On the other hand, the Administrative and Financial area is the only one with a female predominance, with 55.9% of collaborators. In the areas of Marketing and Sales (50.2%) and Other Business Areas (71.0%), men are still the majority, but with less disparity when it comes to technical areas.

These data indicate that, although there has been progress in the presence of women among collaborators, the participation of women is still low in the technical and leadership functions of agtechs, which is a relevant aspect for future research into diversity and inclusion in the sector.

Other indicators of diversity in agtechs

The survey also asked about awareness regarding the existence of LGBTQIA+ people in the company, obtaining 143 responses. It is important to note that the survey uses the organization as the unit of analysis, and not the individual. As such, questions relating to personal identity may be subject to inaccuracies, whether due to the respondent's lack of awareness, a lack of transparency in the company or difficulty in gathering accurate information on the subject.

Unlike the previous survey, 14.6% of companies answered "I don't know", indicating that there are still doubts or a lack of information about diversity within organizations. Among the respondents who gave an objective answer, 43.0% said they didn't know any LGBTQIA+ people on their team, while 39.7% said they did.

This data shows progress in the recognized presence of LGBTQIA+ people within agtechs, but also indicates that the lack of visibility and inclusion are still challenges for the sector. This reinforces the need for active diversity and equity policies, as well as practices that encourage a more welcoming and transparent environment for all collaborators.

Table 47. Awareness of the existence of LGTBQIA+ people in agtech.

Answer	agtechs	%
Yes	58	39,71%
No	63	43,01%
I don't know	21	14,56%

There were 143 responses to the question about the existence of black, indigenous, disabled, neurodiverse, foreign, refugee, trans and/or over-50 people in the business. Although it involves individual aspects, this question tends to be more objective, allowing respondents to provide more precise information about diversity within agtechs.

The results indicate that only 25.2% of the companies said they had people from these groups on their team, while 74.8% responded negatively, suggesting low representation of minority groups within the sector.

This shows that the inclusion of professionals belonging to historically marginalized groups is still a challenge for agtechs, emphasizing the need for more effective diversity and inclusion policies, both in recruiting and retaining talent.

Table 48. Existence of black, indigenous, disabled, neurodiverse, foreign, refugee, trans and/or over-50 people in agtech.

Answer	agtechs	%
Yes	36	25,17%
No	107	74,83%

The breakdown of the distribution of minority groups among members and collaborators was made by 94 of the 143 respondents who declared the presence of black, indigenous, disabled, neurodiverse, foreign, refugee, trans and/or over-50 people in their businesses, representing 65.7% of the total respondents.

The two groups most present among members and collaborators are people over 50 and black or brown people, although there are significant differences between the profiles.

Among members, the most representative group is people over 50, who account for 15.8% of the total. Black or brown people account for 12.6% of members.

Other groups are underrepresented among members, including indigenous people (2.7%), people with disabilities (4.8%), neurodiverse people (2.0%), refugees (1.6%) and transgender people (0.7%). No foreign members were reported among the respondents.

This shows that although there is some diversity within agtechs, the presence of minority groups is still low, especially among members and founders, which underscores the need for strategies to increase inclusion and equity in the sector.

Table 49. Different groups among members.

Group between members	People	%
Over 50 years old	89	15,81%
Black or brown	71	12,61%
Foreign	0	0,00%
Neurodiverse	11	1,95%
Indians	15	2,66%
Disabled	27	4,80%
Transgender	4	0,71%
Refugees	9	1,60%
TOTAL	226	

Among collaborators, the most representative group is black and brown people, who account for 40.5% of all collaborators, a significantly higher percentage than among members (12.6%). People over the age of 50 account for 6.6%, a higher proportion than previously recorded (2.6%), but still relatively low within the sector.

Other groups are less represented, including indigenous people (3.7%), people with disabilities (3.9%), neurodiverse people (2.7%), refugees (1.4%) and trans people (1.1%). No foreigners were reported among the collaborators.

The data indicates that even though there is greater racial diversity among collaborators, the inclusion of other minority groups remains a challenge for agtechs. The low presence of people over 50 and groups such as indigenous, neurodiverse and trans people suggests the need for more effective diversity and inclusion policies in the sector.

Table 50. Diverse groups of collaborators.

Group among collaborators	People	%
Over 50 years old	37	6,57%
Black or brown	228	40,50%
Foreign	0	0,00%
Neurodiverse	15	2,66%
Indians	21	3,73%
Disabled	22	3,91%
Trans	6	1,07%
Refugees	8	1,42%
TOTAL	337	

The **distribution of people belonging to diverse groups** within agtechs shows significant differences between members and collaborators. In general, diversity is more present among collaborators, while partners still mostly belong to groups that are traditionally more represented in the sector.

The group of **black and brown people** is one of the most present within agtechs, but with a much higher participation among collaborators than among members, where only 12.6% are black or brown, with 55 men, 12 women and 4 non-binary people. Among collaborators, this number increases significantly, with 130 men, 92 women and 6 non-binary people, reflecting an advance in racial diversity among collaborators, but the persistence of challenges for inclusion in leadership positions.

The presence of **indigenous people** is also relatively small in the sector, with 7 men, 5 women and 3 non-binary people among the members. There are 9 indigenous men and 12 indigenous women on the staff, with no records of non-binary people. Although there is some representation, the numbers still indicate a restricted space for these groups within agtechs.

With regard to **people with disabilities**, distribution is more even between members and collaborators. There are 10 men, 8 women and 9 non-binary people on the corporate board. Among collaborators, the numbers are slightly lower, with 11 men, 5 women and 6 non-binary people. This suggests that the inclusion of people with disabilities in the sector has advanced, but there are still challenges in increasing this representation.

The group of **neurodiverse people** follows a similar pattern, with 6 men, 3 women and 2 non-binary people among the members. There are 8 men, 5 women and 2 non-binary people on the staff. The participation of this group is still limited, which may indicate barriers in adapting the work environment to meet their needs.

There are very few **refugees** in the sector, with only 5 men, 2 women and 2 non-binary people among the members. Among collaborators, the numbers are even lower, with 4 men, 2 women and 2 non-binary people. This scenario points to the need for greater inclusion of this group within agtechs, considering their potential to contribute to innovation and cultural diversity.

The number of **trans people** is also quite low within agtechs. There are only 2 trans men and 2 trans women on the corporate board, with no records of non-binary people. Among collaborators, the numbers are the same, with 2 men, 2 women and 2 non-binary people. The low representation of this population reflects structural challenges in the labor market and reinforces the need for more effective inclusion policies.

The group of **people over 50**, on the other hand, presents a different scenario. This is the most significant group among members, with 75 men and 14 women, suggesting that many leaders in the sector are made up of more experienced professionals. In the workforce, however, the numbers are much lower, with 33 men, 3 women and only 1 non-binary person, indicating that there is a more restricted presence of this group in operational positions.

According to the data, although there has been progress in diversity among collaborators, the presence of minority groups among members is still low. This suggests that, even though inclusion initiatives have brought results, there is still a long way to go to ensure greater equity within the agtech ecosystem, especially in leadership and decision-making positions.

Table 51. Different groups in agtechs.

Group	Role and gender	People	Group	Role and gender	People
Black	Male members	55	Foreign	Male members	-
	Female members	12		Female members	-
	Non-binary members	4		Non-binary members	-
	Male collaborators	130		Male collaborators	-
	Female collaborators	92		Female collaborators	-
	Non-binary collaborators	6		Non-binary collaborators	-
Indigenous	Male members	7	Refugees	Male members	5
	Female members	5		Female members	2
	Non-binary members	3		Non-binary members	2
	Male collaborators	9		Male collaborators	4
	Female collaborators	12		Female collaborators	2
	Non-binary collaborators	-		Non-binary collaborators	2

Continued

Group	Role and gender	People	Group	Role and gender	People
Disabled	Male members	10	Trans	Male members	2
	Female members	8		Female members	2
	Non-binary members	9		Non-binary members	-
	Male collaborators	11		Male collaborators	2
	Female collaborators	5		Female collaborators	2
	Non-binary collaborators	6		Non-binary collaborators	2
Neurodiverse	Male members	6	Over 50 years old	Male members	75
	Female members	3		Female members	14
	Non-binary members	2		Non-binary members	-
	Male collaborators	8		Male collaborators	33
	Female collaborators	5		Female collaborators	3
	Non-binary collaborators	2		Non-binary collaborators	1

Another factor analyzed was the presence and maturity of diversity and inclusion programs in agtechs. The results show that the majority of companies still lack structured initiatives in this area, highlighting challenges in promoting equity within the sector.

The data shows that 77% of agtechs have no diversity and inclusion program, which reveals a significant gap in the implementation of policies aimed at including diverse groups. Among the companies that already have an initiative, 18% said they were at an early stage of development, while 3% indicated that their program already exists but still needs improvement.

Only 1% of the companies rated their program as established, with need for improvement, and a very small number, 2%, said they had a mature, thorough and effective program.

This shows that inclusion and diversity are still low priorities in the agtech ecosystem, with most companies still lacking structured policies to promote more inclusive environments. The small percentage of companies with mature programs suggests the need for greater encouragement and support for organizations to implement concrete diversity and inclusion actions in the sector.

Table 52. Maturity of the diversity and inclusion program in agtechs.

Maturity of the diversity and inclusion program	%
No program: The organization has no initiatives in this regard.	77%
Program under development: The program exists, but needs improvement.	3%
Established program: The program works, but needs improvement.	1%
Early-stage program: There is a program, but it is still in the development phase.	18%
Mature program: The program is complete and effective.	2%

Sustainable Development Goals

The Sustainable Development Goals (SDGs) with greatest identification among agtechs continue to be Zero Hunger and Sustainable Agriculture (66.4%), Industry, Innovation and Infrastructure (52.5%) and Responsible Consumption and Production (51.8%), according to the 137 respondents. There was a change in the second and third positions compared to 2023, reflecting an increase in the importance attributed to innovation and infrastructure within the sector.

The SDG Zero Hunger and Sustainable Agriculture, the leader among agtechs, has seen continuous growth in recent years, rising from 59.4% in 2022 to 62.3% in 2023 and 66.4% in 2024. This data reinforces the commitment of agribusiness startups to food security and agricultural sustainability.

Industry, Innovation and Infrastructure grew from 44.2% in 2022 to 52.5% in 2024, highlighting the advance of agtechs in adopting emerging technologies and developing solutions aimed at modernizing the sector. Responsible Consumption and Production, which was in second place in 2023, fell slightly, from 54.4% to 51.8%. Even so, the SDG remains a priority, indicating the agtechs' concern with more sustainable practices and reducing the environmental impact of agricultural production.

Other SDGs that have seen significant growth include Action Against Global Climate Change (38.5%), which jumped from 27.9% in 2022 to 32.1% in 2023 and is now seeing a significant increase. The same is true of Decent Work and Economic Growth (36.4%), which rose from 28.8% last year to a higher level in 2024, reflecting startups' growing concern with valuing labor and creating jobs in the agribusiness sector.

Other SDGs that showed a significant increase were Sustainable Cities and Communities (27.9%), Life on Land (26.6%) and Partnerships and Means of Implementation (26.6%), all of which have grown since 2022.

The survey shows that, in addition to the objectives traditionally more associated with agribusiness, such as Zero Hunger and Sustainable Agriculture, there is a growing movement by agtechs towards innovation, sustainability and good social practices, reinforcing the importance of digitalization, infrastructure and environmental governance within the sector.

Table 53. Sustainable Development Goals (SDGs) and agtechs.

SDG	agtechs	2024%	2023%	2022%
Zero Hunger and Sustainable Agriculture	95	66,43%	62,30%	59,40%
Industry, Innovation and Infrastructure	75	52,45%	48,80%	44,20%
Responsible Consumption and Production	74	51,75%	54,40%	53,90%
Action Against Global Climate Change	55	38,46%	32,10%	27,90%
Decent Work and Economic Growth	52	36,36%	28,80%	30,90%
Sustainable Cities and Communities	40	27,97%	21,40%	18,20%
Life on Land	38	26,57%	19,10%	12,70%
Partnerships and Means of Implementation	38	26,57%	18,10%	14,50%
Health and well-being	32	22,38%	27,00%	23,00%
Eradicating Poverty	30	20,98%	15,30%	11,50%
Quality education	26	18,18%	11,20%	10,30%
Life below Water	24	16,78%	15,30%	11,50%
Reducing Inequalities	24	16,78%	15,30%	15,80%
Clean Water and Sanitation	23	16,08%	17,70%	15,80%
Clean and Affordable Energy	23	16,08%	13,00%	11,50%
Gender equality	18	12,59%	11,20%	13,90%
Peace, Justice and Strong Institutions	13	9,09%	3,30%	4,80%

Main challenges for the business

The main challenges for agtechs are diverse and range from difficulties in accessing capital and funding, especially in the early stages, to structural challenges in scaling the business and expanding its market share. Many startups point to the need for a change of mindset in the agricultural sector, highlighting barriers to the adoption of new technologies and the perceived value of the products and services offered by agtechs. Therefore, it is difficult for companies to demonstrate the benefits of their innovations to customers and investors.

Another critical point identified is the lack of qualified labor. Many agtechs report challenges in finding professionals with the level of training needed to operate and develop technological solutions in agribusiness. This becomes even more relevant when

the sector is moving towards greater digitalization and automation, with the growing use of Artificial Intelligence (AI), Machine Learning, IoT and remote sensing. The need for trained professionals to deal with these technologies is therefore becoming a significant bottleneck for the expansion and consolidation of startups.

In addition, regulatory instability and bureaucracy are obstacles for many companies, which face difficulties with certifications, regulatory deadlines and legal certainty. The lack of clarity about standards and tax incentives for the sector also has a direct impact on the growth of agtechs.

In the medium and long term, technological and market trends such as sustainability, traceability, regenerative agriculture and the advance of connectivity in the countryside should shape the sector. However, these advances depend on reducing structural barriers, such as internet access in rural areas, developing new public policies and strengthening integration between startups, large companies and research institutions.

Therefore, in order to strengthen the agtech ecosystem, it is essential to expand access to funding, encourage talent training programs, create more favorable regulatory environments and stimulate the adoption of new technologies in the agricultural sector.

Technological and market trends

The major technological and market trends pointed out by agtechs indicate an intensification in the use of advanced and disruptive technologies in the agricultural sector. Among the most mentioned are artificial intelligence (AI), the Internet of Things (IoT), automation, digitalization, machine learning, remote sensing and increased connectivity. These technologies are seen as essential for the modernization of agriculture, enabling greater production efficiency, real-time monitoring and waste reduction.

However, there are structural challenges that could hinder the adoption of these innovations in Brazil, creating a mismatch between the vision of agtechs and the reality of the market. Low telephone and internet coverage in the countryside and the slow implementation of the 5G network are significant barriers to the expansion of connectivity, which is essential for the effective application of IoT, self-monitoring and remote monitoring.

Another aspect that is gaining momentum as a trend is the adoption of sustainable technologies. Many agtechs indicate that bio-inputs, the circular economy and regenerative agricultural practices should be consolidated in the sector, driven by the demand for productivity combined sustainability. Traceability and reducing environmental impact also appear as critical factors, influencing market and regulatory requirements.

Therefore, although cutting-edge technologies seen as the future of agriculture, infrastructure and access to connectivity are still challenges that need to be overcome if this transformation is to take place in a comprehensive and effective manner. In addition, the advance of sustainable technologies reinforces the need for strategies aimed at responsible innovation in line with the new environmental and social demands of agribusiness.

Desired improvements in the agtech ecosystem

As for what could be improved in the agtech ecosystem, the main focus is on access to funding, both private and public. The sector's startups point out that the role of the state is fundamental to boosting the ecosystem, and that more funding is needed through incentive policies, government subsidies and improving the efficiency of public services aimed at innovation and agribusiness. The creation of more accessible credit lines and structured development programs is seen as an essential factor in enabling the growth and consolidation of these companies.

In addition to the need for financial resources, agtechs point out that, despite the existence of various innovation environments in Brazil, the connection between the different players in the ecosystem still needs to be strengthened. The lack of integration between startups, large companies, investors and research institutions limits opportunities for collaboration and mutual growth. Another important point raised by the startups is the need for demonstration events.

These are especially critical challenges for early-stage agtechs. The lack of accessible experimental fields hinders the development and scalability of new solutions. Professional training in complex and strategic topics for entrepreneurship is also an aspect that could be further explored, allowing startups to be better prepared to face the challenges of the market.

Therefore, the main opportunities for improving the agtech ecosystem include facilitating access to funding, strengthening the connection between players in the sector, creating spaces for technological validation and investing in training specialized talent. These actions are fundamental to accelerating innovation and making Brazil an even more competitive and attractive environment for the development of new agribusiness solutions.

Innovation environments and ecosystems with governance

- Aurelio Martins Favarin, Martha Delphino Bambini, Gustavo Ungari, Daniela Ferraz Bacconi Campeche and Luiz Ojima Sakuda

This chapter focuses on presenting the analysis of data from four types of innovation-promoting environments, referred to as innovation environments, existing in Brazil (accelerators, hubs, incubators and technology parks), as well as Brazilian regional innovation ecosystems and their governance actions⁶.

We understand innovation governance as a structuring element of an innovation ecosystem, referring to structures, processes and practices that guide the management of innovation in organizations and also between organizations.

According to academic literature, innovation governance can be defined as a set of mechanisms that ensure that innovative activities are aligned with the organization's strategic objectives, promoting the efficiency, effectiveness and sustainability of innovative initiatives.

The so-called "relational governance" involves formal and informal relationships to connect players, maintain collaborations between organizations and promote the evolution of ecosystems. It also involves a mechanism centered on interactions and social relations in economic activities, based on the identification of complementarities, formal or tacit norms, trust and reciprocity⁷. The players can have different roles in this context, acting as focal points steering themes and areas of action or as orchestrators that foster relationships between the players, promoting connections.

In this chapter, we look in particular at the role of innovation environments as mechanisms for generating new ventures. They can be defined as arrangements or players that foster and support the birth and development of innovative ventures, such as technology-based startups. These nascent companies, based on technological differentials for solving social and environmental problems or challenges, are known as startups.

Figure 16 is a general representation of the players involved in an agricultural innovation ecosystem, taking into account four dimensions: knowledge, economic (businesses, producers and fostering entrepreneurship) and social (civil society and consumers). The dynamic interaction between these different dimensions, based on the players that make them up and the identification of synergies, collaborations and interdependencies, is what generates value for the agri-food sector through an evolutionary and multifaceted process.

⁶ The concepts and definitions of innovation ecosystems, venture generation mechanisms, innovation-promoting environments and innovation environments are presented in the subsection "Global connection as an innovation strategy: the potential of innovation-promoting environments".

⁷ Liu, B., Shao, Y. F., Liu, G., & Ni, D. (2022). An evolutionary analysis of relational governance in an innovation ecosystem. Sage Open, 12(2), 21582440221093044.

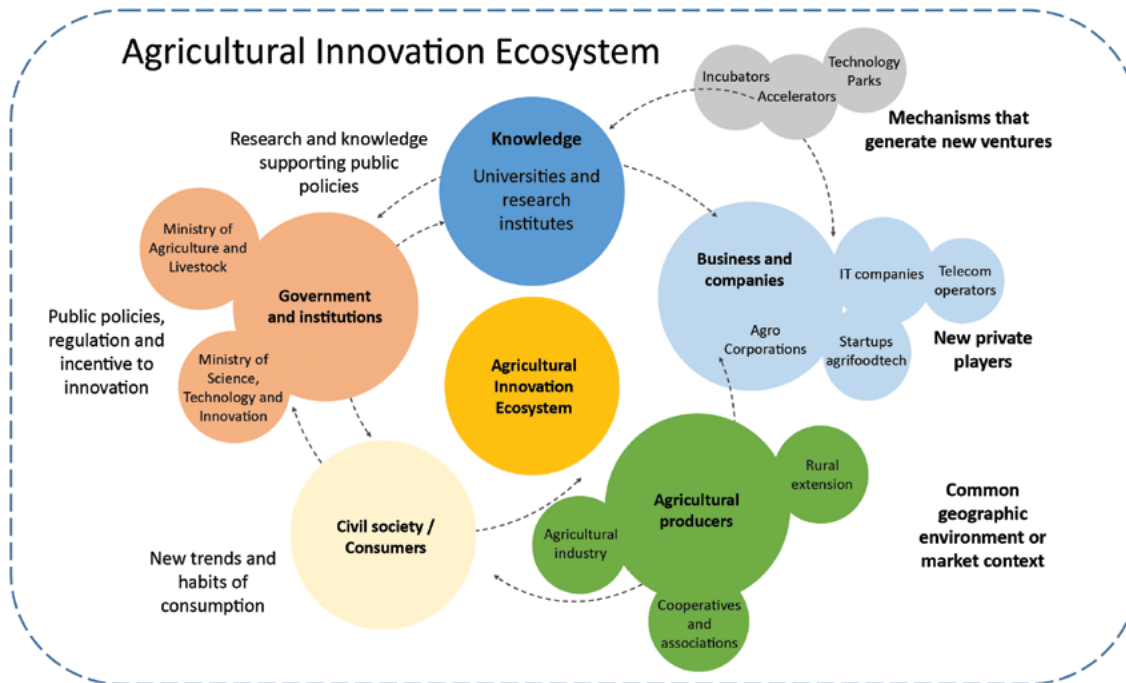


Figure 16. Brazilian agricultural innovation ecosystem: dimensions and players (adapted from Bambini, 2021).

Figure 17 highlights the players involved in the mechanisms that generate new ventures and their interactions with the different dimensions and categories of players. Inserted in the “Business” dimension of the innovation ecosystem, these players are mostly characterized as innovation environments.

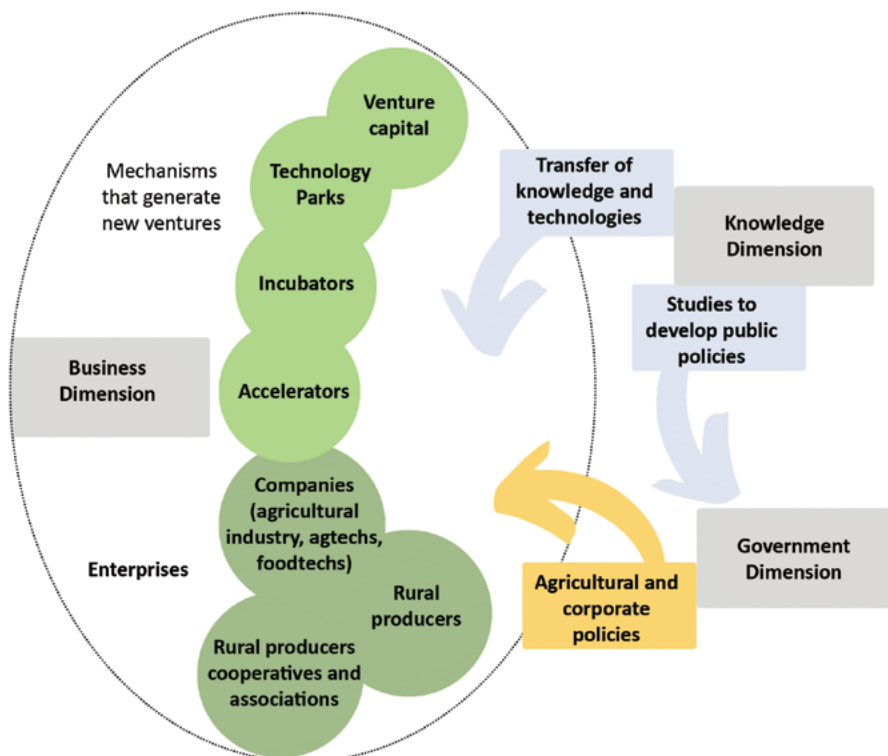


Figure 17. Mechanisms that generate new ventures and their interactions (adapted from Bambini, 2021).

These interfaces and relationships between the business and knowledge dimensions show that the different types of innovation environments have complementary functions. Therefore, the maturity and strength of an innovation ecosystem is directly related to the presence of different innovation environments, creating the necessary conditions for the development of new ventures and solutions, as well as for business generation.

In the scope of this report, one of the analyses refers to the participation of innovation environments in the governance of the ecosystems in which they operate, in order to emphasize the presence and importance of governance for achieving impactful results through action, relationships and evolution in the context of agricultural innovation ecosystems.

There is a synergistic interaction between different players in a given context. Different geographical scales can be considered to study and represent innovation ecosystems, from cities, regions, countries, up to a global approach.

In this context, two studies (Startup Blink, 2024; Startup Genome, 2022) were analyzed to understand the position of different countries, regions and cities in order to comprehend the geographical differences, both in the context of innovation in general and in the Agtech/ Agrifodtech segment. These studies use dozens of criteria to assess the maturity, strength and concrete results generated by innovation ecosystems, at different scales and in the various areas analyzed.

The StartupBlink report, published in 2024, analyzes an innovation ecosystem on a national scale, with regional and/or municipal sections, classifying them on various criteria. The main national ecosystems are ranked as follows: United States, United Kingdom, Israel, Canada, Singapore, Sweden, Germany, France, The Netherlands and Switzerland. Brazil has been in 27th place for the second year and maintains its leading position among countries in the Latin American and Caribbean region.

In the regional/municipal analysis, the following stand out: San Francisco (United States), New York (United States) London (in the United Kingdom), Los Angeles (United States), Boston (United States), Beijing and Shanghai (in the Republic of China), Bangalore (in India) and Tel-Aviv (in Israel). The São Paulo ecosystem is ranked in 23rd position, standing out globally in the areas of fintech, e-commerce and retail, transportation and foodtech. Still on the scale of specific cities or regions within the countries, with a focus on performance in Latin America and the Caribbean, of the top 20 ecosystems, 6 are in Brazil: São Paulo, Curitiba, Rio de Janeiro, Belo Horizonte, Porto Alegre and Florianópolis (StartupBlink, 2024).

The Startup Genome report published in 2022 looked specifically at entrepreneurship in the agri-food sector, also considering municipal and/or regional scales in the context of various countries. In the study in question, the best-rated ecosystem is Silicon Valley, followed by the ecosystems of New York, London, Tel-Aviv, Denver, Los Angeles, Boston, Beijing, Vancouver and Research Triangle (North Carolina). São Paulo is 18th in this ranking.

It is important to note that national, local, regional and sectoral incentives influence the development, level of maturity, attraction of players, and, above all, venture capitalists. Innovation environments play a central role in this development.

In the case of the agri-food sector, a number of new local and regional ecosystems are being developed and created in Brazil. This chapter presents a map of innovation environments that are somehow related to agtech and foodtech entrepreneurship or to these industries.

Mapping innovation environments, ecosystems and governance networks

A total of 451 players were identified, including innovation environments (accelerators, hubs, incubators and technology parks) and governance networks. For the 2024 edition, the Radar Agtech editorial team has chosen to present the data in this way because it believes that it is important for the reader to have knowledge of regional realities, understanding the players who help create new ventures and act in governance.

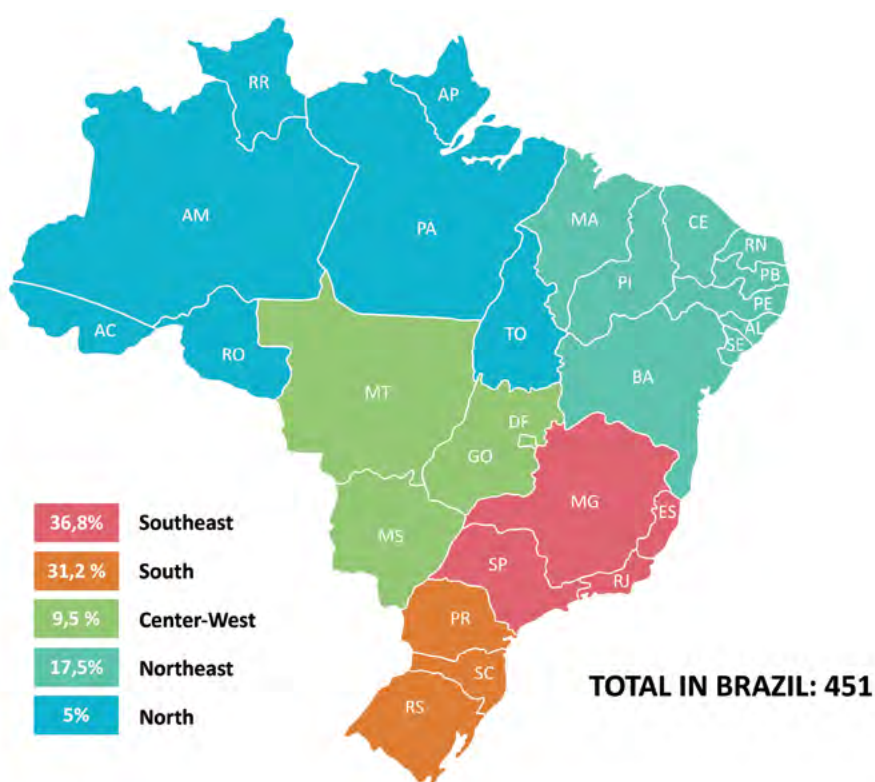


Figure 18. Innovation environments and ecosystems by Brazilian region.

As in the previous edition, the Southeast region has the highest concentration of innovation environments and ecosystems (36.8%), followed by the South (31.2%). The Northeast is in third place (17.5%), with the Center-West in fourth place (9.5%) and the North in fifth (5%).

However, compared to other regions, the Southeast is not always the region with the largest number of players. For example, the South has the largest number of technology parks, incubators and accelerators. The Northeast also has more incubators than the Southeast. Remarkably, the Southeast has the greatest balance in terms of the number of different types of players, which probably makes it a stronger ecosystem, due to the complementarities.

It has not yet been possible to see an increase in the number of environments and ecosystems in the north of the country due to events such as COP 30, which will take place in November 2025 in Belém/PA. There might be an increase in the next edition of Radar and it will probably be necessary for the event to be an opportunity for the development of the region's innovation ecosystem, attracting new players.

Southeast Region

SOUTHEAST (166)

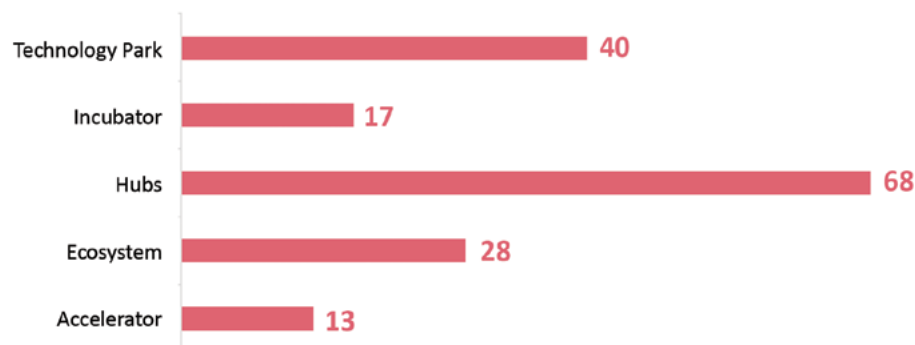


Figure 19. Innovation environments and ecosystems in the Southeast

The Southeast region includes the states of São Paulo, Rio de Janeiro, Minas Gerais and Espírito Santo. As in previous editions, it shows a great number of innovation environments and ecosystems, making it a major hub for agri-food innovation in Brazil.

Analyzing the data by state, it is clear that the state of São Paulo is mainly responsible for the data associated with the Southeast, with a greater balance between São Paulo and Minas Gerais in terms of the number of ecosystems with governance. In fact, Minas Gerais is the state with the second highest number of players in the Southeast.

Southern Region

South (141)

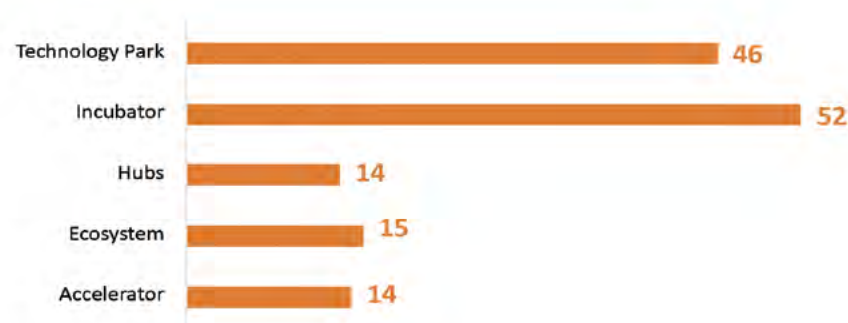


Figure 20. Innovation environments and ecosystems in the South

The Southern region comprises the states of Paraná, Santa Catarina and Rio Grande do Sul. As in the previous edition, in absolute numbers, the region comes second in the sum of the number of innovation environments and ecosystems with governance. However, it stands out nationally in terms of the number of technology parks, incubators and accelerators.

There is a fairly even balance within the region in terms of the number of players, but the states of Rio Grande do Sul and Paraná stand out the most. It is interesting to note that the states

of Paraná and Santa Catarina have several players in the countryside, while in Rio Grande do Sul the players are mostly concentrated in the capital.

Center-West Region

CENTER-WEST (43)

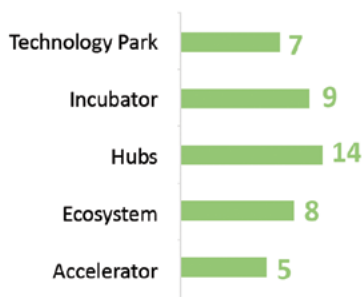


Figure 21. Innovation environments and ecosystems in the Center-West

The Center-West region includes the states of Mato Grosso, Mato Grosso do Sul, Goiás, and Distrito Federal. Despite appearing in second-to-last place in terms of the absolute number of innovation environments and ecosystems with governance, it is important to bear in mind that this is the least populous region in Brazil and that, with the exception of a technology park in Mato Grosso do Sul, all the states in the region, plus the Distrito Federal, had at least one player in each category.

It is also important to note that there is a fairly even spread of players by region, with GO and DF standing out slightly, probably due to their central position in the country and their proximity to the federal government. Considering the voluminous production of the agri-food sector in the states of the Center-West region, there seems to be significant potential for the installation of new innovation environments and the establishment of ecosystem governance.

Northeast Region

NORTHEAST (79)

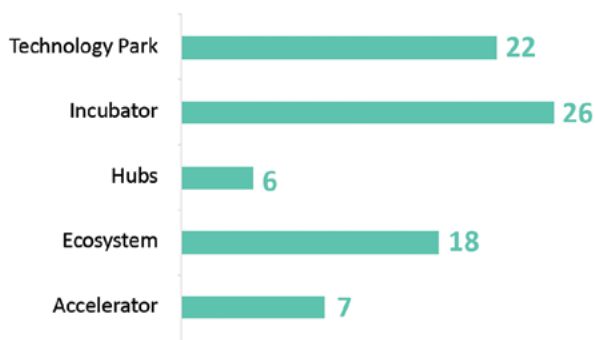


Figure 22. Innovation environments and ecosystems in the Northeast

The Northeast is the region with the largest number of states, comprising Alagoas, Bahia, Ceará, Maranhão, Paraíba, Piauí, Pernambuco, Rio Grande do Norte and Sergipe. It has a considerable number of technology parks, incubators and ecosystems with governance, but given the size of the region, the number of hubs and accelerators is quite small.

The states of Ceará and Bahia are most prominent, followed by Pernambuco. Considering the dispersion and the importance of complementarity between the different types of innovation environments, there is a great opportunity in setting up new environments and governance of innovation ecosystems, especially with the creation of accelerators and hubs.

Northern Region

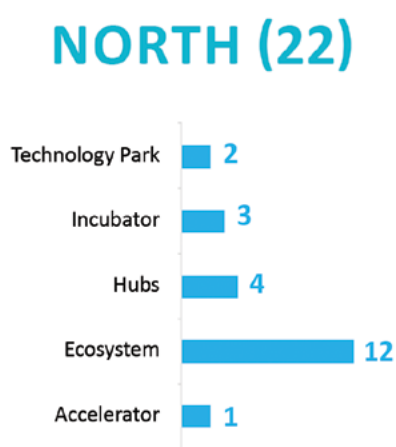


Figure 23. Innovation environments and ecosystems in the North

The North is the second largest region in terms of number of states, comprising Acre, Amapá, Amazonas, Pará, Rondônia, Roraima and Tocantins, but only the fourth largest in terms of number of inhabitants. It has specific characteristics, considering its potential in terms of biodiversity, but also with significant logistical obstacles.

Of the states in the region, only Pará has at least one player in each category. Due to logistical difficulties, the distance between environments appears to be a limiting factor for the potential to be exploited, with international recognition for the territory of the Legal Amazon. It is hoped that new players will realize the existing potential and become part of the region in the near future.

Deepening the analysis: survey of Innovation Environments

The **Radar Agtech Survey Environments 2024** presents a comprehensive overview of innovation environments in the agri-food sector, highlighting the diversity and evolution of startups operating in this ecosystem. Based on the responses of 26 organizations, the survey analyzes key aspects such as year of foundation, location, infrastructure, support for startups, diversity, inclusion and alignment with the Sustainable Development Goals (SDGs).

The survey highlights emerging technological trends, challenges faced by startups and opportunities to strengthen the industry. In addition, the data collected offers strategic insights for formulating public policies, attracting investment and expanding collaboration between startups, companies, academic institutions and governments. By mapping the evolution of the agri-food innovation ecosystem, the study aims to contribute to the sustainable and competitive development of Brazilian agribusiness.

Organizational Profile

The question about the year of establishment had 26 respondents. It is noted that 31% of innovation environments were established by 2016, while more recent years, such as 2022 and 2024, have shown notable growth, with 12% each. This shows the renewal and continuous growth of the sector.

Table 54. Year of establishment of innovation environments

Year of establishment	N	%
Until 2016	8	31%
2017	2	8%
2018	2	8%
2019	1	4%
2020	5	19%
2021	1	4%
2022	3	12%
2023	1	4%
2024	3	12%
Grand Total	26	100%

Geographical distribution

The geographical distribution of innovation environments was also analyzed based on the responses of 26 organizations, considering where the companies are based. São Paulo leads with 42.31% of innovation environments, followed by Minas Gerais, with 15.38%, and Paraná, with 11.54%. The survey covers several strategic cities for the agri-food sector.

Table 55. Distribution of innovation environments by state

Federative Unit	N	%
SP	11	42,31%
MG	4	15,38%
PR	3	11,54%
RS	2	7,69%
BA, MT, PA, PE, RJ, SC	1 each	3.85% each

The cities mentioned as venues were: Belo Horizonte, Benevides, Campinas, Cascavel, Chapecó, Cruz Alta, Cuiabá, Jaboticabal, Londrina, Luís Eduardo Magalhães, Paraguaçu, Piracicaba, Ponta Grossa, Recife, Registro, Rio de Janeiro, São José do Rio Preto, São José dos Campos (3x), São Manuel, São Paulo (2x), Sertãozinho, Uruguaiana, Varginha and Viçosa.

Operation by Category

The survey had 24 respondents who indicated the categories in which startups operate. The most prominent areas include system integration platforms (70.83%), remote sensing (70.83%) and telemetry and automation (70.83%). There is also a strong presence in biological control (62.50%) and the Internet of Things applied to agriculture (62.50%), demonstrating the diversity of technological solutions for the agri-food sector.

Table 56. Performance of innovation environments by category

Segment - Category	N	%
Inside - Systems, solutions and data integration platform.	17	70,83%
Inside - Remote Sensing, Diagnostics and Image Monitoring.	17	70,83%
Inside - Telemetry and Automation.	17	70,83%
Inside - Drones, Machinery and Equipment.	16	66,67%
Before - Fertilizers, Inoculants and Plant Nutrition.	15	62,50%
Inside - Biological Control and Integrated Pest Management.	15	62,50%
Inside - Internet of Things for Agriculture: detecting pests, soil, climate and irrigation.	15	62,50%
Inside - Connectivity and Telecommunications.	15	62,50%
After - Bioenergy and Renewable Energy.	15	62,50%
Inside - Meteorology, Irrigation and Water Management.	14	58,33%
Before - Seeds, Seedlings and Plant Genomics.	13	54,17%
After - Biodiversity and Sustainability.	13	54,17%

Continued

Segment - Category	N	%
Before - Animal Nutrition and Health.	12	50,00%
Inside - Rural Property Management System.	11	45,83%
Inside - Content, Education, Social Media.	11	45,83%
After - Innovative foods and new trends.	11	45,83%
Before - Credit, barter, insurance, carbon credits and fiduciary analysis.	10	41,67%
Before - Laboratory analysis.	10	41,67%
Inside - Agricultural waste management.	10	41,67%
After - Storage, Infrastructure and Logistics.	10	41,67%
Before - Agribusiness Input Marketplace.	9	37,50%
After - Food safety and traceability.	9	37,50%
After - Marketplaces and platforms for trading and selling agricultural products.	9	37,50%
After - Packaging, environmental and recycling systems.	9	37,50%
Before - Genomics and Animal Reproduction.	8	33,33%
Inside - Beekeeping and Pollination.	8	33,33%
Inside - Sharing economy.	8	33,33%
After - Food industry and processing 4.0.	8	33,33%
After - Urban planting: plant factories and new ways of planting.	6	25,00%
After - Online grocery store.	5	20,83%
After - Online restaurants and meal kits.	4	16,67%
After - Autonomous management system for stores and food services.	4	16,67%
After - Cloud cooking and ghost cooking.	3	12,50%

Performance by production chain

The survey had 26 respondents who indicated the production chains in which they operate. Cattle lead the way with a 53.85% share, followed by pigs, soybeans and corn, each with 50%. The diversity of production shows the breadth of innovation in agribusiness.

What are the production chains in which the startups related to your organization operate?
– 26 respondents

Table 57. Areas of operation of startups connected to innovation environments

Chains	N	%
Cattle (Oxen and Cows)	14	53,85%
Pigs, Soybeans and Corn	13 each	50,00%
Sugarcane	12	46,15%
Chickens, Fish, Forestry, Rice, Wheat	11 each	42,31%
Other Animals	10	38,46%
Coffee	10	38,46%
Horticulture	9	34,62%
Orange	8	30,77%
Cassava and Cotton	7 each	26,92%
Banana	6	23,08%
Other Grains	9	34,62%
Other Fruits	8	30,77%
Other Vegetables	10	38,46%

Among the answers regarding other animals and plants, it is possible to observe a great diversity since, with the exception of shrimp, there was no repetition in the answers. The respondents indicated: traditional crops (such as yam), canola, shrimp, sorghum, oats, fodder, chicken, bees, hops, horses, algae, ornamental plants and palm hearts.

Types of Innovation Environment

Among the 22 respondents, self-identification with the types of venture generation mechanisms and innovation ecosystems varied considerably. The distribution of responses shows that the majority of participants identify with multiple venture generation mechanisms, with 6 respondents indicating only one category, while 5 mentioned two, 2 chose three, 5 identified with four categories and 4 indicated five or more categories, showing a diversified and integrated innovation ecosystem.

The majority of organizations (54.55%) are associated with innovation areas, while 45.45% mentioned the use of open spaces for cooperative work or coworking. Innovation centers were highlighted by 36.36% of respondents, followed by business incubators, business accelerators and venture generation spaces, each with 31.82%. In addition, 18.18% of the organizations said they were linked to technology parks and innovation promotion arrangements. Smart cities, technology hubs and other alternative categories were mentioned by 13.64% of the participants. Only one respondent indicated the use of open product and process prototyping laboratories (makerspaces), while no innovation districts were mentioned. This data demonstrates the diversity of

structures and supports used to boost startups in the sector, highlighting the importance of collaborative environments and specialized centers to foster growth and innovation.

Table 58. Respondents' types of innovation environments

Types	N	%
Areas of innovation	12	54,55%
Open spaces for cooperative work or coworking	10	45,45%
Innovation Centers	8	36,36%
Business incubator	7	31,82%
Business accelerators	7	31,82%
Spaces for generating business	7	31,82%
Technology parks	4	18,18%
Innovation Promotion Arrangement	4	18,18%
Smart cities	3	13,64%
Technology Center	3	13,64%
Other	3	13,64%
Open product and process prototyping labs (makerspaces)	1	4,55%
Innovation districts	0	0,00%

Other mechanisms for generating ventures and innovation ecosystems that the organizations identified with were: Innovation Hub, Venture Builder, Startup Studio and Innovation Ecosystem.

Environments that participate in the governance of regional ecosystems

The answers to the question about participation in the governance of regional ecosystems or broader national or international networks show that various environments are part of these networks at different scales, in line with the development of innovation ecosystems focused on agribusiness and technology.

At the regional level, initiatives such as Iguassu Valley, AgroValley, Desbravalley and RIAGRO-RS stand out, promoting collaboration between companies, startups and academic institutions to boost local innovation. There is also mention of the emerging governance of the Jaboticabal Local Productive Arrangement (APL), demonstrating efforts to structure innovative networks in developing regions.

At the national level, the presence in networks such as InovAtiva, Corredor Agro, AgriHub and ANPROTEC suggests a commitment to the dissemination of good practices and the integration startups and innovative ventures. Participation in MAPA's Agrodigital Innovation Thematic Chamber (CTIAD) underscores involvement with public policies and guidelines for innovation in the agri-food sector.

At the international level, the International Association of Science Parks (IASP) and ENRICH demonstrate a connection with global innovation ecosystems.

This diversity of networks and governance strengthens regional development, the exchange of knowledge and the attraction of investment for technological solutions in the agri-food sector.

Infrastructure and resources offered

The survey on infrastructure and resources had different numbers of respondents depending on the item analyzed. For example, 22 respondents indicated that 77.27% of the organizations offer innovative services or products. In addition, 66.67% of the 21 organizations consulted offer high-speed internet connection, an essential resource for the connectivity and efficiency of startups.

Table 59. Infrastructure and resources of innovation environments

Infrastructure and resources	I currently offer	I don't offer, but I intend to	I don't offer, and I don't plan to	I used to offer, but not anymore	Not applicable	Respondents
Coworking spaces	9	4	1	0	5	19
	47,37%	21,05%	5,26%	0,00%	26,32%	100%
Implementation of a pilot project	13	5	1	0	2	21
	61,90%	23,81%	4,76%	0,00%	9,52%	100%
Resources for R&D and Prototyping	11	5	3	0	3	22
	50,00%	22,73%	13,64%	0,00%	13,64%	100%
Co-development of the solution	15	2	3	0	2	22
	68,18%	9,09%	13,64%	0,00%	9,09%	100%
Corporate purchasing	2	4	8	0	5	19
	10,53%	21,05%	42,11%	0,00%	26,32%	100%
Laboratories and specialized equipment	6	5	5	0	3	19
	31,58%	26,32%	26,32%	0,00%	15,79%	100%
Experimental growing areas	10	4	3	0	3	20
	50,00%	20,00%	15,00%	0,00%	15,00%	100%
Intellectual Property Licensing	5	2	6	0	5	18
	27,78%	11,11%	33,33%	0,00%	27,78%	100%
Providing an innovative service or product	17	4	1	0	0	22
	77,27%	18,18%	4,55%	0,00%	0,00%	100%
Service and technology vouchers	9	2	5	0	4	20
	45,00%	10,00%	25,00%	0,00%	20,00%	100%
High-speed Internet connection and Wi-Fi networks	14	2	1	0	4	21
	66,67%	9,52%	4,76%	0,00%	19,05%	100%

Continued

Infrastructure and resources	I currently offer	I don't offer, but I intend to	I don't offer, and I don't plan to	I used to offer, but not anymore	Not applicable	Respondents
Specialized libraries and database (scientific bibliography, patents, market data, climate data, market information, etc.)	11	4	3	0	3	21
	52,38%	19,05%	14,29%	0,00%	14,29%	100%
Specialized software (proprietary software, data analysis, modeling, development platform, etc.)	8	7	4	0	1	20
	40,00%	35,00%	20,00%	0,00%	5,00%	100%

The answers collected reveal services aimed at innovation, sustainability and socio-economic inclusion. From these results, three main axes emerge: socio-biodiversity of the bioeconomy, biotechnology and information and communication technology (ICT) applied to agriculture.

- The socio-biodiversity of the bioeconomy highlights the value of sustainable practices and fair trade, benefiting vulnerable populations. Examples such as bio-jewelry, ecological fashion and essential oils point to opportunities for strengthening the local economy with a positive environmental impact.
- In biotechnology, the emphasis is on improving agricultural productivity through breeding, genetic selection and the exchange of organic and creole seeds. These practices boost the resilience of family farming and food security.
- ICTs applied to agriculture suggest improvements in communication and management, including technical support for traditional communities and digital systems for agricultural tracking and monitoring. The implementation of these technologies can increase efficiency and safety in the field.

In addition, programs such as a joint purchasing center and a personalized incubation program were mentioned. These actions indicate the search for innovation and cooperation. Overall, the responses reflect the need to integrate technology, sustainability and social development in the agricultural sector.

The responses highlight the relevance of the services offered, especially in strengthening agribusiness and rural education. The Coopavel Rural Show is seen as an opportunity for visibility for producers and companies, reinforcing its importance in the co-connection between innovation, technology and agribusiness.

The Benevides-PA Rural Family House (CFR) project takes a socio-educational approach to training young rural people, combining secondary education and technical training in a hybrid and alternative model. The proposal seeks not only formal education, but also to keep young people in the countryside, promoting sustainability and local development.

The emphasis on biotechnology and the bioeconomy through partnerships with Embrapa shows alignment with the modernization of family farming. The use of Information and Communication Technology (ICT) as a tool for integrating and disseminating knowledge among minority communities also reinforces digital inclusion and the appreciation of traditional knowledge.

Overall, the comments show an effort to balance innovation, sustainability and social impact, promoting a development model that combines technology, education and valuing rural communities.

Origin of the assisted Startups

The question about the origin of the assisted startups had 20 respondents, and revealed that the majority of the startups assisted by the organizations are of regional origin, representing 80% of the responses. In addition, 75% of the organizations support startups from different parts of Brazil, demonstrating a significant national reach. Half of the respondents indicated that they also work with startups located within their own federative unit, as well as those coming from other countries but already operating in Brazil. Finally, 30% of the organizations reported they provide assistance to foreign startups with international operations, showing the connection between these initiatives and the global market and the diversification of the innovation ecosystem they serve.

What is the origin of the assisted startups? 20 respondents

Table 60. Origin of assisted startups by innovation environments

Origin of assisted startups	N	%
Startups in the region	16	80,0%
Startups from all over Brazil	15	75,0%
Startups from the Federative Unit	10	50,0%
Startups from other countries operating in Brazil	10	50,0%
Startups from other countries with international operations	6	30,0%

The question about the number of startups assisted by the organization had 14 respondents, which revealed a great diversity in the way organizations provide services to startups. The number of startups currently being assisted varies between 4 and 144, while the total number served or graduated over time varies between 4 and 450, demonstrating different levels of maturity and support capacity between innovation environments. The current capacity of these organizations also varies widely, ranging from 6 to 144 startups. In total, the participant organizations currently provide services to 425 startups, have graduated 1,099 and have a combined capacity of 445. On average, each innovation environment serves 30 startups, has served or graduated 79 and has the capacity to support 32 startups simultaneously, reflecting the robustness and dynamism of the ecosystem analyzed.

Table 61. Number of startups assisted by innovation environments

	In attendance	Assisted / graduated	Current capacity
Startups	425	1099	445
Average per environment	30	79	32

Innovation environment sectors

The question about the sector of the organizations had 23 respondents and revealed that the vast majority, 73.91%, belong to the private sector, demonstrating the strong presence of private initiative in the innovation ecosystem analyzed. On the other hand, public sector and third sector organizations each represent 13.04% of respondents, indicating a smaller but still relevant participation of these institutions in the support and development of startups. This data shows that although the private sector is the main driver of initiatives, there are also significant contributions from public and third sector entities in building and strengthening the innovation environment.

Table 62. Innovation environment sectors

Sector		
Public	3	13,04%
Private	17	73,91%
Third Sector	3	13,04%

Sources of funds

The question about the organizations' sources of funding had 20 respondents and revealed diversity in the means of funding used. The main source was support from companies and corporations, mentioned by 40% of the participants, followed by federal, state and municipal governments, which contribute 30% of the organizations. In addition, 25% of the organizations obtain funding through startups, while 20% receive support from development agencies, angel investors and universities or research institutions. Venture capital funds are an option for 15% of the organizations, while 10% rely on resources from Sistema S and Non-Governmental Organizations (NGOs). Sectoral funds and corporate venture capital were cited by 5% of respondents each. In addition to these specific sources, 45% of the organizations indicated other ways of raising funds. The survey also showed that there is a variation in the diversification of these sources, with 9 organizations depending on just one source of funding, 4 using two sources, 3 combining three sources and 4 relying on four or more, showing different funding strategies within the innovation ecosystem.

Table 63. Sources of funds

Sources of funds	n	%
Federal, state and municipal governments	6	30,00%
S System	2	10,00%
Development agencies	4	20,00%
Sector funds	1	5,00%
Companies/Corporations	8	40,00%
Angel investors	4	20,00%
Venture capital funds	3	15,00%
Corporate venture capital	1	5,00%
Startups	5	25,00%
Universities and research institutions	4	20,00%
Non-governmental organizations (NGOs)	2	10,00%
Others	9	45,00%

The responses indicate a wide range of funding sources and fundraising models, highlighting the diversity of strategies used to make the projects and initiatives mentioned viable.

Many of the initiatives are financed by private investors and SCP models, as in the case of funds aimed at developing AgriTechs. Other projects rely on their own sources, such as corporate innovation companies that generate revenue by selling plans to other companies.

There is also a strong presence of institutional and governmental partnerships, with support from entities such as FINEP, FAPESP, ABDI, SEBRAE and the S System (*Sistema S*), as well as resources from universities and academic foundations.

Non-profit projects, such as those focused on family farming, seek funding through private donations and sponsorships, such as the adoption system, in which companies fund scholarships. In addition, some companies work with emerging technologies, including IoT, artificial intelligence and cybersecurity, showing the market is focused on digital innovation and systems integration. The diversity of sources shows a dynamic ecosystem, combining private, institutional and public investments to promote sustainable and technological development.

Alignment with the Sustainable Development Goals (SDGs)

The question about the alignment of organizations with the UN Sustainable Development Goals (SDGs) had 18 respondents and revealed a strong commitment to sustainability and innovation.

Among the participants, 15 organizations (83.33%) highlighted their alignment with the SDG on Industry, Innovation and Infrastructure, followed by 72.22% who pointed to initiatives aimed at Action against Global Climate Change. In addition, 66.67% of the organizations said they were working towards SDG Zero Hunger and Sustainable Agriculture, while 61.11% mentioned commitments to Clean and Affordable Energy, Decent Work and Economic Growth,

as well as Responsible Consumption and Production. Other objectives such as Health and Well-being, Sustainable Cities and Communities were cited by half of the respondents, while 44.44% indicated action focused on Gender Equality, Clean Water and Sanitation and Partnerships and Means of Implementation. The survey also pointed out the diversity of engagement with the SDGs, with one respondent selecting only one SDG, two selecting three SDGs, two indicating four SDGs, two marking five SDGs, three selecting six SDGs, three organizations identifying work on 7 to 10 SDGs and five reporting alignment with 12 to 17 goals. These results show different levels of commitment to the global sustainable development agenda, ranging from more focused initiatives to broad and integrated approaches.

Table 64. Alignment of agribusiness innovation environments with the SDGs

Alignment with the SDGs	Environments	%
Industry, innovation and infrastructure	15	83,33%
Action against global climate change	13	72,22%
Zero hunger and sustainable agriculture	12	66,67%
Clean and Affordable Energy	11	61,11%
Decent work and economic growth	11	61,11%
Responsible consumption and production	11	61,11%
Health and well-being	9	50,00%
Sustainable cities and communities	9	50,00%
Gender equality	8	44,44%
Clean water and sanitation	8	44,44%
Partnerships and means of implementation	8	44,44%
Quality education	7	38,89%
Life under water	7	38,89%
Reducing inequalities	6	33,33%
Life on Land	6	33,33%
Eradicating poverty	5	27,78%
Peace, justice and effective institutions	4	22,22%

Talent and Diversity

The question about the number of people leading the organizations had 16 respondents and revealed the distribution of leaders by gender and area of activity. In the Administrative and Financial sector, men represent a total of 25 directors, with an average of 1.6 per organization, while women account for 24, with an average of 1.5. In the Production and Operations area, there is a male predominance, with 41 directors and an average of 2.6 per organization, while women occupy 14 positions, with an average of 0.9. In the Research and Development sector,

there are 18 male directors (average of 1.1) and 9 female directors (average of 0.6). In Marketing and Sales, there are 16 male directors (average of 1.0), 12 women (average of 0.8) and one non-binary person (average of 0.1). In other areas, only 4 men hold management positions, with no representation of women or non-binary people. In total, there 164 people in the management of these organizations, 104 of whom were men (63.41%), 59 women (35.98%) and 1 non-binary person (0.61%), reflecting the predominance of men in most sectors, although there is a significant female presence in some areas.

Table 65. Diversity by area of activity

Area	Gender	Total	Average
Administration and Finance	Homens	25	1,6
	Mulheres	24	1,5
	Não-Binárias	0	0,0
Production and Operations	Homens	41	2,6
	Mulheres	14	0,9
	Não-Binárias	0	0,0
Research and Development	Homens	18	1,1
	Mulheres	9	0,6
	Não-Binárias	0	0,0
Marketing and Sales	Homens	16	1,0
	Mulheres	12	0,8
	Não-Binárias	1	0,1
Other areas	Homens	4	0,3
	Mulheres	0	0,0
	Não-Binárias	0	0,0
TOTAL	Homens	104	6,5
	Mulheres	59	3,7
	Não-Binárias	1	0,1
TOTAL		164	10,25

Table 66. 12 respondents

Area	Gender	Total	
Administration and Finance	Men	1	0,1
	Women	13	1,1
	Non- binary	0	-
Production and Operations	Men	13	1,1
	Women	9	0,8
	Non- binary	0	-
Research and Development	Men	16	1,3
	Women	5	0,4
	Non- binary	0	-
Marketing and Sales	Men	8	0,7
	Women	9	0,8
	Non- binary	0	-
Other areas of the business	Men	1	0,1
	Women	2	0,2
	Non- binary	0	-
TOTAL		77	6,4

Diversity, Equality and Inclusion

The question about the presence of LGBTQIA+ people in the organization had 18 respondents. Of these, 38.89% said they knew people belonging to this community within the company, while 50% said they didn't and 11.11% said they were not aware.

Table 67. Awareness regarding LGBTQIA+ people in the organization (agtechs)

Are you aware of the existence of LGBTQIA+ people in the organization? 18 respondents		
Yes	7	38,89%
No	9	50,00%
I don't know	2	11,11%

The question about diversity in the work environment, considering the presence of people who are black, brown, indigenous, disabled, neurodiverse, foreign, refugee, trans and/or over-50, had 19 respondents. The majority, 78.95%, indicated that there is diversity in the business, while 21.05% said that there is no presence of these groups.

Table 68. People who are black, brown, indigenous, disabled, neurodiverse, foreigners, refugees, trans and/or over 50 in the business

Are there any people who are black, brown, indigenous, disabled, neurodiverse, foreign, refugee, trans and/or over 50 in your business? 19 respondents		
Yes	15	78,95%
No	4	21,05%

The question about the distribution of demographic characteristics between different positions in the company had 9 respondents. The data shows 23 black or brown female collaborators, followed by male directors over 50 (16) and black or brown male collaborators (13). In addition, there are 9 male collaborators over the age of 50, 5 black or brown female directors, 4 foreign male directors, 3 neurodiverse male directors, and only 1 foreign female director and 1 female director over the age of 50.

Table 69. Diversity in different positions in the organization

Features	Position	n
Black or brown	Female collaborators	23
Over 50 years old	Male directors	16
Black or brown	Male collaborators	13
Over 50 years old	Male collaborators	9
Black or brown	Female Directors	5
Foreigner	Male directors	4
Neurodiverse	Male directors	3
Foreigner	Female Directors	1
Over 50 years old	Female Directors	1

The question about the presence of LGBTQIA+ people in the organization was answered by 17 people. 35.29% said they were aware of the existence of LGBTQIA+ people in the workplace, while 58.82% said they didn't know anyone from this community in the company. Only 5.88% said they were not aware.

Table 70. Awareness regarding LGBTQIA+ people in the organization (innovation environments)

Are you aware of the existence of LGTBQIA+ people in the organization? 17 respondents		
Yes	6	35,29%
No	10	58,82%
I don't know	1	5,88%

The study included 16 respondents in the analysis of diversity and inclusion programs. The results indicate that half of the organizations (50%) do not have a diversity program. On the other hand, 12.5% said they had a mature and effective program, while 18.75% indicated that their program was still under development.

Table 71. Maturity of the diversity and inclusion program

How do you rate the presence and maturity of the diversity and inclusion program in your organization? 16 respondents		
No program: The organization has no initiatives in this regard.	8	50,00%
Early-stage program: There is a program, but it is still in the development phase.	2	12,50%
Program under development: The program exists, but needs improvement.	3	18,75%
Established program: The program works, but there are still points for improvement.	1	6,25%
Mature program: The program is complete and effective.	2	12,50%

The breakdown of the programs shows a growing commitment to technological innovation, social inclusion, sustainability and talent retention.

One project mentioned, CFR/Benevides-PA, highlights the importance of education and technical training for young people living in rural areas, combining modern agricultural technology (geo-referencing, drones, CAR) with sustainability and socio-environmental governance (ESG). In addition, the proposal to set up an OSCIP reinforces the search for a sustainable model of financing and social impact.

Concerns about talent retention and accessibility also feature strongly, showing that some initiatives have adopted equal opportunities and equal treatment policies. Strategies such as engagement, literacy and support groups, run by HR and leadership, demonstrate efforts to create inclusive and attractive environments for talent.

Similarly, some initiatives link innovation to the development of technological businesses, as in the case of the Incubation of Technology-Based Companies, which aims at fostering startups and new ventures in the sector.

Thus, the actions addressed reflect a strategic vision aimed at the development of people and communities, based on technology, innovation and sustainable governance, promoting both economic growth and social inclusion in the agricultural and technological sector.

Challenges for Innovation Environments

Based on the responses regarding the main challenges faced by organizations in the agtech sector, several critical aspects stand out for the growth and consolidation of these companies, which are described below.

- **Consolidation and Growth:** The main challenges mentioned are to become a reference hub in the Agtech sector and to expand operations. This involves looking for entrepreneurs with a long-term vision and the scalability of innovative solutions in agribusiness.

- **Fundraising and Investment:** Recurring challenges include finding investment opportunities and diversifying sources of revenue. In addition, the difficulty in raising federal funds, especially for private innovation environments, is a major obstacle.
- **Technology and Innovation:** Bringing technology into rural environments and implementing new solutions require continuous efforts. Growth in the areas of intelligent monitoring, IoT and digital systems integration highlights the need for constant innovation.
- **Human Resources:** Searching for talent and attracting new entrepreneurs are constant challenges. There is also a need to offer specialized legal support to startups and emerging companies.
- **Regulation and Entrepreneurial Culture:** The lack of incentives, a less resilient entrepreneurial culture and high taxes make it difficult for startups to be sustainable. Encouraging a more favorable ecosystem for the specific profile of entrepreneurship is essential to overcome these obstacles.

Given this scenario, overcoming these challenges requires an integrated approach between innovation, investment and strengthening the entrepreneurial ecosystem.

Insight into technological trends

The technological and market trends pointed out by the respondents reflect an accelerated transformation in the agri-food sector, driven by advances in Artificial Intelligence (AI), automation, biotechnology and digital agriculture.

In the short term (6 months), the adoption of AI applied to cultivation, precision agriculture, IoT, smart irrigation, biological pest control and process automation stand out. These technologies aim to increase operational efficiency, reduce waste and optimize agricultural production.

For the medium and long term (3 to 5 years), trends such as regenerative and low-carbon agriculture, advanced biotechnology, the use of biological inputs, blockchain for traceability, cultivated meat, CRISPR and advanced energy sources should gain momentum. The massive integration of IoT and big data will enable more precise and sustainable monitoring of production chains.

These transformations directly impact organizations and careers, promoting greater incentives for innovation, attracting investment and creating new business models. Issues such as cybersecurity, regulating new technologies and adapting to the ESG agenda are also becoming increasingly relevant.

The need for favorable environments for biotech startups and innovation in agribusiness reinforces the importance of public policies.

Potential improvements to the ecosystem

The responses regarding improvements in the agtech ecosystem in Brazil revealed different challenges and opportunities, especially in the relationship with public and private entities and the training and research system.

The results are summarized in the following topics.

- **Financing and promotion:** There is a high demand for greater ease in obtaining investment and access to government funds, and many point out that the current model of investment per project is valid but insufficient, suggesting the need to promote entire ecosystems for greater impact.
- **Integration and Interconnection:** Integrating actions between different agents is seen as essential to generating collective benefits and solving complex challenges. Of particular note is the need for greater connection between sectors and dialogue with the Ministry of Agriculture, Livestock and Food Supply (MAPA) to facilitate registrations and regulations.
- **Education and Research:** Alignment between academia and global market demands is a critical factor. More incentives are suggested to launch academic spin-offs, as well as programs in the format of Startup Brasil, which involve accelerators, startups, large companies and research institutes.
- **Innovation environment:** Encouraging technology parks and greater interaction between experienced companies and startups are seen as strategies to strengthen the sector. In addition, benchmarking with Israel and the USA is proposed in order to replicate good practices adopted in those countries.
- **Taxation and Regulation:** Tax reductions and specific tax incentives are used to facilitate the growth of small innovative companies, ensuring that the sector caters for everyone from small producers to large corporations.
- **Entrepreneurial Culture and Internationalization:** The answers point to suggestions for disseminating the entrepreneurial culture in universities and programs to attract global startups to Brazil, favoring interaction between entrepreneurs from different countries.

The results of the Radar Agtech Survey Environments 2024 reinforce the importance of innovation in the agri-food sector and highlight the growth of startups and innovation environments. The survey highlights advances in the adoption of new technologies, the importance of institutional support and the need to strengthen policies to foster entrepreneurship and applied research.

The data also points to structural challenges, such as attracting investment, integrating different players in the sector and promoting a more solid entrepreneurial culture. The existence of initiatives aimed at diversity, sustainability and social inclusion also demonstrates a growing move towards a more accessible and representative ecosystem.

Based on the information collected, the results of the study will hopefully serve as a basis for improving innovation strategies, boosting the development startups, attracting investment and strengthening the competitiveness of agribusiness in Brazil and on the international stage.

Investment Scenario, Agribusiness and the Brazilian Economy in 2024: Overcoming Obstacles, Building Opportunities

• *Felipe Guth, Pedro Jábali and Luiz Ojima Sakuda*

2024 was a challenging year for Brazil, with difficulties that transcended the agribusiness and impacted the entire national economy. While the agri-food sector faced adversities such as severe weather conditions, rising input costs and international regulatory pressures, the macroeconomic scenario also proved unfavorable, with direct implications for investors and the financial market.

From January to September, agribusiness GDP shrank by 2.49%, according to estimates by the Brazilian Confederation of Agriculture and Livestock (CNA) and Cepea. However, the third quarter saw growth of 1.26%, reversing the negative trend seen at the start of the year. This recovery suggests that the sector has adjusted market conditions, reinforcing its ability to adapt. Based on these figures, agribusiness GDP should close the year at approximately R\$2.58 trillion, corresponding to 22% of the Brazilian economy.

In foreign trade, agribusiness continued to play a leading role. Agri-food exports totaled US\$ 184.7 billion, representing 43.2% of national exports. The state of São Paulo led the sector's foreign sales, recording a surplus of R\$ 150 billion, driven by exports of sugar, orange juice and meat. Agribusiness was fundamental to Brazil's positive trade balance, ensuring the country's competitiveness on the global stage. Despite the challenges by regulations such as the European Union Deforestation Regulation (EUDR), which created additional barriers to the export products such as soy, coffee and meat, global demand for food continued to sustain Brazil's agribusiness trade balance.

In macroeconomic terms, the Central Bank revised its projection for Brazilian GDP growth for 2024 to 3.5%, a positive figure considering the global economic scenario.

In contrast to GDP growth, 2024 was marked by a worsening fiscal situation in Brazil, with growing challenges for balancing public accounts. The difficulty in containing spending, combined with the frustration of revenues and the resistance to approving adjustment measures, increased the market's concerns about the trajectory of the public debt. At the same time, inflation remained above expectations, pressured by rising food and fuel prices, as well as by the exchange rate devaluation. The deterioration of the fiscal scenario and persistent inflation undermined investor confidence, resulting in an environment of greater risk aversion and contributing to market volatility.

The Brazilian currency, the real, suffered a significant devaluation, ending the year quoted at R\$6.18 per dollar, making it one of the worst performing currencies globally. These factors directly influenced the financial market, with the Ibovespa, Brazil's main stock market index, accumulating a fall of 10.36% in the year, the worst result since 2021.

A symbolic example of the impact of this scenario was the experience of foreign investors in the Brazilian market. Those who invested US\$ 1,000 in the IBOVESPA index at the beginning of 2024, when the dollar was quoted at R\$ 4.86, converted their capital to R\$ 4,860 before purchasing

shares in the index. However, over the course of the year, the Ibovespa fell by 10.36%, reducing the value of the investment to R\$4,360.58.

In addition to the devaluation of the index, the real also lost value against the dollar, ending the year quoted at R\$6.18. Thus, by reconvertng the capital into dollars at the end of 2024, the foreign investor would have approximately US\$ 706.99, registering a total loss of 29.4% in relation to the amount originally invested.

Despite the macroeconomic challenges faced in 2024, Brazil maintains a solid economic base, and strategic sectors such as agribusiness and the export industry continue to play a key role in balancing the trade balance. The uncertain environment requires greater fiscal discipline and structural measures to restore investor confidence, but there is room for recovery as the global economy stabilizes and more effective policies are implemented. The market remains attentive to possible adjustments and re-forms that could strengthen the country's credibility and create a more favorable scenario for sustainable growth in the coming years.

Context

Why Agro? An Investment Route that Goes Beyond Brazil

Although Brazil and agribusiness faced a number of challenges in 2024, the agri-food industry continues to demonstrate its strength and resilience. Even in a year marked by economic downturns and climatic difficulties, Brazilian agribusiness reaffirmed its importance as the driving force behind the national economy and its strategic position in the global market, supported by a number of competitive advantages and protection mechanisms that mitigate some of the adverse economic impacts.

If we analyze the accumulated growth of agribusiness compared to Brazil's GDP, it is clear that the sector has consistently outpaced the growth of the national economy throughout the historical series. This is no coincidence: agribusiness plays an essential role in generating wealth and is mainly responsible for consolidating Brazil's trade balance surplus.



Figure 24. Sector performance and annual expansion

Source: CNA, Cepea & Central Bank of Brazil 2023.

Brazil also stands out as one of the main global exporters of agricultural commodities, leading in several categories. The country is the world’s largest exporter of soybeans, beef, chicken, corn, sugar, ethanol, orange juice and coffee, consolidating its position as a key supplier to international markets. The country is also a leading producer of soy, sugar, orange juice and coffee, demonstrating its strength in both the generation and marketing of these commodities. This leading role reinforces Brazil’s importance on the global stage, not only as a major producer, but also as one of the main suppliers of food and agricultural inputs in the world.

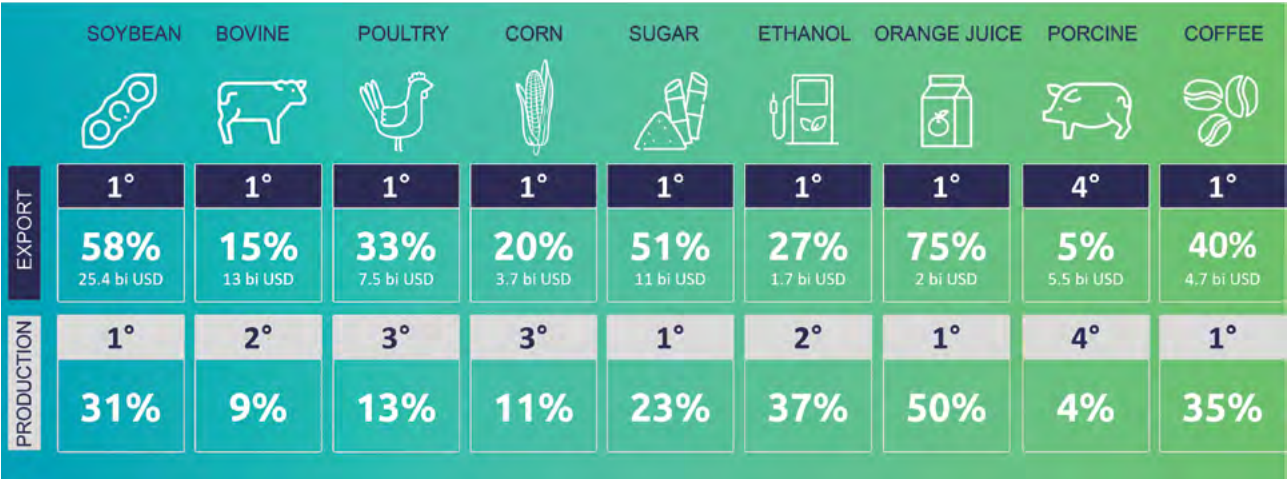


Figure 25. Production and exports of Brazilian agricultural products

Source: EMBRAPA, Agrolink, NovaCana, Conab - Calendar 2023.

The fact that agribusiness is highly dollarized is also a factor that naturally protects the industry against currency devaluation. While other segments of the Brazilian economy suffered from the sharp devaluation of the real in 2024, agricultural producers and exporters in the agri-food sector saw their gains in dollars partly offset the increases in domestic costs.

This dollarized characteristic reduces the impacts of exchange rate instability and maintains the competitiveness of Brazilian products on the international market, since local costs, such as labor and national inputs, become relatively cheaper in foreign currency.

Another feature that stands out is the ability of Brazilian agribusiness to quickly adapt to change and invest in innovation. Even in a challenging year, the sector recorded important advances in the adoption of agricultural technologies, such as the use of biologicals, remote monitoring systems and more efficient agricultural machinery. Brazil's climatic and territorial diversity also allows the country to maintain high productivity in different regions, even when some areas face climatic adversities.

Furthermore, Brazilian agribusiness has a consolidated commercial infrastructure and a network of strategic partners that guarantee access to the main global markets, such as China, the United States and Europe. This position strengthens the sector as one of Brazil's economic pillars, even in periods of instability.

Finally, agribusiness continues to be a highly attractive sector for foreign investors, mainly due to its links with the international market and the growing global demand for food. In a scenario of increased dollar value and growing demand for food security, Brazilian agribusiness maintains its relevance, showing that, despite the obstacles faced in 2024, the sector is still one of Brazil's major economic and strategic pillars.

Brazilian agribusiness, therefore, not only survives crises, but continues to be a resilient and adaptable force, reinforcing its position as one of Brazil's greatest competitive advantages on the global stage.

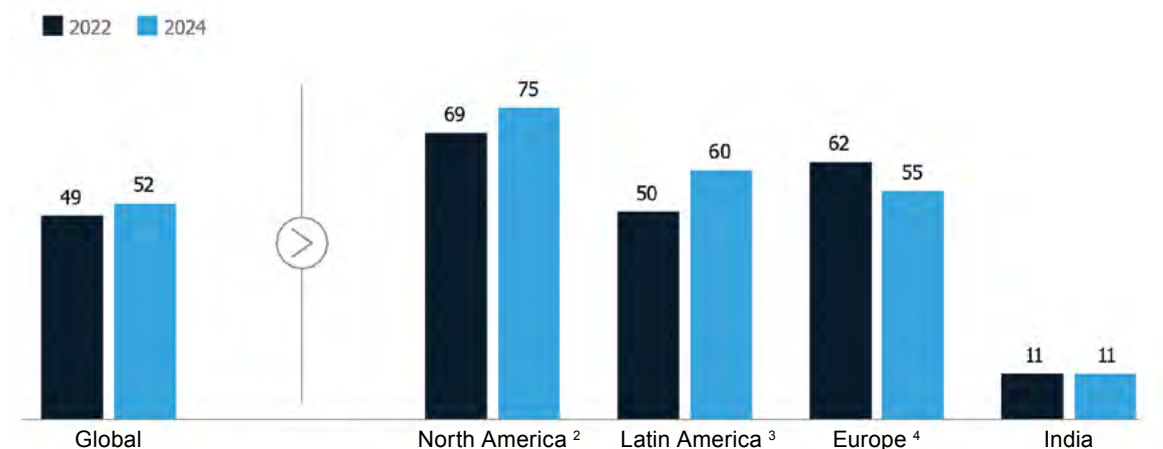
Scenario for Investment in Technology in Agriculture

Now, with regard to the technology scenario in agribusiness, what was 2024 like? Did it present the same challenges that shook the Brazilian economy and the traditional agri-food sector? At first glance, it might seem that the agtech startup ecosystem would be equally pressured by adverse macroeconomic conditions. However, 2024 has brought a more complex and, in many ways, more optimistic outlook for technology in agribusiness.

In recent years, the adoption of technology in Latin America has advanced significantly, and Brazil stands out in this movement. According to Global Farmers Insights 2024, a study carried out by McKinsey, technology adoption in the region grew by 10 percentage points between 2022 and 2024, considering the main agricultural markets in Latin America: Argentina, Brazil and Mexico.

Technology adoption keeps growing, led by North and Latin America

% of respondents¹ currently using or willing to adopt at least 1 technology



¹ Question: What is your level of adoption in the following trends? (2022, n= 4.474; 2024, n = 4.382).

² Canada and USA.

³ Argentina, Brazil and Mexico.

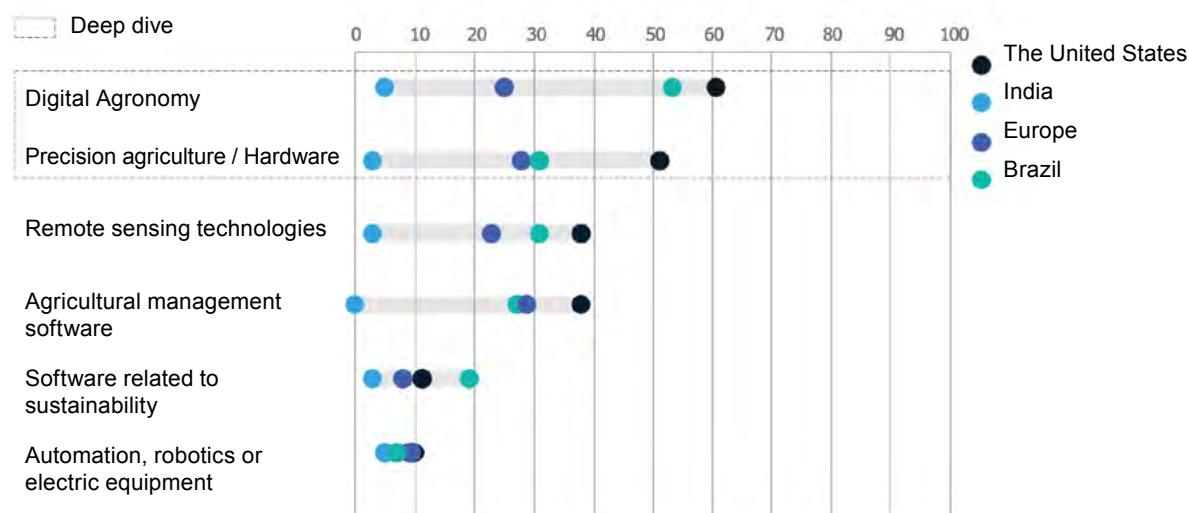
Figure 26. Current adoption or interest in adopting at least 1 technology

Source: McKinsey Global Farmer insights, 2024.

When we look specifically at Brazil, the data is even more impressive. The country ranks second globally in technology adoption in the agri-food sector, second only to the United States. This progress reinforces the maturity of the Brazilian agro-technological ecosystem and its growing capacity to absorb innovations.

Countries with the largest number of rural properties, such as Brazil and The United States, are leaders in adopting digital technology

Distribution of producers currently using or willing to adopt a technology, per type of technology, % of respondents¹



¹ Question: What is your level of adoption in the following trends? (2022, n= 4.474; 2024, n = 4.382).

² France, Germany and Netherlands.

Figure 27. Level of adoption by type of technology

Source: McKinsey Global Farmer insights, 2024.

Despite this progress, Brazil still has a long way to go to reach the levels of digitization and automation seen in the United States. However, this difference represents a major growth opportunity for the country's agtech sector, which continues to expand its relevance on the global stage. The continuous advance of innovation in Brazilian agribusiness shows that there is a fruitful space for new technologies, consolidating the country as one of the epicenters of digital transformation in world agribusiness.

By 2024, estimates suggest that investments in Agtechs in Latin America will reach approximately US\$550 million, representing a 25% increase compared to 2023. This increase reflects the maturing of the innovation ecosystem in the region's agri-food sector and the growing interest of investors in technologies that promote efficiency, sustainability and competitiveness in agribusiness.

In Brazil, the five main players in the sector stood out significantly, together accounting for around 30% of the total raised in Latin America over the course of 2024. Among the companies that led these equity raisings were Agrolend, Cayenna, Solintec, Traive and Gênica, which attracted significant funding by presenting innovative and scalable solutions to the challenges faced by the agri-food sector.

Table 72. Capital raised by agtechs in 2024

Company name	Location	Value (R\$ million)	Series	Segment
Agrolend	Brazil	300	Series C	Agfintech
Cayenna	Brazil	300	Series B	Markteplace
Solinfitec	Brazil	300	Series C	Farm Robotics
Traive	Brazil	110	Series B	Agfintech
Genetic	Brazil	68	Series B	Biologicals

Source: Radar Agtech 2024.

Another important point observed this year was the concentration of investments in more mature companies. This concentration, however, occurred specifically in terms of the volume of capital invested and not necessarily in the number of rounds carried out. In fact, seed and series A rounds continued to account for most of the deals made in the year, but due to a downturn in the national and global Venture Capital market, startups found it more difficult to raise capital.

How has the Agtech Ecosystem evolved over time?

Over the last ten years, the ecosystem in Latin America has undergone significant growth, driven not only by increased technological adoption, but also by a structured movement to finance and support innovation. If agribusiness was once seen as a niche within investment strategies, today it occupies a strategic role in the portfolios of specialized and generalist funds, reflecting its growing relevance to the global economy and food security.

This progress is due to the emergence of new sectoral Venture Capital funds, the growth in the number of Corporate Venture Capitals (CVCs) linked to the large agribusinesses and the entry of generalist funds that began to include agtech startups in their investment theses. This

transformation has created a more robust ecosystem, offering a more favorable environment for innovation and startup growth.

Radar Agtech also mapped more than **40 general Venture Capital funds** – i.e. those that don't have a specific thesis for agribusiness – but which **are actively investing in Ag&FoodTech startups**. In total, these funds have carried out **130 deals** in this category, resulting in an average of **11.3% of their portfolio being allocated to Ag & Food Techs in Brazil**.

This data reinforces a fundamental point: **even without an exclusive focus on agribusiness, generalist funds are attaching significant importance to the sector in the country**. This demonstrates the maturity of the ecosystem and the growing realization that **innovation in agribusiness is a strategic axis for risk investments in Brazil**.

Given this scenario, we decided, for the first time, to carry out a survey of investors, seeking to map the dynamics of the sector and understand how the different venture capital profiles are positioning themselves in relation to Agtechs. Although this is the first edition of this survey and the initial sample was relatively small due to the still small number of specialized sector funds, we were able to capture valuable insights into the investor landscape and the trends that should shape the future of the sector.

In the survey, we identified that approximately 85% of technology investors focused on agriculture already participate in innovation environments, which reinforces the importance of these networks in structuring the ecosystem.

Does your company participate in an innovation ecosystem, local productive arrangement, innovation hub and/or other innovation environment?

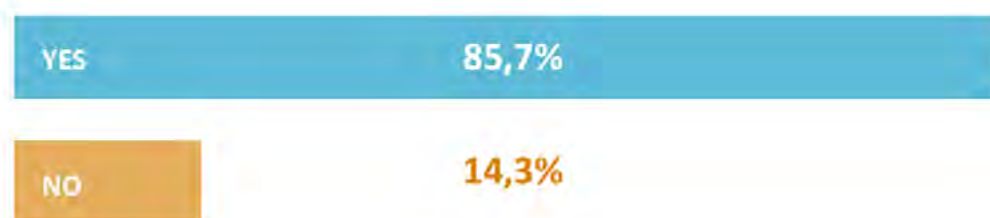


Figure 28. Participation in an innovation ecosystem, local productive arrangement, innovation hub and/or other innovation environment

Source: Survey Investors (EMBRAPA, SP Ventures, Homo Ludens), 2024.

Although most of the respondents are already part of these environments, we sought to carry out a deep research to understand what improvements are still needed for the agtech ecosystem in Brazil.

What Can Be Improved in the Agtech Ecosystem?

In your view, what could be improved in the agtech ecosystem in Brazil that could help with your challenges?

- Greater integration between agro-innovation hubs, connecting centers such as Campinas, Piracicaba, Mato Grosso and Goiás.

- Expansion of support for entrepreneurship, with specific programs and benchmarking with global demands.
- Strengthening partnerships between startups and large corporations, facilitating investments and strategic connections.
- Greater incentives for international fundraising, making the Brazilian ecosystem more attractive to global investors.
- Closer ties with universities and research centers, fostering innovation right from the academic stage.
- Expanding the culture of investment in agro startups, encouraging more players in the sector to become active investors.

Source: Survey Investors (EMBRAPA, SP Ventures, Homo Ludens), 2024.

Trends in the Sector According to Investors

Given that the ecosystem has evolved so much in the last decade, what can we expect in the coming years? We asked investors which technological and market trends they believe will have the greatest impact on the sector.

In your opinion, what technological and/or market trends stand out? Cite both those that refer to the short term (6 months) and the medium/long term (3-5 years).

- Biological inputs as sustainable alternatives to traditional chemicals, promoting greater agricultural productivity.
- Agfintechs that democratize access to credit and financial services for small and medium-sized rural producers.
- Foodtechs focused on improving production, traceability, preservation and sustainability in food processing.
- Agricultural digitalization with solutions such as IoT, artificial intelligence and management systems to optimize efficiency in the field.
- Metagenomics as a tool to accelerate the development of bio-inputs and new solutions in agribusiness.
- Using artificial intelligence (AI) to transform different areas of the agro-industrial sector and accelerate innovation.
- Solid waste treatment and water saving as global challenges that need innovative solutions.
- Genomics combined with artificial intelligence to speed up the development of new formulas and products.
- Bioeconomy as a way to make the sector more sustainable and efficient.
- Blockchain as a tool to guarantee traceability and transparency in the agri-food sector.
- Cultivated meat as an innovation in the production of alternative proteins.

- CRISPR gene editing as a disruptive technology for the development of new agricultural varieties.
- Internet of Things (IoT), robotics and new energy sources to increase the efficiency and sustainability of agribusiness.

Source: Survey Investors (EMBRAPA, SP Ventures, Homo Ludens), 2024.

The Main Challenges for Agtech Investors

Even as the sector advances, challenges persist. We sought to understand what the main barriers are for investors and their startups in the agtech market.

In your view, what are the main challenges for your business?

- Under-allocation of capital in Agtechs in Latin America, despite the region's strategic importance in global agribusiness.
- Low participation of Latin America in global investments in Agtechs, receiving less than 5% of the capital invested in the sector.
- Difficulty in finding good businesses and skilled managers to scale their startups efficiently.
- Low adoption of technology by small and medium-sized rural producers, requiring patience and resilience from entrepreneurs in the sector.
- Lack of highly qualified and resilient entrepreneurs, especially in the agribusiness sector.
- **Limited investment culture in agro startups**, making it difficult to attract venture capital to the sector.
- **Difficulty in raising funds abroad**, restricting access to domestic capital.
- **High interest rates and a high tax burden**, impacting the growth and competitiveness of startups.
- Shortage of qualified labor to work in the agtech sector.
- **Need to expand operations and market presence** to strengthen the impact and scalability of agro startups.

Source: Survey Investors (EMBRAPA, SP Ventures, Homo Ludens), 2024.

What can we expect for 2025?

In recent years, the **Venture Capital** market has undergone profound changes. Between 2020 and 2021, we experienced a period of high global liquidity, driven by low interest rates, which allowed startups to raise robust rounds of funding, often without the need to prove commercial viability or immediate financial return. However, between 2023 and 2024, this scenario changed drastically. With rising interest rates and reduced liquidity in global markets, investments in startups have become more selective, requiring more sustainable business models and greater efficiency in the allocation of capital.

2025 promises to consolidate this new reality. Venture capital funds, especially **early-stage** ones, will have an even more critical eye for startups that demonstrate clear paths to profitability or, at the very least, concrete strategies to reduce cash burn. Unlike the boom seen in 2020 and 2021, funds now operate in an environment with **less dry powder** (capital available for investment), requiring even early-stage startups (pre-seed and seed) to demonstrate early concerns about profitability.

Top Investment Theses for 2025

Given this scenario, some theses are likely to become stronger in 2025: The Accelerated Growth of the Biologicals Sector, New Trends the AgFintechs Market in Brazil, Growth of Trade Finance in Agriculture and Consolidation of the AgFintechs Market. These theses are analyzed below.

The Accelerated Growth of the Biologicals Sector

The bio-inputs and biological control market continues to be one of the most dynamic segments within the agtech ecosystem. With estimated annual growth of between 30% and 40%, this area benefits from two key factors:

1. Regulatory pressures and consumer demand: International markets such as the European Union and the United States are adopting stricter regulations against chemical pesticides, creating a growing global demand for sustainable alternatives. In addition, end consumers are increasingly demanding food produced with less environmental impact.
2. Brazil's agronomic opportunity and competitiveness: Brazilian tropical agriculture favors the proliferation of beneficial microorganisms, making the country one of the most promising in the world for the development and scalability of bio-inputs. Brazil already has one of the largest global markets for biologicals, exceeding US\$ 1 billion by 2024 and growing rapidly.

However, this growth is not only in market volume, but also in the sophistication of the technologies used. The evolution of the sector can be understood in different generations of biologicals, reflecting the advancement of the solutions available to producers.

The Technological Evolution of Biologicals

Over the last few years, the bio-inputs sector has undergone significant transformations, moving from simpler formulations to highly sophisticated and scientifically based solutions. This evolution can be divided into five main generations:

First and Second Generation Biologicals

The first commercial formulations of bio-inputs were based on isolated microorganisms such as fungi and beneficial bacteria applied directly to control pests and diseases.

Although effective, these solutions had limitations in terms of stability, compatibility with chemicals and agronomic predictability.

In the second generation, progress was made towards mixtures of microorganisms, combining different strains of bacteria and fungi to broaden the spectrum of control and improve efficacy. However, there were still challenges related to formulation, shelf life and resistance to adverse conditions.

Third Generation

The third generation of biologicals, which is currently leading the innovation market, introduces the use of secondary metabolites – bioactive compounds produced by microorganisms that have antimicrobial, antifungal or biostimulant action. Unlike products based solely on living organisms, metabolites guarantee greater agronomic efficiency, stability and extended shelf life.

In addition, nanotechnology has begun to be incorporated to enhance the effects of biologicals. Nano-scale particles allow for more efficient delivery of active compounds and protection against degradation, broadening the spectrum of action in the field.

Examples of this generation include:

- Products based on microbial metabolites, such as lipopeptides produced by *Bacillus subtilis*, which act to control fungal diseases.
- Use of silicon nanoparticles or liposomes to encapsulate bioactives and protect against degradation under adverse conditions.

Fourth and Fifth Generations

The next generations of biologicals will incorporate more advanced and disruptive biotechnological tools, bringing a new level of specificity and efficiency.

Fourth Generation - RNA Interference (RNAi):

RNA interference makes it possible to silence specific pest and disease genes, making biologicals even more precise and effective. This technology is being developed to replace conventional chemical pesticides, acting directly on the genetic regulation of target organisms without affecting the environment or non-target species. Pioneering companies in this area are already developing RNAi solutions to control insects, fungi and even plant viruses.

Fifth Generation - Microorganism Engineering and Artificial Intelligence:

The future of biologicals involves the genetic editing of microorganisms, making them more efficient at producing bioactive metabolites or fixing nutrients. In addition, artificial intelligence and bioinformatics are being used to model and optimize interactions between biologicals and agricultural crops, allowing solutions to be tailored to different biomes and soil types.

In terms of investments, the first and second generations played a fundamental role in consolidating the biologics market in Brazil. However, we believe that investments from the third generation onwards will be the sector's main focus in the coming years. With technological advances that increase the efficiency and predictability of bio-inputs, these innovations are becoming increasingly attractive to capital, positioning them as one of the main investment opportunities in 2025.

New Trends in the AgFintech Market in Brazil

The credit market in Brazilian presents a scenario of great uncertainty and significant opportunities for innovation. Currently, it is estimated that around R\$ 277 billion comes from subsidized credit, while R\$ 215 billion is offered by the big banks to the agri-food sector. Although agribusiness accounts for between 20% and 25% of Brazil's GDP, only 5% of the financial products available on the market are aimed at the sector. This gap highlights the

growth potential of AgFintechs, which are playing an increasingly strategic role in diversifying and modernizing access to credit and insurance for rural producers.

In recent years, the AgFintech market has undergone a considerable evolution. Whereas before the trend was for startups to operate on a more general basis, catering for different cultures and producer profiles, we are now seeing a move towards specialization and segmentation, with new investment theses gaining traction. The main trends that should shape the sector over the next few years include:

1. Expansion of Insurtechs into Agribusiness

The agricultural insurance sector in Brazil is still underdeveloped compared to more mature markets such as the United States. The low penetration of rural insurance, coupled with the growing exposure of producers to extreme weather events and price volatility, opens up space for the advance of insurtechs specializing in agribusiness.

Startups that combine more accurate pricing models, the use of climate data and remote sensing and new parametric insurance approaches are gaining relevance. These solutions allow producers to access more efficient financial protection, reducing risks and making agricultural management more predictable.

2. Sectoral AgFintechs: Specialization by Production Chain

Another trend observed is the specialization of AgFintechs by production chains. Instead of acting broadly, covering different crops and segments, new fintechs are emerging with models aimed at specific sectors of agribusiness, creating solutions that are more tailored to the realities of each chain. Some examples include:

- Fintechs specialized in the animal protein chain: Startups that offer financing and risk management for livestock, poultry and pork producers, aligning credit with the specific needs of the meat and dairy industry.
- Fintechs focused on cooperatives: Companies developing financial solutions for agri-food cooperatives, facilitating credit, onlending and receivables management.
- Fintechs aimed at specific export chains: Models aimed coffee, cocoa and fruit producers, who require specialized financial instruments to deal with international markets and contracts.

This specialization allows AgFintechs to act more deeply on the financial challenges of each segment, increasing efficiency and customer acquisition.

Growth of Trade Finance in Agribusiness

One of the most promising trends in the AgFintech sector is the growth of trade finance solutions. Brazilian agribusiness is highly dependent on exports, and the financing of international trade operations still presents a number of challenges. New fintechs are emerging to act as intermediaries in credit for the export and import of agri-food products, offering solutions such as:

- Anticipation of receivables for exporters of agricultural commodities;
- Structured financing for international operations, allowing greater predictability in producers' cash flow;
- Financial hedging and currency risk mitigation tools, essential for producers who rely on foreign markets.

With the increasing complexity of global agri-food trade and new regulatory requirements, such as the European Union Deforestation Regulation (EUDR), trade finance solutions will become increasingly essential to guarantee liquidity and security in international transactions.

Consolidation of the AgFintech Market

Another factor likely to impact the sector in 2025 is a potential move towards the consolidation of the AgFintech market. With the reduction in global liquidity and a more selective venture capital scenario, mergers and acquisitions between fintechs with complementary synergies could gain momentum. This will allow companies to combine financial product portfolios, strengthen their customer bases and improve their competitiveness in an environment where access to capital will be a determining factor for sustainable growth.

The credit market for Brazilian agribusiness is still in the process of modernization, and AgFintechs play a key role in this transformation. The advance of agricultural insurtechs, sectoral fintechs and trade finance solutions shows how the sector is becoming more sophisticated in order to better meet the needs of rural producers.

With the growing digitalization of agribusiness and the need for increasingly personalized financial products, AgFintechs continue to be one of the most promising segments for investment in Brazil's agtech ecosystem.

Companies that manage to combine technology, credit intelligence and scalable models will have a better chance of standing out in this new context.

Co-evolution of the Agribusiness Innovation Ecosystem and Radar Agtech

- *Aurélio Martins Favarin, Luiz Ojima Sakuda, Pedro Jábali, Vitor Henrique Vaz Mondo, Martha Delphino Bambini and Daniela Ferraz Bacconi Campeche*

The mapping of startups, innovation environments and venture capitalists operating in the agtech segment, promoted by Radar Agtech Brasil 2024, reveals a sector in constant evolution.

Even though economic downturns and climatic difficulties marked the year 2024, the agri-food sector demonstrated its strength and resilience, once again surpassing the national GDP growth levels. Globally, the sector continues to be a major food producer and exporter, with trading place in dollars, which has protected the sector against currency devaluation.

Despite this adverse scenario, the performance of the venture investment sector specializing in agtechs has been positive. Estimates suggest that investments in agtechs in Latin America will grow by 25% compared to 2023, an increase derived from the maturing and evolution of the region's innovation ecosystem. Investors have been prioritizing startups based on technologies that promote efficiency, sustainability and competitiveness in agribusiness, in view of a growing movement to adopt technology in the field, especially in Latin America's main agricultural markets: Argentina, Brazil and Mexico.

In line with this trend, the mapping of startups identified 1972 agtechs, characterized by the significant growth of startups focused on pre-production and automation on the farm.

The "Before the Farm" segment accounted for 18.6% of the agtechs mapped, showing growth from 17.5% in 2019, driven mainly by the increase in financial solutions, such as agricultural credit and insurance, which now account for 26.5% of this category. The "Inside the Farm" segment remained the most representative in the 2024 mapping, accounting for 41.5% of the total number of Agtechs mapped (818 startups), especially in the categories of rural property management (157 startups) and data integration platforms (144 startups). Despite the percentage drop, from 47.3% in 2019 to 40% in 2024, the "After the Farm" segment saw a significant absolute increase in the number of startups (788).

Another relevant point is the decentralization of agtechs in Brazil. The Southeast still concentrates the majority of startups (57.7%), but its share has been declining since 2019, while regions such as the Northeast and North have shown progress, growing from 3.5% to 5.9% and from 1.5% to 5.0%, respectively. São Paulo remains the state with the largest number of Agtechs (43.5% of the total), but states like Rio Grande do Sul (9.6%) and Paraná (8.9%) continue to gain relevance. In addition, Curitiba and the Agro Corridor, located in the countryside of São Paulo, are gaining traction as innovation hubs, reflecting the strengthening of local ecosystems.

The study shows that strengthening the agtech ecosystem depends on collaboration between startups, large companies, investors, cooperatives and the government, guaranteeing a favorable environment for the development of solutions that boost the productivity and sustainability of the agri-food sector in Brazil.

With regard to innovation environments, a comparison of the data mapped in the 2023 and 2024 editions of Radar Agtech shows enormous growth over the period. The categories that grew the most were: accelerators, which went from 21 (2023) to 40 (2024), an increase of

90%; and incubators, which went from 32 (2023) to 107 (2024), an increase of 224%. In the case of hubs, there was an increase of 29%, from 82 (2023) to 106 (2024).

The number of technology parks rose from 93 (2023) to 117 (2024), an increase of 25%. Although the absence of the *farmlab* and *smartlab* categories may have helped increase the number of accelerators and incubators, the increase was more than 25% in all four categories. This may demonstrate, as was portrayed in the 2023 edition about the emergence environments such as Cocriagro in Londrina-PR, that the ecosystems themselves have observed the need to create new environments in the region, which are essential for channeling the creation of new businesses new ventures.

The Southeast continues to have a solid presence of mechanisms that generate new ventures and participate in the governance of local ecosystems. The North still has a low number of innovation environments, which is a warning sign and could be a very limiting factor in taking advantage of opportunities generated by events such as COP 30. Even if there is an increase, it can be very worrying in terms of sustaining startups and the ecosystem itself in the medium and long term.

Even so, in the analysis by region of the country, it is considered that the evolution of the data relating to innovation environments can give good clues as to how the geographical evolution of the presence of startups will be in the next edition of Radar Agtech. There is a tendency to strengthen the innovation ecosystems in the Northeast, Center-West and South, due to a strong increase in the number of accelerators, hubs, incubators and technology parks in these regions.

The results of Radar Agtech 2024 emphasize that the Brazilian agri-food industry maintains its strategic position in the global economy, not only because of its production capacity, but also because of its presence on the domestic market and its international position.

Brazil, which in the 1970s was a food importer, has become one of the largest exporters of agricultural commodities, thanks to the combination of a culture of technological innovation, entrepreneurship and adaptation. Research, Development and Innovation institutions such as Embrapa have built a solid base of scientific knowledge that has made it possible to increase productivity, quality and, consequently, the competitiveness of the sector.

Today, the Brazilian farmer is second only to the American in technology adoption, reflecting the speed with which innovations are incorporated into the field. However, this lead is not yet reflected in the attraction of venture capital: while agribusiness accounts for between 20% and 25% of Brazil's GDP, Latin America as a whole receives less than 5% of global investments in agtechs. This mismatch reinforces the need to increase the presence of strategic investors in the region, consolidating Brazil not only as an agricultural powerhouse, but also as a global benchmark in innovation for the sector.

The study points out that, although there has been an important evolution of the Brazilian agricultural innovation ecosystem, there are still challenges to be overcome, such as: expanding the digital infrastructure in the countryside; implementing product traceability and certification models required by various countries; and expanding and consolidating sustainable business practices and models.

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