Sustainable Digital Impact: Agrifoodtech Startup Ecosystem in Latin America & the Caribbean

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ABOUT IDB INVEST

IDB Invest, a member of the IDB Group, is a multilateral development bank committed to promoting economic growth and social inclusion in its Latin American and the Caribbean (LAC) member countries through the private sector IDB Invest aims to be the key partner of the private sector by providing its clients with access to financial resources and advisory services, providing technical knowledge and sector expertise. The bank prioritizes strategic sectors in Latin America and the Caribbean including energy, transportation, water and sanitation, social infrastructure, agribusiness, manufacturing, tourism, digital economy, investment funds, financial institutions, and non-banking financial institutions.

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TABLE OF CONTENTS

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The world is confronted with significant challenges as it attempts to sustain its capacity to serve and feed a growing population. Climate change and food insecurity are driving the need for a comprehensive transformation of food systems that incorporate sustainable practices that care for limited resources, create resilient and equitable solutions to address the impact of climate change, and improve agricultural productivity to keep competitive prices and mitigate food insecurity. These challenges are notably prevalent in the Latin American and the Caribbean region (LAC), which is the world's largest exporter of agricultural goods and breadbasket of the world.

About this Report

The Agrifoodtech industry can be a key driver in overcoming these challenges by developing and introducing potentially disruptive technologies across the agrifood value chain. These technologies can promote increased efficiency of resource use, optimize agrifood markets, and help reduce environmental and social impact.

This publication launches the second cycle, *Sustainable Digital Impact*, following the previous cycle, *Perspectives on Digital Transformation*, which explored the challenges and opportunities in digital transformation for agribusiness, manufacturing, and financial inclusion sectors in Latin America and the Caribbean (LAC). In this second report, we take an in-depth look at the Agrifoodtech startup ecosystem, first introduced in a general way in the initial report, *Digital Transformation in Agribusiness in LAC*[1].

This study aims to provide an overview of the current state of the sector in LAC and the industry's evolution in recent years, understanding the differences between its countries and other global ecosystems. It explores the ecosystem's future challenges and opportunities and examine how the Agrifoodtech industry can enhance LAC's competitiveness in food production. To achieve this, a methodology was implemented, which encompassed a desk research

[1] (IDB Invest, 2022)

and literature review, as well as case studies analysis and in-depth interviews with key industry players.

The desk research facilitated the identification and conceptualization of the main trends, key players, opportunities, and challenges that characterize the Agrifoodtech ecosystem in the region. Meanwhile, in-depth interviews required direct contact with key stakeholders in the Agrifoodtech ecosystem. This diverse group was comprised of representatives from the LAC region – including Argentina, Brazil, Chile, Colombia, Mexico, and Peru – as well as other countries outside the region such as Spain and the United States. The group consisted of a variety of startups at various stages of development, established scale-ups, sector-dedicated investors, private equity funds, leading corporations, NGOs dedicated to sustainable development, and academic experts. More than 40 in-depth interviews were conducted to obtain direct insights, experiences, and visions of the industry in the upcoming years.

Industry Context

Latin American and the Caribbean is experiencing a growing demand for agricultural products and has become the breadbasket of the world. Currently, the region is the largest exporter of food, accounting for approximately 17% of total exports. Even more, it sells abroad approximately 42% of its production (in calorie equivalent)[2]. Moreover, along with the services and manufacturing industry, which in 2022 represented 64%[3] and 18%[4] of the region's GDP respectively, the agricultural industry has a key role in the region's economy, representing an important share of GDP and employment in the region. Overall, agriculture is responsible for 7% of the region's GDP[5], where for 20 countries the range is between 5% and 18% of each country's GDP[6]. Similarly, the agricultural industry is an important employer in the region, responsible for about 14% of the labor force. The above illustrates the necessity for the world and the region to effectively address the growing demand, while doing it in a sustainable way.

Despite LAC's relevance in global agricultural systems Agrifoodtech is still regarded as a developing industry. The industry's low maturity can be evidenced by the relatively high share of early-stage investment deals and the low share of global Agrifoodtech investment at less than 2% in 2022[7], compared to other regions like Europe and Asia with 17% and 29%[8] of global Agrifoodtech investment respectively. This report provides a comprehensive analysis of this misalignment, between the level of agricultural production and the development of the Agrifoodtech industry, which represents a clear opportunity for the industry's development potential in the LAC region.

Historically, the Downstream[9] category has been the recipient of more than half of the Agrifoodtech industry's investment in the LAC region. These subcategories have been attracting most of the funding due to trends in consumer demand and shorter software development cycles, which leads to perceived lower risk and faster return on investments.

[2] (OECD and Food and Agriculture Organization of the United Nations, 2022)
[3] (The World Bank, 2024)
[4] (The World Bank, 2024)
[5] (The World Bank, 2024)
[6] (Statista, 2022)
[7] (AgFunder, 2023)
[8] (AgFunder, 2023)
[9] Involves the distribution, marketing, and delivery of ffood products to consumers

However, in recent years there has been a shifting trend at a global and regional levels, in which Upstream and Midstream categories have been attracting a growing share of investment. This shift is due to increasing interest and primed positioning in the Upstream[10] and Midstream[11] solutions to address global challenges, in a region with such high agricultural relevance. These categories are essential for the agrifood industry's sustainable practices, increase the productivity of land, ensure crop resilience to climate change, enhance the nutritional value of food, reduce costs associated with production and transportation of food, promote the efficiency of resource utilization, and improves inclusion and diversity within the agrifood value chain. All the above is key for ensuring food security by providing nutritious and accessible food, reducing the impact of agriculture on climate change through the efficient use of less harmful resources.

The Agrifoodtech industry in the region has not been uniformly developed across its countries. Brazil has been the most successful, Colombia and Mexico have focused on Downstream solutions and Argentina and Chile have shown signs of early development in Upstream solutions.

Brazil is the undisputed leader in the region, showcased by holding the largest share of funding with US$ 765 million in 2022, which doubles any other country in the zone, and has the largest share of deals, with a high-ticket size. The country has a strong presence in all categories of the value chain, with an emphasis on the development of Upstream categories.

Colombia and Mexico follow behind in terms of funding and number of deals and they even stand out with some of the highest average ticket sizes in the region, with US$ 21.4 million and US$ 10.9 million, respectively against the region's average of US$ 9.5 million. It is important to note that the Downstream sector and its high-ticket deals have been the main drivers of their increased investments in Agrifoodtech, which is also their most mature category.

In contrast, even though Argentina and Chile have lower investments than Colombia and Mexico, the

Upstream category appears to be more mature, particularly in Argentina, which has leveraged its strong relevance in agricultural production and research institutions.

Regional and International Benchmarking:

As mentioned above, the industry's development within the region has not been homogeneous, which can be partially explained by different factors. First, it appears that there is a positive correlation between agricultural production quantity and the number of startups in each country. This relationship illustrates the potential market size for the application of Upstream solutions, which are still in the phase of low maturity.

Secondly, the levels of adoption of Agtech technology solutions seem to be explained by farmer fragmentation; a higher share of small producers in agricultural production suggests a lower level of adoption. This explains the reason for a slower growth rate of the Upstream category in Mexico and Colombia, in comparison to other countries such as Argentina, Brazil and Chile.

Lastly, there seems to be a strong correlation between the innovation ecosystem and the amount of investment a country receives. Countries with a stronger innovation ecosystem, like Brazil and Colombia, are more likely to attract greater investment. Argentina and Chile show a gap between their good innovation ecosystems and the amount of

[10] Refers to the part of the value chain that is closer to the primary production of crops, harvesting, and using technology to improve and innovate agriculture
[11] Encompasses the processing, storage, and transportation of agricultural products, bridging production and consumption

investment they receive. This discrepancy can be attributed to specific factors, such as economic and political instability in Argentina, and targeting of a small local market rather than international markets in Chile[12].

In addition, an international benchmarking was also conducted, to gain a more comprehensive understanding of the key factors behind the successes and failures of other regions worldwide. Overall, the LAC region seems to have lower maturity compared to other regions like the United States, Europe, Asia, and Israel, which can be explained by several factors. First, LAC needs to strengthen its innovation ecosystem and further promote VC investment in the Agrifoodtech industry. Examples of strong innovation ecosystems include the United States and Europe. Known for its ability to recruit a significant number of international entrepreneurs, the US is a prime location for global expansion. It has a strong collaboration between the top world universities with highly qualified talent and enjoys having policies in place that protect entrepreneurs from failure (bankruptcy laws). Similarly, Europe has an encouraging innovation ecosystem that is conducive to growth, as evidenced by strong government support and enabling public policies that provide incentives for the resolution of high-risk issues through technology and innovation. These include funding, tax breaks for angel investors, policy openness and flexibility towards change and disruption. Finally, the LAC region can also learn from Asia's approach, which encourages a risk averse population to enter the startup world through different programs and incentives.

In terms of VC investment in the Agrifoodtech industry, it was identified that LAC and Asia lag in terms of their share of investment, contributing a very small portion compared to their share of agricultural value. This may be attributable to the different risk profiles among various regions.

Furthermore, government policies promoting sustainable agricultural production may be a key driver for the emergence of Agrifoodtech technologies that facilitate compliance. As previously said, Europe has strong regulations that have created a fertile ground for Agrifoodtech solutions, as does Asia which has implemented regulations aimed at promoting food sovereignty. Building such regulations in the LAC region might accelerate technological development and acceptance.

Finally, productor value and talent quality and availability are regional characteristics that explain the disparities between the level of development and scalability reached by the Agrifoodtech industry. First lower productor value received by farmers in LAC and Asia may result in less disposable funds for investment in new technologies. In terms of human talent, LAC trails in education levels, with the lowest Human Capital Index average across regions and the region with fewer agriculture and food science universities within the top 250. Low education levels

[12] (StartupBlink, 2023)

hinder adoption of Agtech solutions in rural areas, and a scarcity of qualified professionals and agrifood universities limits the development opportunities for disruptive technologies in the Agrifoodtech industry by limiting the collaboration opportunities between universities and startups.

Drivers for the Development of the Agrifoodtech Industry:

Up until now, several factors have contributed to the early growth and improvement of the region's Agrifoodtech industry. First, some private and public initiatives have begun to promote the establishment of Agrifoodtech startups by providing critical high-risk capital and other essential resources. Second, the region has seen a consolidation of a couple of cities as innovation centers due to the presence of major agricultural universities, startups incubators and accelerators, large agribusiness corporations and advanced agricultural infrastructure, among other things. Finally, demand has increased significantly driven by growing interest from established organizations in Agrifoodtech startups, paving the way for corporate-startup partnerships to leverage each other's strengths in developing and validating technologies.

Main Challenges in the LAC Region:

LAC must overcome several challenges to achieve the desired scale and competitiveness. These issues arise from both the demand and the supply sides of the Agrifood value chain.

On the demand side, barriers are mainly associated to the lack of adoption of Agrifoodtech solutions. First, farmers are hesitant to adopt Agrifoodtech solutions due to uncertainty about the return on investment, low customization of available solutions, complex operability, and lack of trust between farmers and startups. Second, a low level of digital skills among an aging rural population, along with low levels of generational replacement, have prevented incoming innovations from obtaining a good footing in the region's agricultural industry, particularly among small and medium farmers. Third, limited access to financing on acceptable terms and conditions that meet the needs of small and medium farmers, restricts available funds for the implementation of Agrifoodtech solutions. Fourth, insufficient rural infrastructure might hinder the adoption of Agrifoodtech technologies. Internet connectivity infrastructure may prevent farmers from acquiring or getting the full value out of Agrifoodtech solutions. Finally, the Foodtech segment of the Agrifoodtech value chain faces a challenge in achieving significant customer buy-in for specific incoming solutions, such as Innovative Food, mainly due to higher prices and taste concerns.

On the supply side, the most common barriers are related to strengthening LAC region's innovation ecosystem, increasing sources of high-risk funding, and attracting skilled and expert talent. Even while LAC has an emerging innovation ecosystem and strong entrepreneurial culture, it is still lagging compared to other regions.

Corporate Engagement

Collaboration between startups and agribusiness corporations is a key lever in the evolution of the Agrifoodtech industry. The former represents a symbiotic relationship in which both parties can greatly benefit from what the other has to offer.

Agribusinesses can interact with Agrifoodtech startups at varying levels of involvement. Agribusiness can gain access to ready to go innovative solutions through licensing agreements, invest in startups to promote and gain preferential access over a disruptive solution, co-develop a solution to their specific requirements, or even acquire and integrate the startup into their

operations to gain access to their resources and unique know-how.

Through these collaborations, agribusinesses can increase their business innovation capabilities, gain access to new markets and customer segments, offer a better customer experience, enhance their brand reputation, and even better manage innovation risks.

To capture the mentioned benefits agribusiness, need to consider lessons learned and best practices around several factors. First, it is important to innovate with clear purpose and agility by establishing objectives that aim to close innovation gaps. Second, developing a structured partnership framework and building a partnership operating model is key to align expectations and establish key enablers for the partnership's execution. Third, designing and executing a change management strategy that ensures change buy-in, cultural integration and talent development, is critical.

Agrifoodtech Subcategories in the LAC Region

Many Agrifoodtech solutions in the Upstream and Midstream categories have significant impact potential in terms of agricultural productivity, climate change, sustainability, food security and inclusion of diverse populations. However, not all of them have the same level of maturity to achieve short-term impact. Three groupings of subcategories were determined based on their impact potential and relative maturity.

Group 1: Includes solutions with lower relative maturity but high impact potential. To keep their competitive edge, startups in these subcategories require significant R&D funding to further mature their technologies, as well as collaboration with academia, research institutes, incubators, and farmers to develop and validate solutions. Subcategories within this group include Ag Biotechnology, Innovative Food, Bioenergy & Biomaterials, and Waste Management.

Group 2: Includes subcategories that leverage their relative maturity to accelerate high impact potential. These solutions need cash to grow and expand their operations. Investment in this group is expected to have relatively lower risk due to the greater predictability of market fit. To promote the success of these subcategories, agribusiness corporations and startups should collaborate to amplify the impact of the solutions while also improving operational efficiency. Subcategories within this group include Ag Marketplaces & Fintech, Midstream Technologies, and Water Management.

Group 3: Includes subcategories with relatively high maturity and relatively lower impact potential. They mainly focus on improving efficiency and fostering productivity. Startups within this group need to expand their market penetration by ensuring greater adoption. Collaboration with the government, NGOs, associations and guilds can help consolidate demand while also developing important enablers to unlock full value. Currently, there are multiple players aiming to target these subcategories, showing early signs of market saturation. Subcategories within this group include Farm Robotics, Equipment & Mechanization, and Farm Management Software, Sensing, & IoT.

By balancing impact and maturity level, the five most prominent subcategories in LAC are Ag Marketplaces & Fintech, Ag Biotechnology, Midstream Technologies, Water Management, Farm Management Software, Sensing & IoT.

Ag Marketplaces & Fintech's relevance in the LAC region stems mostly from a local context in which small farmers have limited access to integrated value chains and financial resources due to market fragmentation. With proven technologies, particularly for fintech, it has demonstrated great performance and plays an important role in enhancing financial access within the agrifood supply chain, with significant short and long-term impacts. Substantial investment figures and successful integration of fintech solutions demonstrate that the industry is well-developed and positioned for ongoing innovation and expansion.

Ag Biotechnology is one of the least funded categories in the LAC region, in part due to the high development time and capital requirements. Yet, it is one of the subcategories with the highest expected growth and greatest potential impact to improve climate change resilience and food security. To foster its development, it needs investment in R&D, as well as collaboration to create a regulatory framework that will increase demand and improve adoption.

Midstream technologies have been gaining relevance in recent years. Traceability, for instance, leverages technologies such as blockchain, IoT and AI to ensure transparency in food security, sustainability, and product quality. The approach meets consumers' demands and enhances farmers' access to lucrative international markets. Similarly, food logistics optimization is key for food security, ensuring efficient food access at affordable prices. Although challenges like system interoperability and accurate data collection still exist, growth and investment trends indicate clear development potential, driven by emerging sustainability compliance regulations.

Water Management solutions' relevance in the LAC region comes from the urgent need to balance agricultural productivity with water conservation, as well as facing water scarcity. The subcategory solutions are essential for enhancing productivity and sustainability; however, they have not yet achieved widespread adoption. Therefore, there is important potential for the subcategory's growth in the region and a high value to unlock.

Finally, Farm Management Software, Sensing & IoT is one of the first subcategories to emerge and has a relatively high level of maturity. It is a widely used option among farmers in the region and is slowly becoming the standard practice across many farms. Although there is still significant room to mature, it has the potential to help farmers face high climate and markets volatility through forecasting and optimization capabilities, that improve efficiency, productivity, and sustainability.

GLOSSARY

Agtech: Is a key concept that denotes technological advances to boost production, efficiency, and profitability in agriculture, while driving sustainability and climate resilience in the sector. This area integrates a diverse array of technologies, including IoT, Data Analytics, Artificial Intelligence, Blockchain, Biotechnology, Robotics and Field Sensors, among others. It is designed to revolutionize a variety of aspects of agricultural production

Foodtech: Relates to technology that enhances efficiency and sustainability of the food value chain, thereby introducing new alternatives to proteins and ingredients and generating innovations in the food industry. This field encompasses the application of food science and technology to improve the processing, preservation, packaging, distribution, and development of high quality and nutritious food.

Category: Refers to the division of the Agrifoodtech industry value chain. It is divided into Upstream: solutions that are close to the agricultural producer and are focused on resource optimization and innovative food production; Midstream: solutions focused on logistics and transportation of agricultural products, as well as conservation and emission reduction issues; and Downstream solutions close to the final consumer and the finished product

Subcategory: Refers to the classification of solutions according to the activity in which they are employed. Each subcategory belongs to a category depending on the part of the Agrifoodtech value chain they impact with their operations (see Section 2.2 for more details).

1

INTRODUCTION

1. INTRODUCTION

1.1. Report Context

In the current context of Latin America and the Caribbean (LAC), the Agrifoodtech industry is a critical pillar for bridging productivity gaps, promoting sustainable development, addressing the climate crisis, and overcoming food insecurity. With a rich diversity of natural resources and agriculture rooted in the region's comparative and competitive advantages, technology applied to agriculture becomes an essential catalyst for tackling current global challenges. This sector not only drives efficiency and productivity in the food chain but also opens new opportunities for innovation, collaboration, and economic progress. The purpose of this report is to provide an overview of the current state of the sector in LAC and the industry's evolution in recent years, understanding the differences between its countries and other global ecosystems. It explores the ecosystem's future challenges and opportunities and identifies how the Agrifoodtech industry can enhance LAC's competitiveness in food production.

1.2. About Agrifoodtech

Definition of Agrifoodtech

In the dynamic landscape of agriculture and food production, the convergence of Agtech and Foodtech has given rise to a concept known as Agrifoodtech.

The term "Agrifoodtech" was introduced in 2017 with the objective of unifying the venture capital approach that historically distinguished Agtech and Foodtech. Agrifoodtech represents the optimization of the global food and agriculture industry and addresses the global challenges that this industry faces by placing global food security at the center of its objectives. To better understand this concept, Figure 1[13] describes the Agrifoodtech chain, outlining the main categories and subcategories from the initial stage of production and harvest (Upstream), through processing, storage, and transportation (Midstream), to the final stages of retail sales, distribution, and food waste reduction (Downstream).

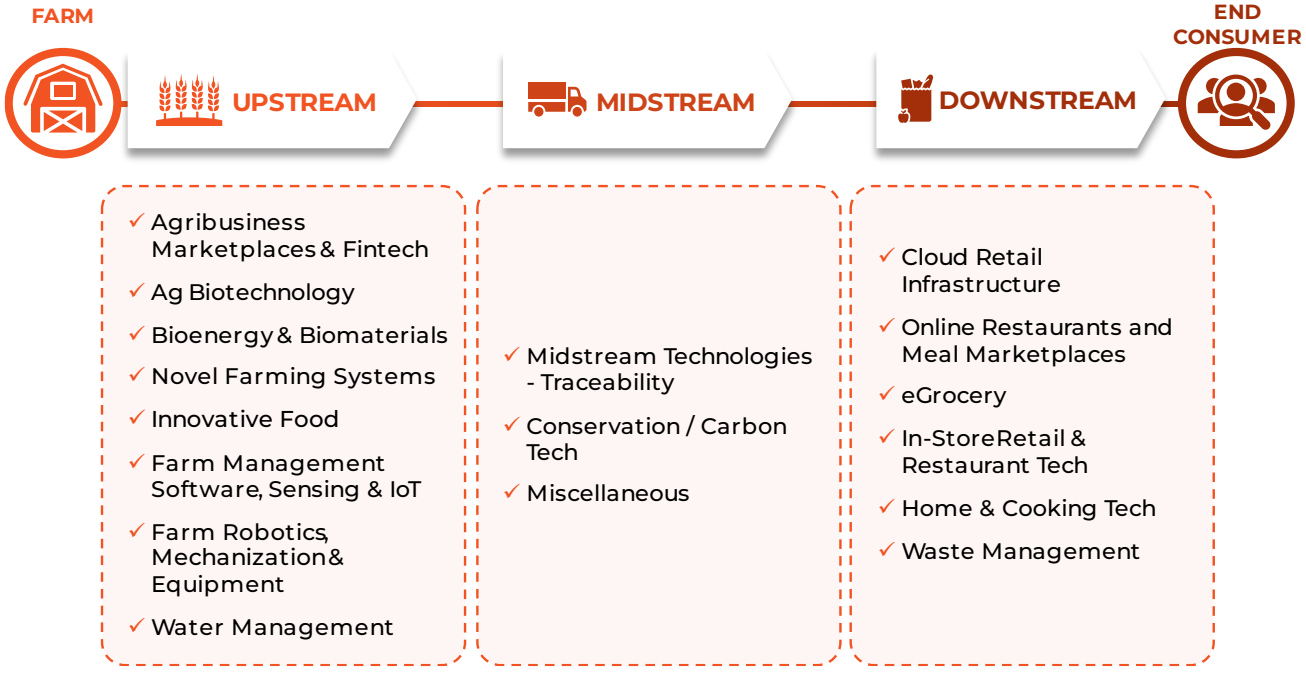


Figure 1: Agrifoodtech Industry Categories and Subcategories

[13] Subcategory categorization according to Agfunder (AgFunder, 2023)

History of Agrifoodtech

Since the early 2000s, major agricultural corporations began to recognize the importance of technological innovation as a key factor in staying competitive in an ever-evolving market. Some even established corporate venture capitals (CVCs) to identify and stay on top of emerging trends and technologies. In this transition, Monsanto was a clear leader and pioneer, as it redirected its strategic focus to technological innovation and began investing in and acquiring emerging technologies. This included acquiring startups like Beelogics and Divergence in 2011, followed by Precision Planting in 2012. Later in 2013 established Monsanto Ventures, which facilitated the acquisition of Agradis, GrassRoots, Rosetta Green, and Climate Corporation for nearly US$1 billion. This last acquisition broadened Monsanto's Integrated Agricultural Systems platforms, focusing on precision agriculture. It also conveyed a clear message to the agricultural industry that its future depended on technological implementation into operations, achieving automation, resource optimization, and operational efficiency.

Between 2012 and 2014, the Agrifoodtech industry worldwide received a total of US$ 10.4 billion. Between 2015 and 2017, after Monsanto's intervention, that figure rose to US$ 26.5 billion

Monsanto's success demonstrated to major Venture Capitals and other corporations that these technological implementations in agriculture were a profitable and appealing field[14]. Consequently, by the end of the first half of the 2010s, several traditional Venture Capital firms began incorporating Agtech sector solutions into their portfolios. Simultaneously, many of the leading agricultural corporations were fostering a greater level of engagement with startups, with some even creating their own corporate venture capital branches (CVCs) to implement, encourage, and invest in emerging technological solutions. Syngenta Group Ventures, Cavallo Ventures, Finistere Ventures, Maumee Ventures, Paine&Partners, and Google Ventures were among the major VCs and CVCs.

During this expansion in the 2010s, significant technological progress emerged, which facilitated the integration of technology into agriculture. Farmlogs' agricultural management software, acquired by Bushel, showcased the ability to simplify the management of agricultural activities. Furthermore, the AgFiniti platform was among the first to develop data analysis capabilities for equipment monitoring, field mapping, and crop performance analysis. Novel GPS systems were also developed, which allowed drones to autonomously navigate fields, identify areas that required treatment, and apply chemicals with exceptional precision. These advancements paved the way for more complex, specialized, and precise technologies that emerged subsequently, defining the subcategories of the Agrifoodtech industry.

This industry transformation was reflected in a significant increase in investment: between 2012 and 2014, the Agrifoodtech industry worldwide received a total of US$10.4 billion, and subsequently, between 2015 and 2017, after Monsanto's intervention, that figure rose to US$26.5 billion, underscoring the industry's growing investor attraction[15].

Additionally, the rise in Agrifoodtech funding is a result of the increasing popularity of Agtech and Foodtech in the 21st century, which is driven by emphasis on sustainability, climate change mitigation and increasing climate resilience, improving efficiency, shifting consumer trends that have altered the way in which end consumers buy food. As digital technology becomes more integrated with agriculture, Agtech has gained focus and relevance due to its emphasis on sustainability, mitigating the impacts of climate change, and improving efficiency. The global Agtech market size was valued at US$ 15.5 billion in 2023 and is expected to surpass US$ 57 billion by 2032, with a Compound Annual Growth Rate (CAGR) of 15% between 2024 and 2032[16]. However, Venture Capitals have also provided significant support to the Foodtech sector, investing over US$ 88.4 billion in Foodtech companies between 2018 and 2022 worldwide. This

[14] (Leclerc & Tilney, 2015)
[15] (AgFunder, 2017)
[16] (Expert Market Research, 2023)

commitment has significantly boosted innovation in the food value chain[17].

Even with these encouraging numbers, the global Agrifoodtech industry is presently experiencing a slowdown in investment. The industry investment levels in 2023 hit their lowest level since 2016 with US$16 billion, after an all-time high in investment in 2021, where global funding reached US$53 billion (Figure 2). This report will explore the internal and external factors that have contributed to this investment decline. Nevertheless, the pressing need to improve the food value chain, coupled with global challenges such as climate change and food security, promotes the continuous development of the industry and the opportunities it holds.

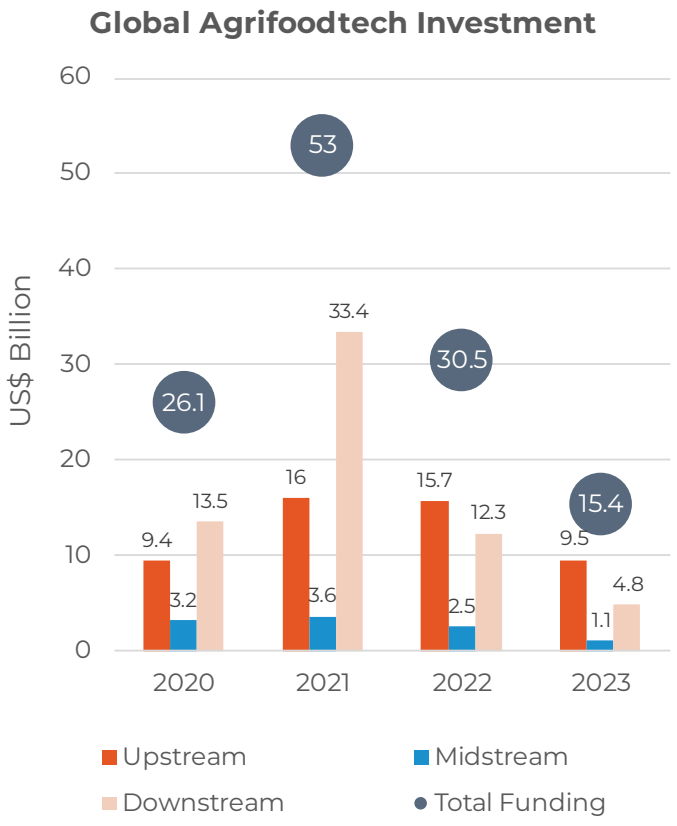


Figure 2: Global Agrifoodtech Investment 2020-2023

Historical Background of the Agrifoodtech Industry in LAC

Over the last five years, there have been significant efforts and advancements that have contributed to the growth of the Agrifoodtech industry in Latin America and the Caribbean. Nonetheless, the maturity of the industry in the region remains low there is still an enormous potential to unlock, particularly in the Upstream category, where technology adoption is lower than in other regions, such as Europe and the United States[18].

Further evidence of this low maturity is the relative underinvestment in Agrifoodtech solutions, despite the region's significant relevance to the global agricultural system. Latin America and the Caribbean account for approximately 9%[19] of agricultural value of production and approximately 18%[20] of agricultural production in tons. Nevertheless, there is a disconnection in Agrifoodtech investment, as the region only captured 5% of global funding between 2018 and 2022[21], and even less in 2023 with just 2.3% of global investment[22].

To properly drive the development of the Agrifoodtech industry in the LAC region there needs to be an increase in funding, from both private and public sources. This will enable the maturation of existing technologies and develop new ones that adapt to the region's unique requirements.

Investors need initiatives that enhance their certainty to address this investment gap. First, it is necessary to establish a regulatory framework that would facilitate the development of a stable investing environment and a variety of investment incentives. The Enterprise Investment Scheme and the Seed Enterprise Investment Scheme, which were implemented in the United Kingdom, are examples of successful enabling policies implemented around the globe. These legal guidelines offer tax incentives to investors backing emerging and high-growth companies. Moreover, the promotion of demand for Agrifoodtech solutions can enhance investor confidence.

[17] (Dealroom.co, 2024)
[18] (Fiocco, Ganesan, Garcia de la Serrana Lozano, & Sharifi, 2023)
[19] (Food and Agriculture Organization of the United Nations, 2022)
[20] (Food and Agriculture Organization of the United Nations , 2022)
[21] (AgFunder, 2023)
[22] (AgFunder, 2024)

In contrast, LAC has key characteristics that can be utilized to improve the development of its Agrifoodtech industry. These include a strong relevance in the global agricultural value chains and a strong entrepreneurial quality.

First, Agrifoodtech is on the edge of becoming a critical instrument for the preservation of sustainability and competitiveness in agricultural production. This creates a burning platform for its development in a region where agriculture is one of the most relevant industries. The LAC region holds 576 million hectares of agricultural land (more than any other region), over 15 million farmers, 31% of the planet's freshwater, and 50% of global biodiversity. Additionally, It is endowed with an abundance of natural resources[23]. Furthermore, in comparison to other regions of the world, the agricultural industry accounts for a larger share of GDP in many countries in the region. In 2022[24], agricultural production contributed only 1.6% to the GDP of the European Union and 5.5% to the GDP of the United States. However, in the LAC region, it represented a share between 3% and 17% for different economies, and a 7% for the entire region's GDP in the same year[25]. This highlights the great relevance of agricultural activity and the need for continuous technological advancements to support sustainability, drive productivity and economic growth, as well as to unlock the region's potential to enhance its competitiveness as a global agricultural powerhouse.

Second, the LAC region has a strong entrepreneurial culture that can be leveraged to foster innovation within the agrifood value chain. Historically, the region has experienced long-standing unmet needs that have been neglected by both the public and private sectors. This has created a space for local entrepreneurs to capitalize on new opportunities and offer long-awaited and disruptive solutions throughout the region. This can be exemplified by the 41 unicorn startups[26] that the region has across different industries, including Agrifoodtech. The market success of several unicorns in the region has served as a source of inspiration and encouragement to take on new risks, thereby promoting growth in the innovation ecosystem. For instance, one of the region's unicorns in Agrifoodtech, Rappi, has prompted the creation of nearly a hundred startups founded by former employees, more than any other corporation in Latin America (e.g. Laika, Chiper, Tül, Apparta, among others)[27].

Moreover, increasing internet penetration, a growing pool of youthful tech talent, and an increase in English speakers, have fostered the emergence of an innovation ecosystem[28]. Additionally, governments such as those in Chile and Brazil have acknowledged the importance of this sector and are actively working on developing regulatory frameworks to foster the creation of new technologies, and leading policies that facilitate access to resources and financing, as well as to create the necessary digital infrastructure. For example, Argentina and Mexico were pioneers in establishing regulations for genetically modified crops[29], while the Startup Chile initiative launched by CORFO promotes a dynamic ecosystem of startups to drive innovation in the region[30].

Furthermore, LAC's region growing interest and perceived high potential in the Agrifoodtech industry have resulted in the organization of the first international summits and forums focused on agricultural technologies. These events served as essential platforms for the integration and engagement of various stakeholders, supporting innovation, collaboration, and industry development. Similarly, they facilitated an open dialogue and the exchange of ideas among key industry participants, from researchers and entrepreneurs to investors and government institutions. This allowed for the identification of common challenges and the pursuit of joint solutions to drive a comprehensive approach for the development of the Agrifoodtech industry. Some of the earliest and most relevant examples of these events included the inception of the World Agritech Summit in 2012, which annually attracts over

[23] (Jacto, 2022)
[24] (USDA Economic Research Service, 2024)
[25] (The World Bank, 2022)
[26] (Startupeable, 2022)
[27] (Rappi, n.d.)
[28] (Pertsiya, 2024)
[29] (Ministerio de Agricultura, Ganaderia y Pesca Argentina, n.d.)
[30] (CORFO, 2024)

2,500 key industry players. Since 2020, the World Agritech South America Summit in Sao Paulo is a version that is specifically tailored to the Latin American industry. This event has demonstrated a growing interest in the Agrifoodtech sector in the LAC region. Similarly, other key events were subsequently launched, such as the Regenerative Agriculture Summit Series, which was held in Europe, the United States, and Latin America, that brought together global and regional leaders to discuss sustainable agricultural practices. This series underscored the importance of regenerative agriculture and showcased solutions from the Agrifoodtech industry.

The LAC region is presented with an opportunity to develop its Agrifoodtech industry by combining all the aforementioned factors. This will enable the region to create not only local solutions but also leverage the region's biodiversity to provide exportable solutions to other regions of the world, thus demonstrating the versatility and global reach of the region.


2
METHODOLOGY &
TAXONOMY

2. METHODOLOGY & TAXONOMY

2.1. Methodology and Approach Overview

An integral methodology, including primary and secondary research, was implemented to analyze the evolution and current state of the Agrifoodtech industry in Latin America and the Caribbean, as well as to highlight referent success stories and identify future opportunities. This methodology included desk research, literature overview and in-depth interviews with key players in the sector.

Additionally, a two-tiered prioritization of countries was developed to facilitate an in-depth analysis that enabled the report to identify specific trends across the region. The selection considered each country's relevance in agricultural production as well as the level of investment it received and the number of deals (more than 5) it gathered for the Agrifoodtech industry in 2022. Consequently, Tier 1 includes Brazil, Mexico, Argentina, and Colombia, while Tier 2 comprises Peru and Chile, as shown in Figure 3.

The initial phase involved thorough desk research, where secondary sources, sector reports, statistical data, and specialized publications were analyzed. This process allowed the identification and conceptualization of the main trends, key players, opportunities, and challenges characterizing the Agrifoodtech ecosystem in the region. It is important to note that most resources available up to the date of this document's elaboration consider data up to the year 2022. Therefore, the analyses conducted in this report primarily utilize figures up to 2022 to ensure consistent comparison periods.

The second phase involved direct contact with key stakeholders in the Agrifoodtech ecosystem. This diverse group included representatives from the LAC region – including Argentina, Brazil, Chile, Colombia, Mexico – and other countries outside the region such

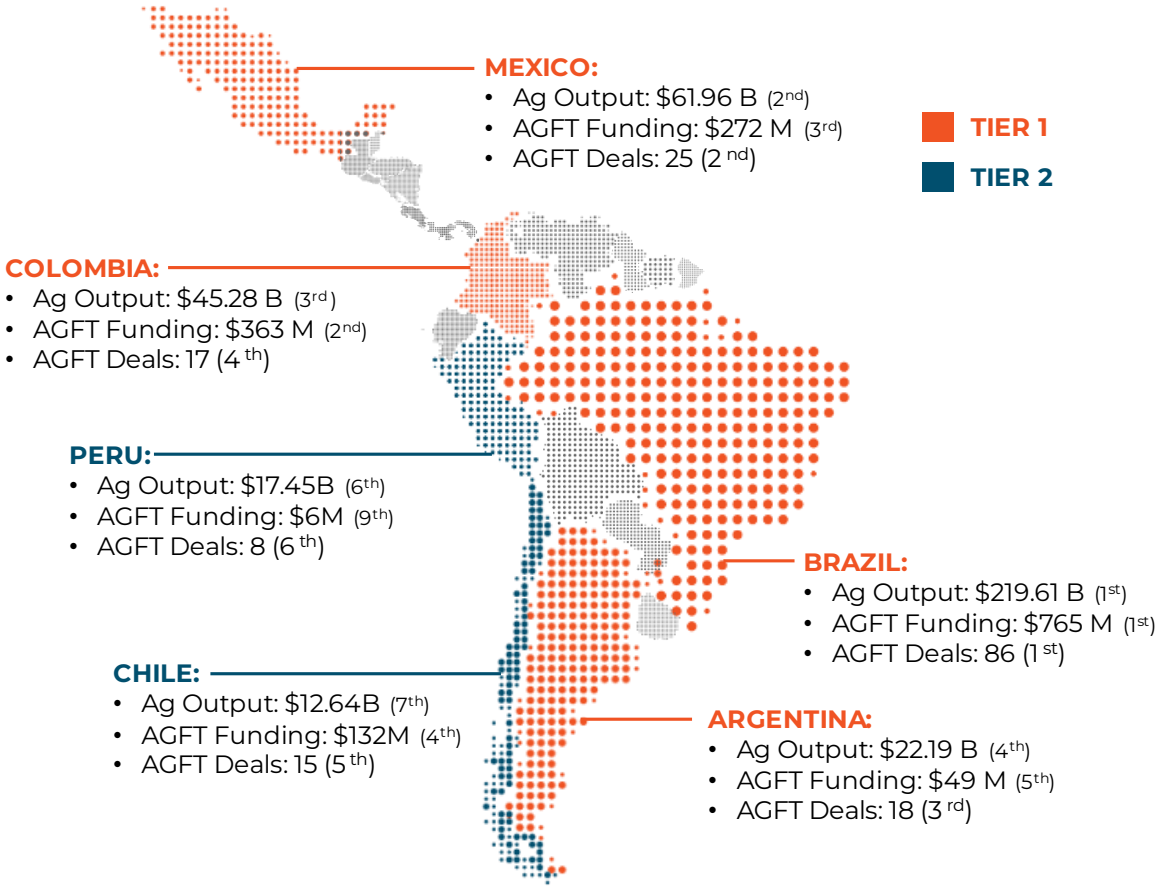


Figure 3: Key Data of the Prioritized Latin America Countries

as Spain and the USA. These represented a wide range of entities, including startups at different stages of development, established scale-ups, sector-dedicated investors, private equity funds, leading corporations, NGOs engaged in sustainable development, and academic experts. More than 40 in-depth interviews were conducted to acquire firsthand insights, experiences, and visions of the industry in the upcoming years. The Appendix contains information regarding the distribution among countries, the type of stakeholder, and the categories and subcategories.

The integration of the desk research, ecosystem analysis, and in-depth interviews provided a panoramic and contrasted view of the Agrifoodtech industry in Latin America and the Caribbean. The results reflect initially identified trends and challenges and incorporate the authentic voices of those actively shaping the industry's future.

2.2. Taxonomy

This study follows the standard taxonomies of the Agrifoodtech industry, aligned with those being used in AgFunder's reports. This taxonomy divides the value chain into three categories: Upstream, Midstream, and Downstream.

Upstream

The Upstream category is composed of eight subcategories:

Ag Marketplaces & Fintech

Platforms for trading agricultural products, purchasing inputs, leasing equipment, and the provision of financial services to farmers, such as payments, insurance, financing, and access to credit.

Ag Biotechnology

Inputs in crop and livestock farming, such as genetics, microbiome, reproduction, animal health, genetically modified organisms, biofertilizers, and biopesticides, to improve productivity and sustainability.

Bioenergy & Biomaterials

Extraction and processing of non-food feedstocks, development of biofuels, biomaterials, and bio pharmaceuticals. Includes the use of agricultural waste to produce energy, the creation of sustainable materials for various industries, and the use of bioactive components for medical and pharmaceutical applications.

Novel Farming Systems

Indoor farms, aquaculture, insect and algae production.

Innovative Food

Cultured meat, novel ingredients, alternative proteins, and plant-based food.

Farm Management Software, Sensing & IoT

Solutions that integrate big data analytics and decision-support software from a variety of sources, including sensors, weather forecasts, and crop health assessments, to provide comprehensive insights.

Farm Robotics, Mechanization & Equipment

On-farm machinery, automation, drone manufacturers, and crop equipment.

Water Management

Reducing and optimizing water usage in the initial stages of agricultural production, through innovative technologies and practices.

Midstream

The Midstream category is composed of three sub-categories:

Midstream Technologies

Technologies for food safety and traceability tech, logistics and transport solutions, and processing technology.

Conservation & Carbon Tech

Technologies and tools for ecological restoration, including carbon credit platforms and forestry initiatives.

Miscellaneous

All other agrifood-related tech that cannot be classified in other subcategories.

Downstream

The Downstream category is composed of six sub-categories:

Cloud Retail & Infrastructure

On-demand enabling technology, ghost kitchens, last-mile delivery robots, and services.

Online Restaurants & Meal Marketplaces

Online tech platforms delivering prepared food and meal kits from a wide range of vendors.

eGrocery

Online stores and marketplaces for sale and delivery of processed and unprocessed agricultural products to consumers.

In-Store Retail & Restaurant Tech

Shelf-stacking robots, 3D food printers, payment systems, food waste monitoring.

Home & Cooking Tech

Smart kitchen appliances, nutrition technologies, food testing devices, and home growing kits.

Waste Management

Solutions focused on reducing food waste by connecting consumers with food that would potentially be wasted.

Aligned with IDB Invest's priorities, the analysis made in this report targets sub-categories with high economic, social, and environmental impact. As previously stated, IDB Invest's investments align with SDG principles and internal corporate priorities such as climate change adaptation and mitigation solutions, sustainability, SMEs, gender diversity and inclusion and digital transformation, with expert advice and capacity, building to support our clients to navigate through their digital business journey. This report focuses on the Upstream and Midstream primarily due to greater alignment with IDB Invest's strategic objectives considering the opportunities these two categories generate for employment, entrepreneurship, and value creation, while also enhancing social development in education, productivity, and community empowerment, with a focus on small farmers.

3

INDUSTRY OVERVIEW

3. INDUSTRY OVERVIEW

3.1. The Agriculture Industry in the LAC Region

Latin America and the Caribbean are rapidly becoming the world's breadbasket, as they are subject to an increasing demand for agricultural products. Currently, the region is the largest exporter of food, accounting for approximately 17% of total exports. Even more, it sells abroad around 42% of its production (in calorie equivalent). These data reveal the need for the LAC region to address the increasing global demand while simultaneously preserving its resources by improving both productivity and sustainability in agricultural practices.

In 2022, LAC was responsible for 18.6% of the agricultural crop volume produced globally which was planted in 12% of the world's cultivated area[31]. In addition, it is anticipated that the production volume will increase by 14% over the next decade, with 64% of this development being driven by crops, 28% by the livestock sector, and 8% by fish production[32]. In 2022, the production value in LAC amounted to US$ 453 billion, which is approximately 9% of the global agricultural production value of US$ 5.17 trillion[33].

Moreover, it is important to understand the significance of the agricultural industry in LAC's economy, as it accounts for a substantial share of the region's GDP and employment. In total, agriculture accounts for 7% of the region's GDP[34], where for 20

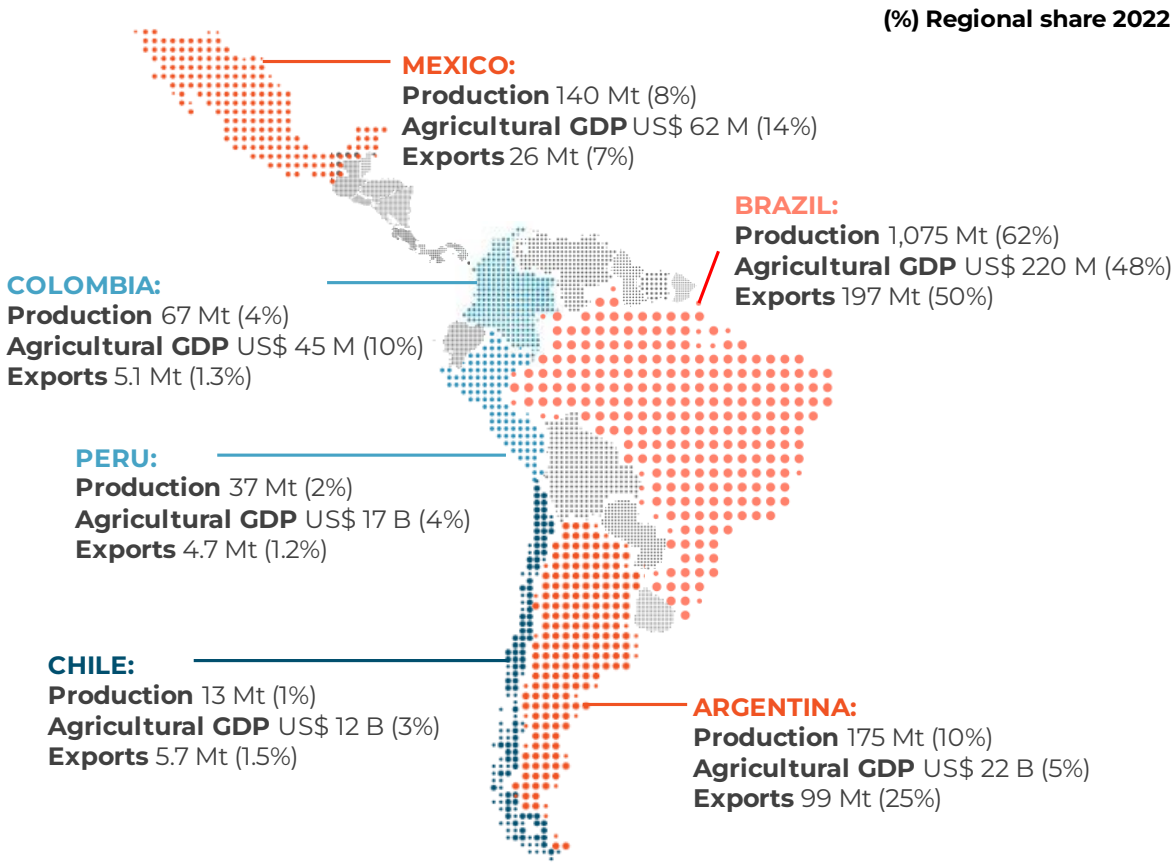


Figure 4: Production Volume, Production Value and Export Volume of agriculture by country

[31] (Food and Agriculture Organization of the United Nations , 2022)
[32] (OECD and Food and Agriculture Organization of the United Nations, 2022)
[33] (Food and Agriculture Organization of the United Nations, 2022)
[34] (The World Bank, 2024)

countries the range is between 5% to 18% of each country's GDP[35]. Similarly, the agricultural industry is an important employer in the region, responsible for about 14% of the labor force. In countries such as Ecuador, Nicaragua, Bolivia, and Peru, between 26% and 32% of their labor force works in the agricultural sector[36].

LAC has a strong concentration in a limited number of crops when analyzed by crop type. The dependence and concentration of agricultural production raises concerns about the lack of crop diversity, which results in a failure to capitalize on the land's diversification potential opportunity. The region's top three crops are soybean (28%), corn (16%), and sugarcane (8%). Soybean alone accounts for a quarter of the value of crops production in the region, and together with corn and sugarcane account for half of the total value of crop production[37]. Soybeans are an important source of protein for animal feed, corn is a versatile grain used for food and fuel, and sugarcane is an ingredient in biofuels and sugar production.

From a country perspective (Figure 4) there is a high concentration of production in the region's most important economies. This distribution may explain the importance of economies of scale in the region's agricultural industry, as countries with superior infrastructure, resources and access to technology are the leaders in production. In terms of volume, Brazil (62%), Argentina (10%), and Mexico (8%) account for 80% of agricultural production[38]. Similarly, in terms of agricultural value of production Brazil (48%), Mexico (14%) and Colombia (10%) hold 72% of total value. The above shows concentration of agricultural volume and value in only four countries which is consistent with their economic dominance in the region, where the same four countries account for approximately 68% of LAC's GDP[39](Figure 5).

As has been mentioned, the LAC region plays an important role in agricultural exports, accounting for 17% of global exports' value. Additionally, this value of exports is concentrated in soybeans (30%) and in coffee, sugar, and corn, combined (20%)[40].

Similarly, the distribution of exports by country is concentrated in a small group within the region, where Brazil and Argentina are the most prominent, accounting for 50% and 25% of the region's export volume in 2022, respectively. Mexico follows with 6% of the region's exports[41].

Lastly, farmland distribution within the LAC region is diverse, with approximately 50% of the agricultural area occupied by a few extensive farms (over 1,000 hectares), and the remaining 50% divided among small and medium-sized farmers.

Country	GDP 2022 (US$ Billion)	Region's Share (%)
Brazil	1,920	30%
Mexico	1,465	23%
Argentina	631	10%
Colombia	344	5%
Chile	301	5%
Peru	243	4%
LAC	6,302	100%

Figure 5: Global GDP of LAC Countries

3.2. Current State of the Agrifoodtech Industry in LAC

Exploring the Agrifoodtech industry in Latin America and the Caribbean offers a glimpse into a sector where innovation meets tradition. The agricultural sector, which has long been a cornerstone of the LAC economy, has been striving to incorporate technological advancements into its operations, seeking to become more sustainable, enhance its productivity, and maintain its competitiveness in the market.

[35] (Statista, 2022)
[36] (World Bank, 2022)
[37] (Food and Agriculture Organization of the United Nations , 2022)
[38] (Food and Agriculture Organization, 2022)
[39] (World Bank, 2022)
[40] (OECD and Food and Agriculture Organization of the United Nations, 2022)
[41] (Food and Agriculture Organization of the United Nations, 2022)

Investment Landscape

The Agrifoodtech ecosystem in Latin America and the Caribbean is comprised of more than 2,500 startups that have successfully raised approximately US$ 7.3 billion between 2018 and 2022. The ecosystem managed to raise US$ 1.7 billion in 2022, which represents 5% of the global capital raised for Agrifoodtech[42]. This low percentage can be attributed to two main factors: the investment risk associated with the region and the maturity of the Agrifoodtech industry.

First, the countries have a risk rating that ranges from intermediate to very high, which creates uncertainty for foreign investors to invest in the region[43] (Figure 6). Second, while there has been significant progress, the industry is still in early stages where factors such as the slow adoption of technologies in the farms and the low maturity of startups (88% of deals since 2018

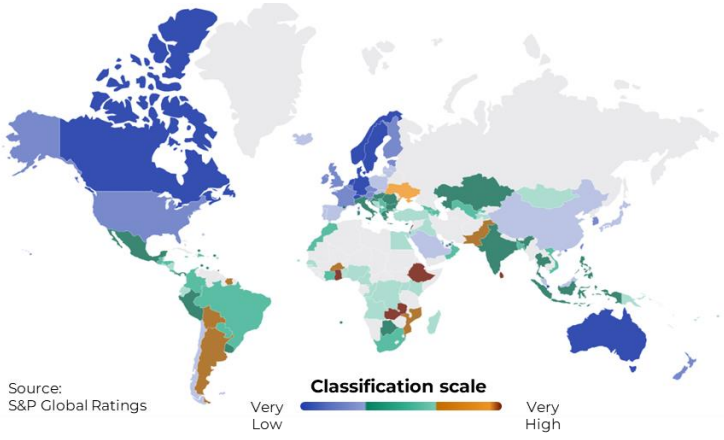


Figure 6: S&P Global Ratings: Country risk classification

have been in early stage) have limited the industry's scalability. Additionally, the limited availability of agriculture-specialized investment funds in the region, political instability, high regional inflation and

[42] (AgFunder, 2023)
[43] (Engin, Chakar, & Lutereau, 2023)

the industry's reliance on volatile variables such as climate, all contributed to a higher risk perception among investors

Although the Agrifoodtech ecosystem in LAC is still in early stages of development, between 2018 and 2021 the level of investment had maintained a growth trend, showing a peak in 2021 with US$ 2.8 billion. In addition, the proportion of late-stage investment deals increased from 7% in 2019 to 17% in 2022[44] (Figure 7), which indicates an evolving level of startup maturity.

Agrolend and NotCo are two startups that have emerged in recent years as examples of the maturation of Agrifoodtech. These startups transitioned from early-stage investment rounds to Series B+ within a three-year period. This stage is considered less risky as the product is expected to have been validated and the funds are needed to continue with the expansion.

Agrolend (Ag Marketplaces & Fintech): A Series B investment round of US$ 27 million was secured by the Brazilian startup in November 2022. With the funds, Agrolend expects to be able to expand its credit offering to more than 10,000 small and medium-sized farms across Brazil and seeks to increase its loan portfolio to around US$ 385 million (BRL 2 billion) by the 2023/24 harvest season[45].

NotCo (Innovative Food): In December 2022 the Chilean secured the extension of its US$70 million Series D investment round. The extension aims to catapult their new AI platform "Giuseppe," a B2B unit that enables innovations for CPG[46] brands, ingredient suppliers and technology providers. Furthermore, they have identified the need to address a challenging near-term economic environment to ensure healthy cash flow and future profitability. Also, they are actively preparing for an IPO, probably by 2025[47].

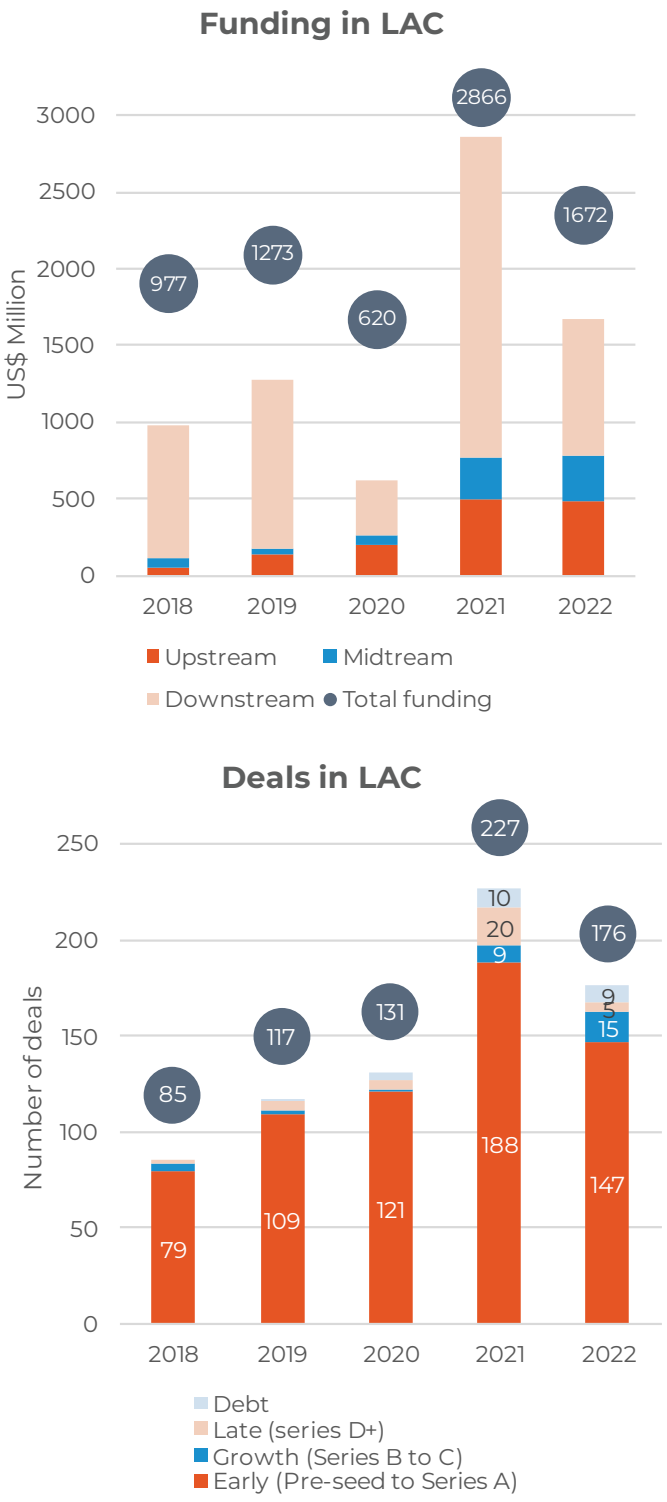


Figure 7: Agrifoodtech Investment in LAC 2018-2022

[44] (AgFunder, 2023)
[45] (Pugh, 2022)
[46] CPG: Consumer packaged goods are items used daily by average consumers that need to be replaced or replenished regularly..
[47] (Yu, 2022)

Recent Investment Downturn

In 2021, the global Agrifoodtech ecosystem experienced a significant investment surge in response to high liquidity in global markets, which was mainly caused by economic incentives at the onset of the pandemic. A total of US$ 52 billion in record-breaking investment was attained by the global Agrifoodtech sector that year. However, the industry experienced a reduction in available VC funds that caused a 42% decrease in 2022, which was subsequently followed by a 49% reduction in 2023 (Figure 9).

There are numerous factors that may have contributed to its sudden downturn. First, wars and disruptions to supply chains generated an increase in input prices[48]. Second, the challenging global economic climate has resulted in central banks increasing interest rates in response to inflation, which has made it difficult for Venture Capital to raise funds. Moreover, the market has faced challenges due to the underperformance of certain investments that were made during the industry's peak. During this period, many startups were overvalued, leading to suboptimal outcomes for investors, particularly in subcategories such as Innovative Food, Novel Farming Systems, and eGrocery.

Region	Funding US$ Billion			% change YoY	
	2021	2022	2023	21-22	22-23
LAC	2.8	1.67	0.28	- 38%	- 83%
USA	21.0	12.4	5.4	- 41%	- 56%
Europe	9.2	5.9	5.1	- 36%	- 14%
Asia	14.9	8.6	3.8	- 42%	- 56%
Global	52.9	30.5	15.6	-42%	49%

Figure 9: Investment Change by Region 2021-2023

The Latin American and the Caribbean region was the most severely affected by the decline, as investment decreased by 83% in 2023 compared to 2022 (Figure 9).

Nevertheless, it is crucial to acknowledge that the slowdown was a general trend in various industries throughout the region. In 2022, Venture Capital investment fell by 51% in comparison to 2021, the Fintech and Healthtech sectors experienced declines

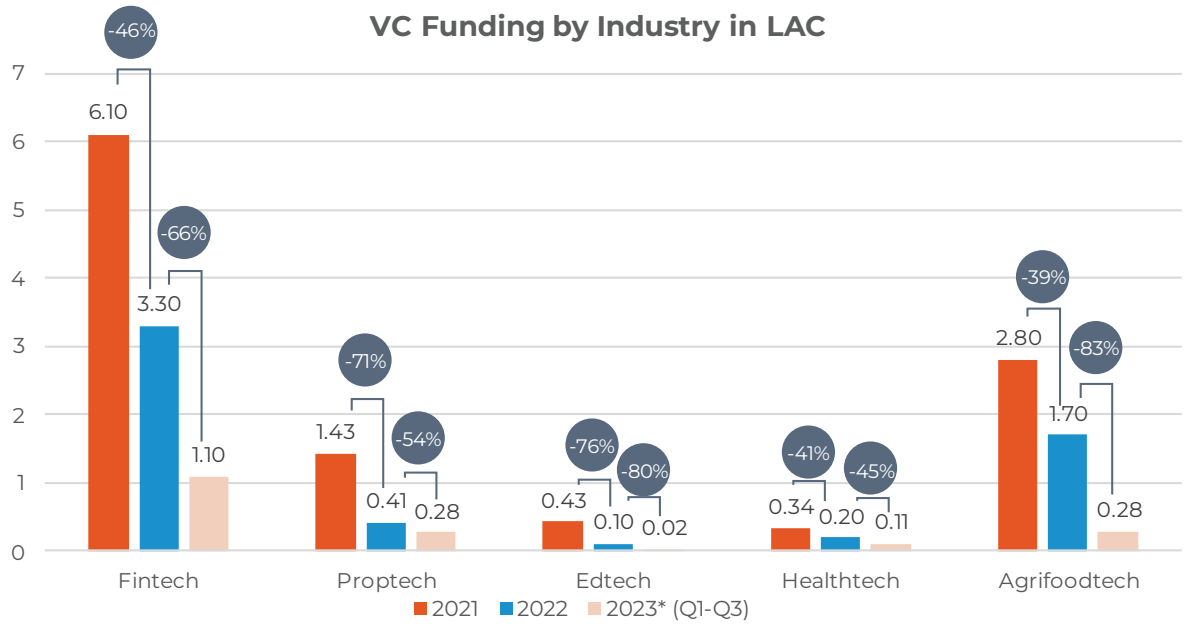


Figure 8: VC Investment Fintech, Proptech, Edtech, Healthtech and Agrifoodtech in LAC 2021-2023

[48] (AgFunder, 2023).

of 46% and 42%, respectively, which were comparable to the Agrifoodtech sector's decline. Meanwhile, Proptech and Edtech sectors declined up to 71% and 76%, respectively[49] (Figure 8).

Thus, although there has been a significant investment slowdown over recent years it is not unique to the region or the industry, given VC investment has seen a decline at a global level and cross industries. In a recent survey of different Venture Capital players, in response to the question "Where are we in the current downturn cycle?": 30% believe that this is merely the beginning of the cycle and expect a further downturn, 45% believe that the sector is at its lowest point, and 11% responded that the worst is over and anticipate better times in the future[50].

Moreover, the growth trend in investments between 2018 and 2021 indicate a growing interest in the industry. In particular, there appears to be untapped potential in the Upstream given the current and future magnitude of sustainability and climate change challenges in the agriculture and food industries. This potential will be further unlocked as emerging technologies mature and find new applications in the industry, such as Generative and broader AI, Biotechnology, Internet of Things, Blockchain, Big Data analytics, among others.

Countries Overview:

The development of the Agrifoodtech industry in the LAC region has not been homogeneous, as different countries have different levels of maturity and even different focus areas across the value chain. In particular, five countries in the region have been the engine behind the industry's development in the region, accounting for a staggering 94% of the investment and 91% of all deals. These countries are Brazil, Colombia, México, Argentina and Chile (Figure 10).

On the one hand, Brazil is the undisputed leader in the Agrifoodtech industry of the LAC region. In 2022, it accounted for 46% of funding and 49% of deals in the region. Overall, Brazil's maturity across the value chain is evidenced by important deals across all categories and an average ticket size of US$ 8.9 million in more than 86 deals in 2022.

Country	Funding US$ Million	Deals	Avg. Ticket Size US$ Million
Brazil	765	86	8.9
Colombia	363	17	21.4
Mexico	272	25	10.9
Chile	132	15	8.8
Argentina	49	18	2.7
Belize	27	2	13.5
Uruguay	10	1	10.0
Peru	6	8	0.8
Total	1,674	176	9,5

Figure 10: Funding, Deals and Avg. Ticket Size (2022) - LAC Countries

Conversely, Colombia and Mexico follow behind in terms of funding and number of deals. They exhibit some of the highest average ticket sizes in the region, with US$ 21.4 million and US$ 10.9 million, respectively. It is important to acknowledge that their favorable Agrifoodtech numbers and maturity has been highly driven by the Downstream sector, which has been historically favored by a considerable flow of capital accumulating most of the investment of these countries in few high-ticket deals.

In 2022, Colombia allocated 69% of its total Agrifoodtech financing to just two startups in the eGrocery subcategory (Merqueo and Muni) and four in Cloud Retail Infrastructure (Rappi, Foodology, Muncher, and Melonn). These startups were between Series B and Series C[51] maturity level. Similarly, 79% of Mexico's total Agrifoodtech financing in 2022 was

[49] (Fonseca, 2023)
[50] (AgFunder, 2023)
[51] In Venture Capital, Early-Stage funding refers to Pre-Seed, Seed and Series A investment rounds, where startups are building on their idea, constructing a minimum viable product, and developing a market strategy. During the Growth stage, which include Series B, C and D, startups have proven their product and are looking for funds to scale by building new products and reaching new markets (Indeed, 2023).

allocated to only two startups in the eGrocery subcategory (Jüsto and Calii) and one startup in Cloud Retail Infrastructure (Zubale). These startups all had a maturity level above Series A with high funding rounds.

These figures reveal that Colombia and Mexico are markets where development is predominantly focused on a single component of the Agrifoodtech chain, resulting in a significant disparity between the high maturity of the Downstream category and the low development in Midstream and Upstream categories. Nevertheless, although Colombia still seems to maintain its concentration within the Downstream category, Mexico has begun branching out into other Agrifoodtech segments, particularly in the bio-energy sector[52].

Even though, Argentina and Chile have weaker investment number than those of Colombia and México, they appear to have a more mature Upstream category. Argentina has leveraged on its strong relevance in agricultural production and research institutions. Additionally, Argentina's tendency to relocate many of its startups beyond its borders, on top of its devaluated currency, may explain the lower numbers despite its good maturity.

Drivers for the Ecosystem Development

The growth and advancement of the Agrifoodtech industry in the region has been driven by three main factors:

1. Private and public initiatives that promote the development of Agrifoodtech startups.
2. The consolidation of cities in the region as innovation centers.
3. The development of demand, driven by growing interest of established companies in incorporating new technologies to support their strategy.

The first important factor is the existence of private and public initiatives that have promoted the establishment of Agrifoodtech startups in the region. On the one hand, the development of the Agrifoodtech industry has been significantly influenced by Venture Capitals. These funds have identified the potential of the industry in the region

and have provided funding in areas where other traditional and less risk-averse investment funds are unwilling to participate. Venture Capital has provided more than US$ 7.4 billion since 2018 and have also allowed startups to access invaluable resources and guidance that has helped early-stage startups to validate their products, develop their business strategy, and scale their operations. Notable examples include The Yield Lab Latam, SP Ventures, Arpegio, Glocal, Barn Investimentos, Xperiment, among others, which are mainly based in Brazil and Argentina, the countries with the highest relevance in the agricultural industry of LAC. Some of the most innovative and impactful startups in the region are included in the portfolios of these investment funds.

On the other hand, there are significant public initiatives that have promoted the development of Agrifoodtech startups by supporting research, as well as providing key resources to startups. For example, a major player in the sector is the Brazilian Agricultural Research Corporation (EMBRAPA), which was established in 1973 and has played an important role in the sector. EMBRAPA has been involved in promoting the use of cutting-edge technologies in agriculture, including biotechnology, precision agriculture, and sustainability. Through its practical approach to research, EMBRAPA has significantly improved agricultural productivity and environmental sustainability in Brazil.

Similarly, the Chilean Economic Development Agency (CORFO) in Chile, has played a central role in fostering

[52] (Marston, Data snapshot: Brazil still leading Latin America agrifoodtech investment, but keep an eye on Mexico, 2023)

innovation in the Agrifoodtech sector, as well as supporting research, by providing funding and technical assistance programs. Since 2011, CORFO has received more than 75,000 project proposals and has provided nearly US$ 236 million in financing for approximately 8,300 initiatives. In addition, Start-Up Chile, a public accelerator sponsored by CORFO, invested about US$ 96 million in startups until 2020. This capital has enabled more than 2,000 startups to raise more than US$ 2 billion, with 71% of the funds coming from foreign sources and 29% from domestic sources.

Other examples of public-private initiatives in other countries include the Argentine Association of Direct Seeding Producers (Aapresid), which has led research in relevant farming practices and has partnered with private companies to share new technologies to farmers in Argentina. In Peru, the National Institute of Agricultural Innovation (INIA), is responsible for conducting research, technology transfer, genetic resource conservation and utilization, and produce high-value genetic seeds, seedlings, and breeders. Lastly, the National Council for Science and Technology (CONACYT) in Mexico provides funding for projects in precision agriculture, biotechnology and food security with the objective of enhancing the productivity and competitiveness of Mexican agriculture.

According to several key industry interviewees, the second factor that has led to the development of the ecosystem is the consolidation of several cities in the region as innovation hubs. These cities have relevant agricultural universities, accelerators, and large agribusiness companies, among others, that help drive the industry.

One of the main cities consolidated as innovation hubs is São Paulo in Brazil. The city has emerged as a regional leader in Agri-Fintech thanks to its status as a financial capital that attracts experts, sponsors, and major financial institutions. In addition, it was chosen to host the World Agri-Tech South American Summit conference, welcoming more than 700 local and international players from South America's dynamic Agrifoodtech ecosystem. These participants included cooperatives, agribusinesses, startups, investors, and government agencies.

Other important cities include Piracicaba and Florianopolis in Brazil, as well as Cordoba and Rosario in Argentina, which are recognized centers of agricultural technological development. Their relevance is attributable to two key factors: high-level agricultural research institutions, and technological infrastructure and entrepreneurial ecosystem. These cities have research centers and prestigious universities specializing in agriculture, such as the Luis Queiroz School of Agriculture in Piracicaba, the Federal University of Santa Catarina in Florianopolis, the Universidad Nacional de Córdoba, and the Universidad Nacional de Rosario, the Universidad Austral, also in Rosario. These institutions promote the development of the ecosystem, by fostering collaboration among scientists, academics and entrepreneurs to accelerate the progress of Agrifoodtech.

In addition, these cities have advanced infrastructure, and an entrepreneurial ecosystem that have permitted the development of technology parks and incubators which specialize in Agrifoodtech. These facilities offer access to specialized laboratories, state-of-the-art technological equipment, and expert mentors to accelerate the development and commercialization of agricultural technologies.

The FoodTechHUB Latam, a Brazilian organization that specializes in the promotion of a variety of sectors, including production systems, processes and technologies, smart packaging, food loss and waste, nutrition, regenerative agriculture, and bioinputs, is a great example of the development of innovation centers. It has also collaborated with the Food Accelerator Network, an accelerator specializing in the Agrifood industry, to set up a program to assist entrepreneurs in validating their ideas to prepare them for commercialization and access investors[53]. Cubo and the Rosario Stock Exchange (Bolsa de Comercio de Rosario) in Argentina are other prominent centers in the region, which contribute to the development of an entrepreneurial ecosystem through the sponsoring BCRinnova an area that promotes the exchange of ideas and synergies between different players in the ecosystem[54].

The third and final key factor in the development of the Agrifoodtech ecosystem has been the recognition by agribusinesses of the strategic importance of incorporating digital technologies into operations. The former has fueled demand, thereby providing startups with a stable client base to enable scaling. Additionally, it has facilitated the creation of corporate-startup partnerships, to leverage each other's strengths in developing and validating technologies. Just as Monsanto did through its acquisition of the Climate Corporation in 2013, companies are constantly looking for ways to improve the efficiency, quality and sustainability of their operations, and are turning to technology to do so. Established companies can guarantee their competitiveness in a dynamic marketplace by acquiring or partnering with startups, which provides them with rapid access to cutting- edge innovations.

Additionally, these acquisitions also boost innovation and entrepreneurship in the region by providing startups with essential resources such as financing, expertise, and distribution channels. This accelerates their growth, thereby creating a dynamic business environment that fosters continuous innovation and development throughout the sector. One example of this virtuous relationship is Pulse Hub, supported by Raizen in Brazil, which works with more than 1,200 startups, that align with Raizen's needs[55]. One notable collaboration is with Arpac, a company that specializes in precise pesticide spraying using drones, which has led to substantial cost reductions. This technology is now being used on Raizen's 30,000 hectares.

3.3. Vision of the Agrifoodtech Categories in the LAC Region

As mentioned above, the next few years will represent both a challenge and an opportunity for the Agrifoodtech sector to respond to growing food demand in an efficient and sustainable way. To address this issue, it is necessary to implement technologies and foster innovation across the entire value chain. The LAC region has been maturing by developing technologies across the three categories: Upstream, Midstream, and Downstream.

[53] (FoodTech Hub Latam, n.d.)
[54] (Rosario Stock Exchange, 2024)
[55] (Pulse Hub de Innovacao, 2024)

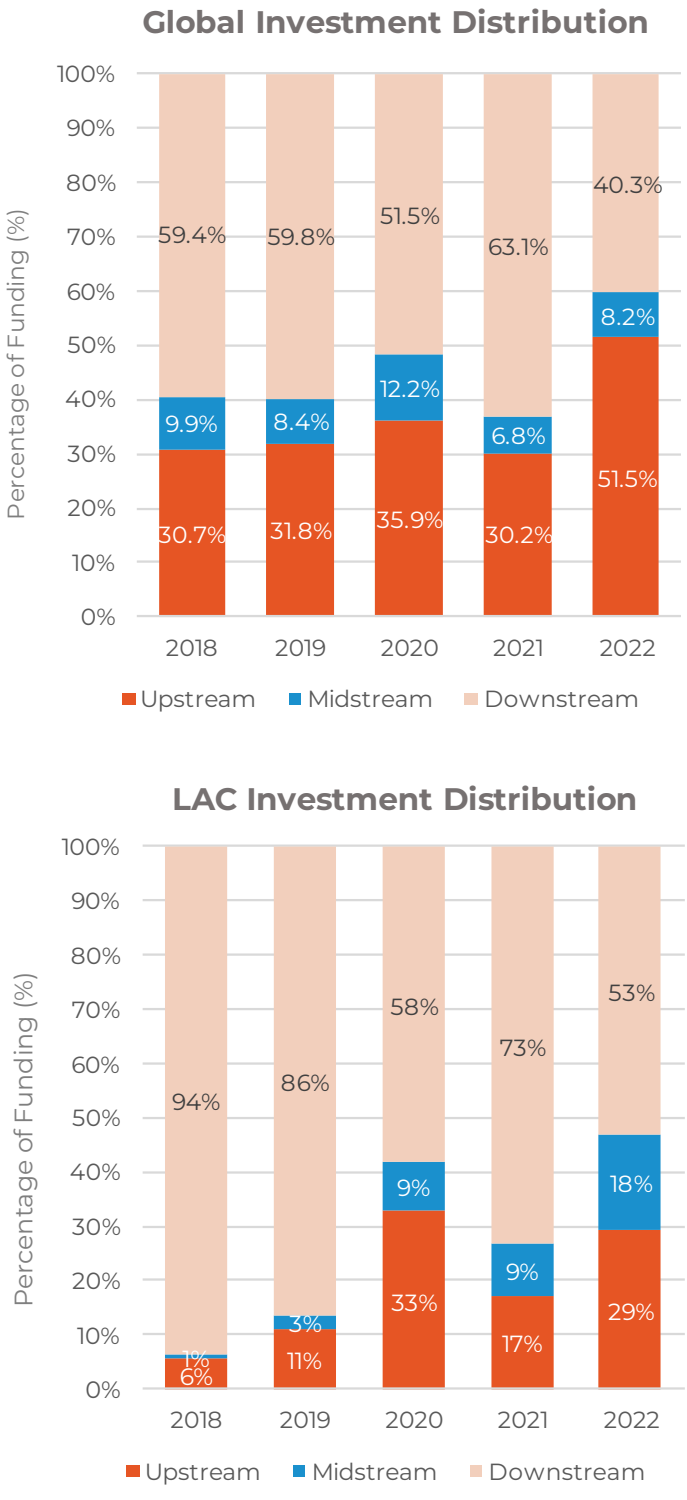


Figure 11: Investment distribution by category at a Global and Regional level

The Upstream and Downstream categories have attracted the most funding on a global scale. In 2018, Downstream accounted for most of the sector's financing (59%), followed by Upstream (31%) and Midstream (10%). However, Downstream's funding share has decreased to 40% in 2022, while Upstream increased its relevance to 50% of the financing (Figure 11).

This reversal can be explained by a growing interest in subcategories such as upstream robotics and agricultural automation and a post-pandemic reduction in interest in subcategories such as e-grocery and phantom kitchens, as consumers have returned to stores face-to-face.

In LAC, investment distribution between categories has followed a similar trend. Although the Downstream category still holds the greatest share of investment with 53%, its has come down from a 94% in 2018. In turn, the share of investment destined for the Upstream category has increased from 6% in 2018 to a 29% in 2022 (Figure 11), showing a growing interest in solutions in the Upstream category.

Similarly, Downstream has held the highest average ticket size (around US$ 17.5 million), with important late stage deals for startups like Rappi and Justo, while the Upstream category has steadily increased its ticket size from $US 1.2 million in 2018 to US$ 6.2 million in 2022 indicating emerging maturity (Figure 12).

Ticket size US$ Million	2018	2019	2020	2021	2022
Upstream	1.21	3.28	3.29	4.33	6.20
Midstream	8.75	1.78	3.11	9.71	13.95
Downstream	24.46	19.64	7.06	24.71	11.70
Average Ticket Size	**11.49**	**10.88**	**4.73**	**12.63**	**9.50**

Figure 12: Average Ticket Size by Category in LAC

Upstream

The Upstream category has consistently increased its investment levels in recent years, growing nearly tenfold between 2018 and 2022 to reach an

investment level of US$ 490 million in 2022 (Figure 13). Venture capitalists and other interviewees agree that agricultural biotechnology, Ag Marketplaces & Fintechs, Precision Agriculture, and Bioenergy & Biomaterials have been and will continue to be relevant due to their ability to reinvent the production of food, improve food quality (e.g. higher caloric quality) and enhance the efficiency and sustainability of food production.

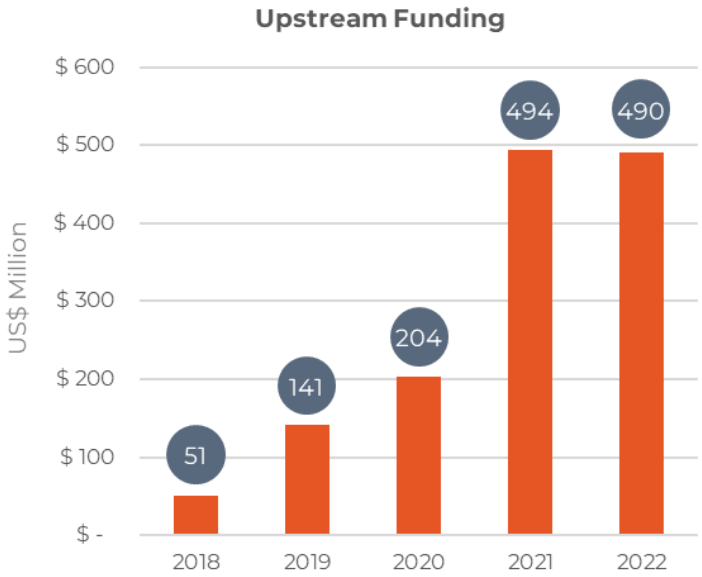


Figure 13: Funding between 2018 and 2022 for the Upstream category in LAC

Latin America and the Caribbean has a unique opportunity to capitalize on some of the Agrifoodtech Upstream technologies and further expand their participation in the sector due to the region's extensive arable land and favorable climate. For instance, the genetic potential of regional crops can be unlocked through advancements in agricultural biotechnology, which can improve crop resilience to climate change effects, pests and diseases.

Similarly, the integration of fintech solutions and digital marketplaces can further develop the competitiveness of the agricultural field and its communities by providing smallholder farmers and agribusinesses with access to non-formal bank financing, as well as market information and value-added services. The Ag Marketplaces and Fintech subcategory accounted for 11.9% of Agrifoodtech investment in LAC in 2022, with US$ 191 million[56]. AgroLend, Terra Magna, and Seedz are three startups from this subcategory that achieved important investment deals in 2022, where Agrolend raised US$ 96 million (US$ 14 million in Series A, US$ 54 million in debt financing, and US$ 28 million in Series B), Terra Magna raised US$40 million (US$ 10 million in Series A and US$ 30 million in debt financing), and Seedz raised US$ 16.5 million in series A). In particular, the debt financing of the first two companies are a sign of good maturity

The use of Bioenergy & Biomaterials technologies represents an opportunity to capitalize on renewable resources and advance circularity in the agri-food sector, as there are currently no major players in the region. One of the factors driving the growth of this subcategory is the need to find diversified, low-emission sources to help countries meet their decarbonization and energy transition goals, as well as to ensure access to clean energy for cooking in a region where around 10% of the population do not have access[57]. Similarly, new consumer trends for sustainable and environmentally responsible products have driven the development of biomaterials, where LAC has an important role to play in this regard due to the region's natural resources.

Midstream

Technologies in the Midstream category have undergone a remarkable evolution in the past five years, increasing financing from US$ 7 million in 2018 to US$ 293 million in 2022 (Figure 14). This evolution has been influenced by several trends and developments, including Automation and Robotics, IoT and Sensors, Blockchain and Traceability, Cold Chain Technologies and innovations in food processing and preservation.

Three main trends have contributed to the growth of this category: the emergence of regulatory compliance for market access, the emphasis on carbon emissions reduction and offsetting, and the implementation of logistics operations to address food insecurity.

[56] (AgFunder, 2023)
[57] (International Energy Agency (IEA), 2022)

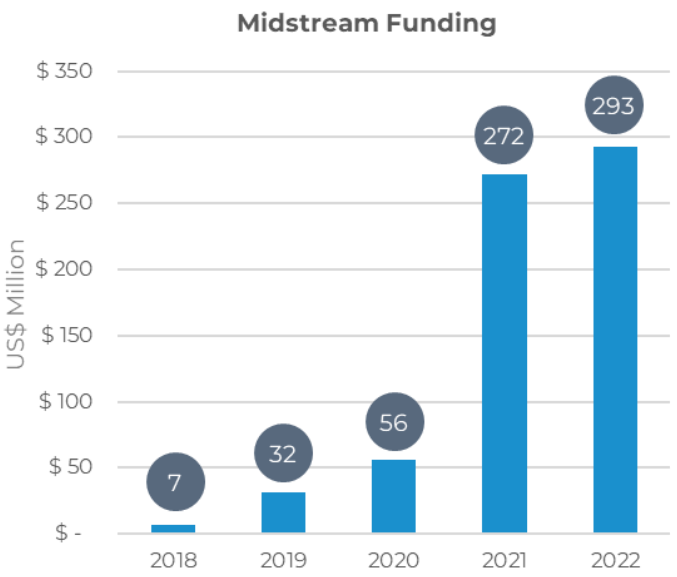
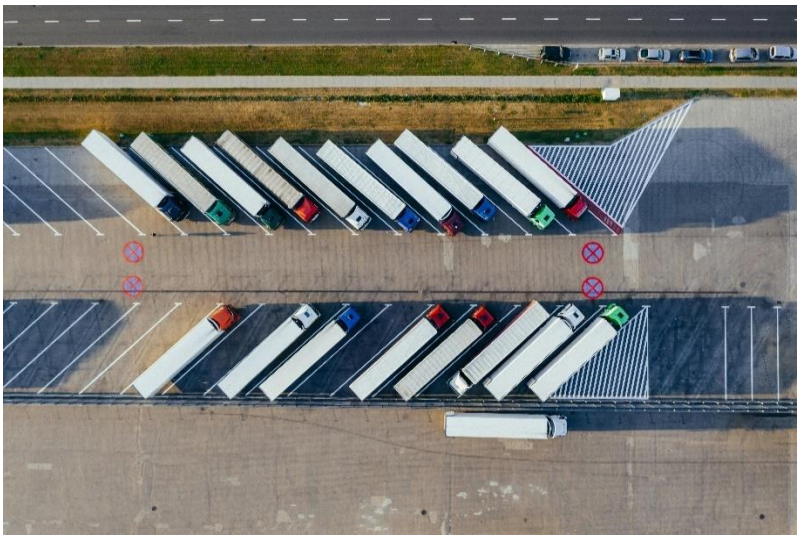


Figure 14: Funding between 2018 and 2022 for the Midstream category in LAC

First, traceability and compliance with emerging regulations for market access are critical considerations for private equity investors in the agricultural sector. The most relevant example is the EU Deforestation Regulation (EUDR), which is designed to mitigate deforestation and forest degradation associated to the production of certain commodities imported into the European Union[58]. This regulation mandates the traceability of origin, which involves the implementation of controls throughout the supply chain to ensure product quality and compliance with sustainability criteria. The enforcement of this new regulatory framework will result in the expansion if a large market for Midstream solutions that enable companies in the agricultural sector to comply with requirements and regulations, particularly in soybean, coffee and palm oil crops, that are prevalent in the LAC region. UCrop.it is a startup from Argentina that operates in this subcategory in LAC. The startup certifies the sustainability of crops with blockchain technology. By 2023, it managed to digitize approximately five million hectares in nine different countries[59].

Second, the Carbon Tech subcategory has seen the emergence of several startups in response to consumer pressure and the pressing need to mitigate deforestation and carbon emissions in Latin America and the Caribbean to combat climate change. In 2022, the Agrifoodtech subcategory accounted for 2.3% of LAC's investment, with a value of US$ 147 million. In addition, the region stands out as a potential leader for the development of carbon markets, especially due to its wealth of natural resources, the vast area that can be used for offsets, and government initiatives that promote low-carbon technologies[60]. The development of advanced carbon markets in Latin America could lead to significant revenue generation as global proceeds from carbon pricing continue to rise. Re.Green, a Brazilian startup established in 2022, employs cutting-edge technology and environmental science to restore land and generate employment in Brazil's Amazon and Atlantic rainforests. The company has made significant progress in the restoration of 19,000 hectares of land[61].

Finally, ensuring food availability for the rural population of LAC, which exceeds 123 million people[62] and is often located in remote areas with difficult access, has created a burning platform for solutions that help address food insecurity. Thus, technologies focused on logistics and transportation solutions are



[58] (Serot & Horenfeld, 2023)
[59] (Forbes Argentina, 2024)
[60] (Pullins, 2022)
[61] (Nicolau, 2023)
[62] (International Labour Organization, n.d.)

essential. GoFlux, a new startup in this category, focuses on offering a real-time freight marketplace that connects shippers with carriers in the agricultural sector. The startup raised US$6 million in April 2024 in a Series A investment round.

Downstream

Downstream has historically been the category that has achieved the largest amounts of investment in the Agrifoodtech sector. In 2022, the Downstream secured an investment amount of US$ 889 million, representing 53% of Agrifoodtech in LAC and 43% of the deals (Figure 15). Two main factors account for the category's increased and faster evolution.

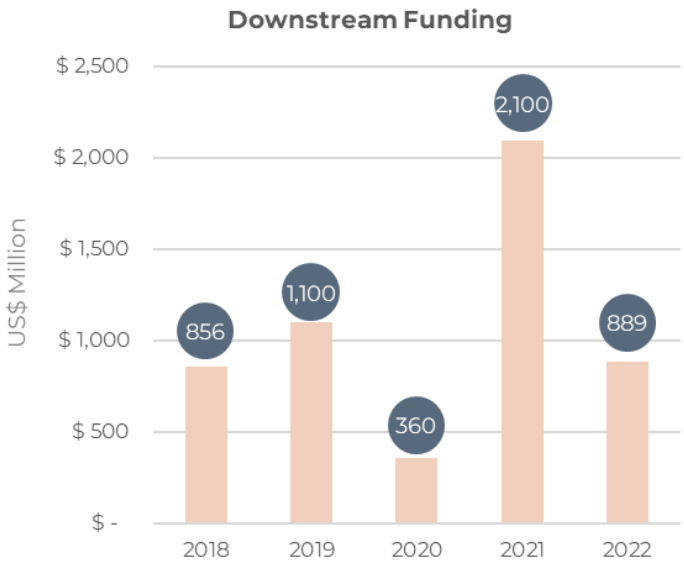


Figure 15: Funding between 2018 and 2022 for the Downstream category in LAC

First, investors perceive the Downstream category as having a lower level of risk than Upstream solutions. On average, Downstream solutions have shorter development cycles, lower barriers to adoption, and lower reliance of highly volatile variables such as weather, price fluctuations, and pests, which are common in Upstream solutions. Furthermore, this category has a clearer and more tangible market potential than Upstream solutions, with shorter expected periods of investment return and higher exit potential.

Second, shifting consumer trends have created a market with high potential for high growth for Downstream technologies. A growing urban population that requires convenient and high-quality food, which was exacerbated by the pandemic, has made these consumer facing technologies highly attractive for founders and investors, given their relatively predictable demand with clear impact and revenue generation.

The most relevant subcategories of the Downstream are eGrocery and Cloud Retail Infrastructure, which accounted for 76% of all funding and 51% of the deals in 2022. Meanwhile, the most important countries in the Downstream category, Colombia and Mexico, where key investment agreements were closed. These included Rappi (US$ 112 million in debt), Foodology (US$ 50 million in the growth stage), and Zubale (US$ 40 million in the initial stage).

Despite the strength and maturity of the mentioned subcategories, there are other emergent ones that have a greater impact potential on global challenges such as Food Security, particularly through repurposing of waste as well as preventing food spoilage.

Waste Management is a key subcategory in the LAC region given the region's low recycling rates, which are significantly lower than those of the rest of the world. The global average recycling rate is 13.5%, while the LAC region has an annual average recycling rate of only 4.5%. The region accounts for 12% of the total global waste. For instance, Brazil is expected to

generate approximately 100 million tons of waste annually until 2040, thereby creating a relevant market for waste management solutions. The objective of waste-to-energy technologies is specifically focused on producing biogas, biomethane, and electric power from the utilization of by-products. This also helps in the provision of energy and cost savings to smallholder farmers for self-consumption.

The reduction of food waste, which occurs when viable food is discarded prematurely or unnecessarily, is one potential solution to the issue of food insecurity. This can be achieved using several Downstream technologies, such as different products that can be used to extend food shelf life in grocery stores and supermarkets and prevent spoilage. Yet, technologies that allow for proper real-time monitoring of inventory levels, expiration dates and quality standards, can help reduce the risk of food spoilage by facilitating timely interventions to redirect surplus food to alternative distribution channels, such as food banks or donation programs.

Overall, it is reasonable to anticipate that the Downstream category will continue to expand at a slower pace in the years ahead, as certain subcategories, such as eGrocery, stabilize and others, like Waste Management, continue to expand.

3.4. Challenges and Opportunities of Agrifoodtech in LAC

Challenges of Agrifoodtech in the Region

Even though the Agrifoodtech sector has been expanding in the LAC region, there are still significant challenges to overcome so it can reach the desired scale and competitiveness, particularly in the Upstream category, where there is significant value to unlock. Overall, four main challenges were uncovered, including lack of technological adoption, the absence of the necessary digital skills in the sector, reduced access to capital and other regional barriers. These challenges will be explained in the following chapters.

Lack of Adoption Willingness

The most predominant challenge that Agrifoodtech startups face is the low level of adoption or farmers' reluctance to adopt technologies. This can be caused by an unclear value proposition, a perception of low solution maturity, and lack of trust between farmers and startups.

In South America, approximately 50% of farmers reported that they are either currently using or plan to use at least one technology in the next two years, as compared to 62% and 61% in Europe and North America, respectively. Adoption level is lower when focusing on precision agriculture hardware, where only 27% of farmers have currently adopted or are planning to adopt it over the next two years, mostly focused on yield monitoring and mapping, variable rate fertilizer application and sprayer sector

controllers[63]. On the other hand, the adoption of sustainability related technologies, including software and hardware that measure carbon emissions and sequestration, and monitoring and optimization of irrigation systems, remain extremely low in South America[64], at about 16%.

There are several factors contributing to low adoption levels. First, 30% of farmers indicated that do not have a clear return on investment (ROI) and that the agronomic and economic benefits of Agrifoodtech solutions are unclear. As a result, approximately 50% of farmers show unwillingness to pay any price for Agrifoodtech technologies[65]. This poses a significant challenge, as improvements or losses within the Upstream category could be attributed to a variety of factors, including weather, price fluctuations, and the quality of inputs. Additionally, farmers may find the benefits and return on technology investments take several years to materialize[66]. Consequently, it's necessary to shift farmers' mindsets to a long-run vision that transcends their short-term needs, as well as to better quantify the economics of potential solutions. Even more, the startups should consider business models that include result-based payment to help redistribute the risk among stakeholders.

Additionally, both small farmers and established corporations do not fully understand current technologies, potentially perceive them as in early stages of maturity, and are unwilling to engage in pilot projects. For this, it is crucial to involve farmers and other key stakeholders in the development cycle to create technical solutions that address farmers' agriculture needs but are also user-friendly and more appropriate for the farmers' capabilities. The latter also considering the profile of the farmers in the region, which have longstanding traditional practices and resist change.

Furthermore, in South America, an additional factor contributing to the lack of adoption is the wariness farmers have regarding the purchasing process happening through online platforms. Farmers find that online purchasing does not allow them to get customized recommendations on what to buy, as

well as the current offerings do not satisfy their delivery and logistic needs[67]. This challenge is particularly important in the LAC region, where there is a large participation and an aging rural population that may not be as comfortable with new digital practices. As a result, it is key to establish a strong relationship with farmers to ensure that their needs

[63] (Fiocco, Ganesan, Garcia de la Serrana Lozano, & Sharifi, 2023)
[64] (Ferreira , et al., 2022)
[65] (Fiocco, Ganesan, Garcia de la Serrana Lozano, & Sharifi, 2023)
[66] (Food and Agriculture Organization of the United Nations, 2023)
[67] (Fiocco, Ganesan, Garcia de la Serrana Lozano, & Sharifi, 2023)

are understood, their questions answered, and the product they receive meets their expectations.

Finally, cross-systems interoperability is a key detractor in technology adoption. Farmers, regardless of their size, struggle to integrate all the different solutions available in the market to successfully capture the full value of a digital operating system. Because of this fragmentation, each solution's value is marginal, making it less attractive for farmers to acquire them. Specifically, farmers usually face challenges in managing multiple farm management software systems, when engaging with a variety of stakeholders, including cooperatives, exporters, and certification standards. This is closely linked with traceability difficulties in countries where agriculture organizations do not appear to use or integrate data across the supply chain, which only increases the likelihood of interoperability issues arising between supporting applications. To overcome this challenge, it is important for Agrifoodtech players to guarantee that their technology is seamlessly integrated with the extensive array of solutions already used by farmers. Additionally, they must blend technical innovation with local knowledge to provide tailored recommendations. A relevant example is Leaf Agriculture[68], a US startup that aims to unify data in the field and food systems through its application programming interface. Leaf collaborates with Aegro in the region, an agricultural management software startup in Brazil, allowing them to offer more products to the market efficiently. Furthermore, software platform providers should focus on a systems approach, considering how all the different parts of farming work together, to develop practical solutions that address different crop needs.

Lack of Necessary Digital Skills

On another note, even if the adoption willingness challenge were to be overcome, there is an important talent gap in the LAC region to properly implement and operate Agrifoodtech solutions. Farmers may be overwhelmed by the complexity of new tools or uncertain about their ability to operate them effectively.

The high age of LAC's rural population and the absence of generational replacement by a younger and tech-driven labor force are contributing factors to the difficulty in adapting to new technologies. It is anticipated that by 2050, 88% of LAC's population is expected to live in urban areas. Furthermore, young people are not currently attracted to the agricultural industry given they perceive it as a low-tech field, where there's a lack of competitiveness in terms of remuneration.

Additionally, the incoming generation is confronted with a talent gap that may hinder the adoption of technologies. Specifically, over two-thirds of the youth population lack a college, university, or high-level technical school education. Even more, approximately 43 million people between the ages of 15 and 29 (31% of the youth population) have not completed secondary education[69]. This significant gap in education, particularly among young people, is a cause for concern, as they are the incoming generation that could help transition from an older population with limited digital skills to a more digital oriented generation that encourages early adoption of agricultural technologies.

Technological adoption in agriculture seems to be strongly and positively correlated with the education level. Early adopters have more years of formal education than late adopters. This may have a beneficial impact on the adoption of technology by decreasing risk aversion[70]. For example, in Argentina 38% of farmers identified the lack of specialized talent as the main factor hindering technological adoption, while 27% of farmers stated that limited training opportunities for agronomists and machine operators as the most important factor[71]. This shows that talent development programs must be implemented in rural communities to drive the digital transformation of agriculture and, consequently, the expansion of the Agrifoodtech sector in the LAC region. These programs can be sponsored by academic and R&D institutions, as well as government initiatives that

[68] (Leaf Agriculture, 2024)
[69] (OECD, 2019)
[70] (Ruzzante, Labarta, & Bilton, 2021)
[71] (Puntel, et al., 2022)

work in close collaboration with startups and established agribusiness corporations.

Reduced Access to Capital

Another key challenge that prevents the expansion of the Agrifoodtech sector is the reduced access to capital, both for Agrifoodtech startups, which prevents them from developing at a faster rate, and for farmers, which prevents them from acquiring and properly implementing Agrifoodtech technologies.

First, it is crucial to understand the funding obstacles that the Agrifoodtech startups are facing, as LAC accounted for less than 5% of global Agrifoodtech investment[72] in 2022 and even less than 2% of global investment in 2023[73]. One key factor that may be hindering investment in the region is the high perceived risk by investors. The EMBI+ indicator shows that the region's emerging economies are associated with a higher perceived investment risk. Although this may be a fact general to other tech sectors, it is an important gap with other Agrifoodtech ecosystems of other regions.

On the other hand, the Agrifoodtech sector still captures a very small percentage of VC funds in the region. In 2023, the Agtech sector represented approximately 5,1% of VC deals, however, it didn't make it into the top 10 vertical of the region which represent around 85% of the investment (Figure 16). In contrast, other verticals such as Fintech, Logistics, and even Healthtech have attracted 46%, 6%, and 3% in funding, respectively, representing 26%, 4% and 5% of the deals.

It is possible that the agricultural industry's nature with long return on investment periods may be the reason behind its low participation in VC funding. First, the industry has a different growth trajectory in comparison to other sectors, which are characterized by low margins and long R&D and sale cycles. Unlike sectors such as software platforms, which measure release cycles in hours or even minutes, Agrifoodtech startups face extremely long development cycles, often getting one shot per year. This extensive timeframe makes developing a robust product and demonstrating its market-fit for investors incredibly challenging[74].

Moreover, the Agrifoodtech industry in the LAC region is still in the process of maturing and has seen few exits over the past 12 years. Only 10 of the 80

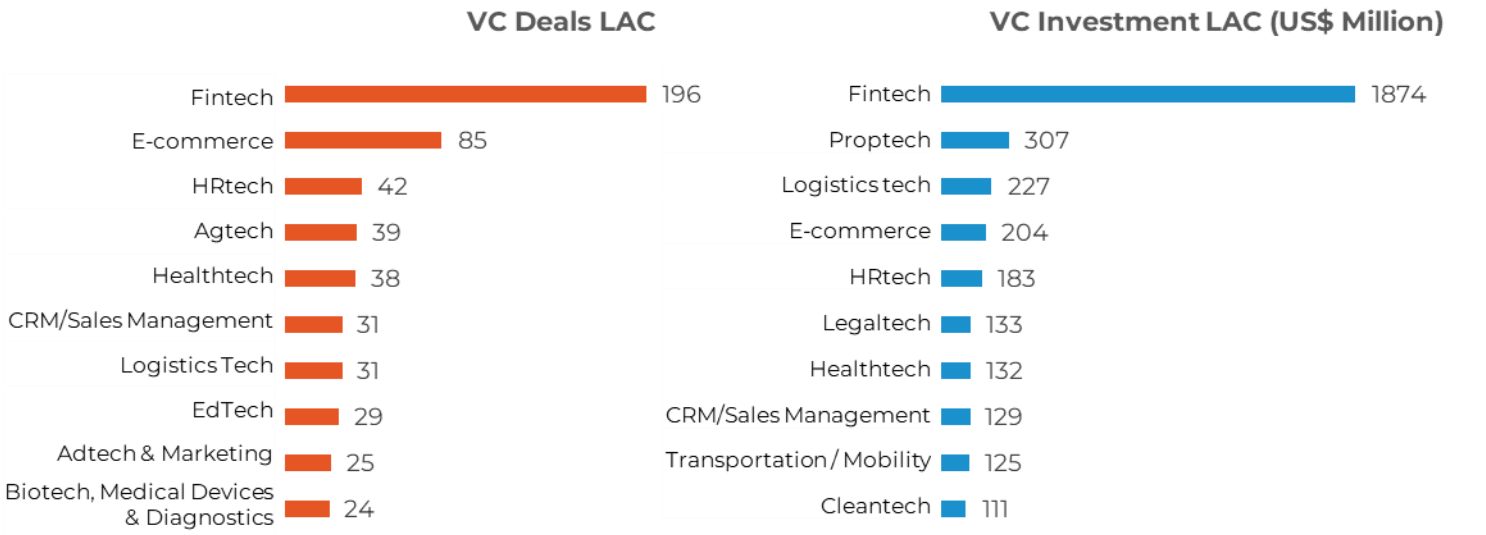


Figure 16: VC Funding and Number of Deals for LAC 2023 (LAVCA)

[72] (AgFunder, 2023)
[73] (AgFunder, 2024)
[74] (Fairbairn & Reisman, 2024)

industry exits have been successful[75]. Similarly, Agrifoodtech funding remains concentrated in the early stages (Pre-Seed to Series A) representing 84%[76], compared to the Fintech sector with 65%[77]. It may be possible that the investment process is being slowed by the lack of exits, as investors are still waiting for the sector's maturity.

Additionally, there is a scarcity of venture capital firms in the region that specialize in Agrifoodtech, which restricts the amount of capital available for investment to a variety of startups. The same is true for government funds, as national programs are mostly focused on agricultural initiatives in general and are not specifically Agrifoodtech oriented.

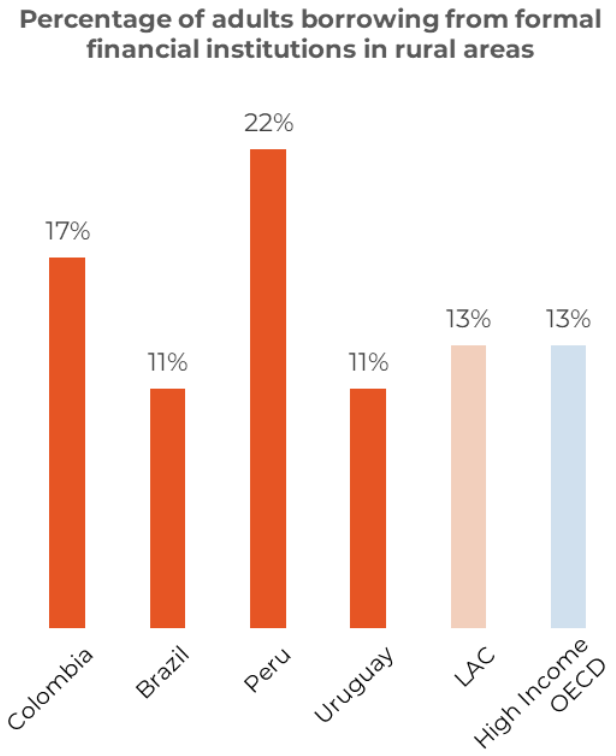


Figure 17: Percentage of Adults Borrowing from Formal Financial Institutions in Rural Areas

On the other end of the spectrum, farmers' capacity to access capital is a significant challenge to Agrifoodtech adoption, 47% of them perceive the high cost of technology to be a main barrier[78]. This is further exacerbated by low levels of financial inclusion in LAC countries as only 11% of rural areas borrow from formal financial institutions[79].

Figure 17, illustrates a need to develop alternative lending and financing solutions to enable farmers to acquire the technologies and minimize their risk.

Other Barriers Inherent to the Region

Lastly, there are other barriers to adoption inherent to the region that may be slowing down the adoption of Agrifoodtech technologies, such as poor connectivity and support services in rural areas, a lack of generational replacement for agricultural practices, and a high heterogeneity in the region's biodiversity which prevents standardization of solutions.

To begin, limited internet connectivity poses significant challenges to the widespread adoption of agrifood technology. There is poor digital and rural infrastructure, a lack of access to essential services in rural areas, and high costs of connectivity in LAC countries. This is evidenced by the fact that 40 million people (6%) in LAC do not live within the footprint of a mobile broadband network[80].

Moreover, LAC countries present a gap between network coverage and the quality of the service. Although most countries have good coverage, the quality of the service might not be sufficient to implement technological solutions. This gap becomes evident by taking a closer look at the 2024 scores of the GSMA Mobile Connectivity Index[81] as illustrated in Figure 18.The constraints imposed by limited connectivity affect various dimensions of farm management in the domain of agriculture, where timely access to data is crucial. The obstruction of real-time data collection results in delays in receiving critical information for on-time decision-making, such as weather forecasts and market prices. Furthermore, modern agrifood technologies, such as

[75] (AgFunder, 2023)
[76] (AgFunder, 2023)
[77] (Smith, et al., 2023)
[78] (Fiocco, Ganesan, Garcia de la Serrana Lozano, & Sharifi, 2023)
[79] (Gutiérrez & Reddy, 2015)
[80] (Castells, Corvalan, & Rattel, 2023)
[81] (GSMA, 2024)

precision farming and smart irrigation systems, often rely on remote monitoring and control. However, limited internet access impedes the seamless functioning of these technologies, impairing farmers' ability to efficiently manage their operations from a distance[82]. In terms of cloud-based farm management software this disruption can affect the traceability and monitoring of the origin and quality of agricultural products, and it restricts farmers' entry into online markets and e-commerce platforms, which serve as direct channels for selling produce and accessing market information. In the meantime, the development and investment of offline solutions may help the acceleration of adoption and the provision of value to farmers despite connectivity issues, where several startups have already begun to develop solutions with lower connectivity dependance.

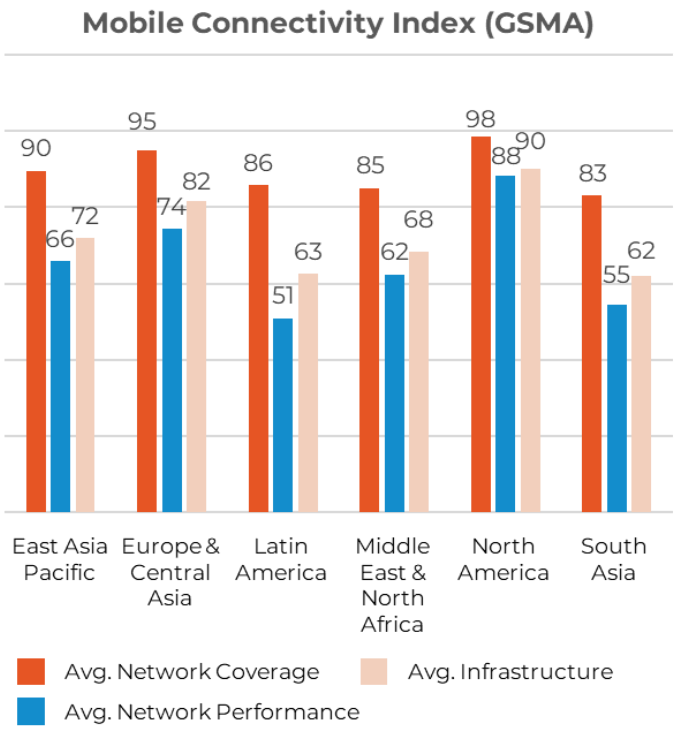


Figure 18: Network Coverage, Performance, and Infrastructure of Mobile Connectivity by Region

Another key challenge in the region is young people are not currently attracted to the agricultural industry given they perceive it as a low-tech field, where there's a lack of competitiveness in terms of

[82] Information retrieved from interviews conducted with Comfama - climaco

remuneration. All these factors make it difficult for the agriculture sector to acquire the right talent that it needs to drive a new wave of technological innovation in the industry.

Lastly, some additional key characteristics in the region that make it hard for the Agrifoodtech sector to scale are the heterogeneity of the crops, topographic conditions, and farmers in the region. This heterogeneity creates a diverse set of challenges that cannot be resolved by a one-size-fits-all solution. Therefore, high levels of solution customization are necessary to effectively generate value to farmers. Startups face a challenge in scaling in a cost-effective manner due to the difficulty of applying standard technologies across the region caused by the high level of customization. Furthermore, farm sizes and farmers themselves also have very different requirements where some solutions may be more suitable than others. Currently, startups may be overlooking this significant diversity, which creates a disconnection between the needs and desires of farmers and the products and services that startups provide. To properly achieve scale, business models and products need to be developed in close collaboration with farmers to correctly understand the requirements and personification needs, recognizing one-size-fits-all is not the standard.

Opportunities of Agrifoodtech in the Region

Climate Change

Currently, the global need to mitigate climate change has become imperative, with a growing awareness focused on reducing greenhouse gas emissions, especially carbon dioxide (CO2). This urgency is reflected in regulatory measures, such as the recent requirement for publicly traded companies to report their CO2 emissions, thereby promoting greater transparency and accountability in carbon management.

In this context, agriculture emerges as a critical sector with significant potential to contribute to reducing CO2 emissions and mitigating the effects of climate change. However, this contribution is not limited to the necessity of reducing direct agricultural emissions, but it also involves the adoption of sustainable practices and innovative technologies, including Water Management, Conservation & Carbon Tech, and Novel Farming Systems. This comprehensive approach can optimize agricultural production, minimize resource waste, and promote climate resilience while reducing global environmental impact.

Water Management is one of the relevant categories in this topic. This sector aims to revolutionize the way water is used and managed in agriculture, resulting in significant environmental, economic, and social benefits. One of the most developed technologies in this category is Precision Irrigation. This technology optimizes data from soil moisture sensors, weather forecasts, and satellite imagery to optimize water consumption. Additionally, advanced water treatment and recycling technologies enable the reuse of agricultural wastewater, thereby

transforming a potential pollutant into a valuable resource.

Similarly, the pursuit of climate smart practices through Conservation and Carbon Tech technologies offers significant opportunities to address climate change challenges in agriculture. These technologies are designed to conserve natural resources, improve biodiversity and reduce carbon footprints. In the region there are solutions focused on the development and deployment of platforms that accurately monitor carbon sequestration and generate verifiable carbon credits. Also, the application of biochar, a stable form of carbon produced from agricultural waste, is gaining traction in LAC to enrich soil carbon content and improve land health[83]. Finally, in 2022[84], the allocation of funding to online platforms that calculate and offset carbon footprints became increasingly important.

Novel Farming Systems includes different methods such as Indoor Farms, Insect Farms, Aquaculture and Vertical Farming. This last method is one of the most revolutionary, as it employs vertically stacked layers, to optimize land use. In the same way. Vertical Farming generates new cultivable areas that would be unsuitable for traditional farming otherwise. This is one of the challenges that Vertical Farming is facing, as more than 288 million hectares in Latin America are expected to be affected by soil degradation processes.[85] In addition, the use of hydroponic systems, a subcategory of Novel Farming Systems[86], especially designed to create an environment where farmers can cultivate crops year-round, thereby reducing the vulnerability to climate changes and increasing production. Similarly, this type of farming eliminates the need for pesticides, reduces transport costs, and lowers labor costs.

Despite a slower pace, LAC's development in this sector has been increasing in recent years. The sector received US$ 18 million in investments in 2022, which accounted for 7% of the total funding in the region[87]. In Latin America the market value of Vertical Farming was US$ 640 million, and it is anticipated that the industry will experience a CAGR of 10,2% from 2022 to 2027[88]. Vertical Farming market value in Latin America in 2026 could be US$ 1.93 billion[89]. On the other hand, Conservation and Carbon Tech is a category that is in high demand by venture capitals in the region, achieving US$ 147 million raised in 2022[90].

Food Security

The challenge of Food Security is not only to meet the needs of a growing population, but also to ensure access to affordable and healthy food for everyone, mainly those in vulnerable communities. LAC is the second region with the highest levels of food insecurity (just before Africa), with over 10% of the population experiencing extreme food insecurity and more than 20% living with moderate food insecurity. Additionally, the FAO determined that 13.2% of global food production is lost, and the Latin America and the Caribbean region surpasses this average with a 14.5% in 2021, making it the third region with the highest food losses worldwide[91].

Precision Agriculture, Ag Biotechnology, Midstream technologies, Food Waste Management, and

[83] (Latin American Biochar Institute, n.d.)
[84] (AgFunder, 2023)
[85] (European Nation and FAO, 2014)
[86] (Burwood-Taylor & Cosgrove, 2017)
[87] (AgFunder, 2023)
[88] (EMR, n.d.)
[89] (Navarro, 2023)
[90] (AgFunder, 2023)
[91] (Food and Agriculture Organization of the United Nations, 2023)

Innovative Food are four effective strategies that the Agrifoodtech industry can employ to tackle this challenge.

First, the subcategories associated with Precision Agriculture (Farm Management Software, Sensing & IoT - Farm Robotics, Mechanization & Equipment) have the potential to increase agricultural productivity by up 80%, resulting in an additional 1.2 billion tons of production, reaching a total of 2.5 billion tons[92].

Second, Ag Biotechnology, which refers to technologies that enable the modification and improvement of plants, animals, and microorganisms, can help to improve crop yields and crops nutritional value, as well as ensure crop resilience to climate change, thereby addressing future food insecurity challenges[93]. For example, Brazil and Argentina have developed crop adaption strategies to cultivate drought-tolerant wheat, which has resulted in a 20% higher yield. Similarly, across the world, there have been different cases, such as genetic corn, increasing in size by 8% to 9%, resulting in a 10% increase in yield. Likewise, a genome edited rice produced approximately 30% larger grains.

Third, Midstream technologies can contribute to the efficient distribution of food to all corners of the region, which increases the access to food by vulnerable communities at affordable prices and prevents food waste. Food Waste Management solutions have the potential to reduce 13.2% of global food waste, by using technologies able to track and monitor the flow of food throughout the entire supply chain, identifying critical points where waste occurs. These solutions enable the optimization of food logistics and distribution, reducing delivery times, avoiding excess storage, and ensuring the efficient delivery of fresh food to markets and consumers. One example of a successful organization is Kigui, an App that connects food suppliers with users interested in acquiring products at attractive prices before they expire. In 2023, Kigui in a partnership with Nestlé, managed to rescue approximately 250,000 products nearing their

expiration date, resulting in a significant decrease of approximately 444.75 tons of CO2 emissions[94].

Finally, Innovative Food solutions can also contribute to solving this global challenge by creating novel food ingredients and by bio-transforming food items to minimize or eliminate antinutrients and undesirable components. These technologies offer the advantages of producing significant quantities of food at a cost-effective rate, coupled with the high nutritional quality of the resultant food products[95]. For instance, plant-based, microorganism, and animal cell-based substitutes for animal meat, fish, eggs, and dairy are anticipated to constitute a minimum of 11% of the world's protein consumption by 2035. The World Economic Forum established that with support from regulatory initiatives and significant advancements in technology, these alternatives have the potential to comprise up to 22% of the total protein consumption[96].

Financial Inclusion

According to the FAO, there are approximately 500 million smallholder farmers worldwide, who account for 80% of the food consumed in developing countries. However, less than 10% of smallholder farmers have access to credit. One of the main reasons of this is the methodology in which traditional institutions rely on to generate a line of credit, that emphasizes on historical financial data, information that is not commonly present in this type of population[97].

[92] (Osorio, 2022)
[93] (Agrilinks Team, 2022)
[94] (Latam Republic, 2024)
[95] (Altaf & Bekhit, 2023)
[96] (Morach, Rogg, & Brigl, 2021)
[97] (Food and Agriculture Organization of the United Nations, 2018)

Although account ownership has reached 76% of adults and 71% in developing countries[98], this challenge is particularly prevalent in the LAC region, where certain countries have the highest percentage of their populations without access to financial bank products. In Colombia 40% of the population didn't have access to banking products in 2021, 42% in Peru, and approximately 30% in Argentina.

The adoption of Agrifoodtech practices powered by the Agri-Fintech companies reflects an opportunity to improve financial inclusion worldwide, especially in developing countries, particularly those in the LAC region. For instance, access to credit might help producers to buy improved inputs or invest in new technologies that could facilitate access to markets, improve their yields and income.

These Agri-Fintech platforms specialized in agriculture facilitate the process for farmers to access financial products and develop their operations. Solutions focused on risk management are relevant by offering micro-insurance products that are specifically designed to meet farmers' needs. Other benefits, as digital wallets, allow farmers to securely save money and give the flexibility to manage these resources from a mobile device[99].

In the region, startups like Agrolend, focused in small and medium sized farmers, provides flexible credit criteria[100] to promote financial inclusion. Some of the impacts are seen as according to the Financial Inclusion Index (FII) of the Credicorp Group, indicates that Colombia's financial inclusion indicators increased 0.9% in 2023, compared to 2022. Additionally, Agree[101], a fintech company based in Argentina, that operates in both Argentina and Mexico, has developed a platform that partners with various banks to offer a unique analysis for farmers. Instead of relying solely on historical performance data, Agree uses prospective information regarding farmers' anticipated outputs, as well as data on soil and climate conditions.

[98] (The World Bank, 2021)
[99] (Digital Partners Network, 2023)
[100] (Agrolend, n.d.)
[101] (Agree, 2024)

4

LAC'S AGRIFOODTECH ECOSYSTEM DEEPDIVE

4. LAC'S AGRIFOODTECH ECOSYSTEM DEEPDIVE

4.1. Challenges and Agrifoodtech Perspectives for Selected LAC Countries

Four countries were selected for a deeper analysis to gain a better understanding of the Agrifoodtech sector in the region. Brazil, Argentina, Colombia, and Mexico were selected based on their relevance in the agricultural industry, as they collectively account for more than 80% of the region's agricultural output. The analysis aims to provide a comprehensive overview of the current state of the Agrifoodtech sector in each of these countries, as well as to understand current challenges that each country is facing, which are driving the need for Agrifoodtech innovation. Additionally, the analysis will identify the stronger and most developed categories and subcategories within each country.

Brazil

Brazil is the leading country in the agricultural industry in the LAC region. It is accountable for 62% of the region's production and for 53% of the region's exports. The country specializes in field crops with sugarcane (67%), soybeans (11.2%) and maize (10.2%)

	Brazil	Argentina	Mexico	Colombia
Current Challenges	• Food insecurity • Deforestation • Vulnerability to climate change • Qualified professionals	• Economic volatility • Price fluctuations (costs) • Low investment	• Water scarcity • Small farmers with little technological adoption • Low access to agricultural commercialization	• Financial inclusion • Market informality • Aging population in the agricultural industry • Armed conflict
Share of LACs Agricultural Production (tons) 2022	62.49%	10.16%	8.16%	3.90%
Share of LACs Agricultural Export (tons) 2022	50.2%	25.2%	6.5%	1.3%
Investment 2022 (US$ million)	765	49	272	363
Number of deals 2022	86	18	25	17
Number of startups	1953	195	127	91
Agrifoodtech ecosystem	Largest LAC Agrifoodtech ecosystem, great concentration in the Upstream sector, particularly in Farm Management. Potential in carbon tech.	Pioneer in the Agrifoodtech sector but with a low maturity level. Startups concentrated in the Upstream and Midstream. Has strong innovation ecosystem (academia and infrastructure)	Investments have been concentrated in Downstream. Great potential to develop Upstream and Midstream, especially Agribusiness Marketplaces & Fintech, Water Management technologies and Midstream technologies	Although high concentration of startups in the Upstream, mature and advanced startups are concentrated in the Downstream category. Potential to develop Upstream and Midstream

Figure 19: LAC Countries Comparison

representing around 89% of the country's production (tons). The nation is also the leading country in the Agrifoodtech sector in the LAC region, with a significant number of startups and responsible for most of the funding in 2022.

Challenges

Brazil is currently facing several challenges that could potentially be addressed by the Agrifoodtech sector. First, despite being the largest agricultural producer in the LAC region, the country still faces a big challenge regarding food insecurity. Between 2020 and 2022[102], 10% of Brazilians experienced severe food insecurity, while 23% endured moderate food insecurity.

On the other hand, deforestation is a great challenge for Brazil, and a key element driving the need for more sustainable agricultural practices. In 2021, the country experienced its maximum level of deforestation in the past 15 years[103]. However, recent government actions, which included more stringent environmental fines, have helped drive down deforestation numbers, where between August 2022 and July 2023 there was a 23% decrease form the same period a year earlier[104]. This shows that public policies have been effective in ensuring individuals and corporations take necessary steps to reduce deforestation in their operations. This may drive the need for new solutions that enable them to meet these guidelines, such as Agrifoodtech.

Finally, Brazil's vulnerability to climate change has been generating annual losses of US$ 2.6 billion, which represented farmer's loss of income and posing a threat to increase poverty in the country in 1.3% by 2030[105].

Agrifoodtech Sector Perspective

As mentioned, Brazil is the leading country in the region in the Agrifoodtech sector. The country has experienced a 74% increase in the number of startups, from 1,125 in 2019 to 1,953 in 2023, over the course of five years[106]. In 2022, the country had 86 investment deals which accounted for approximately 46% of all funding in the LAC region (US $765 million).

The startup participation in the first part of the value chain (Upstream) has increased over the past five

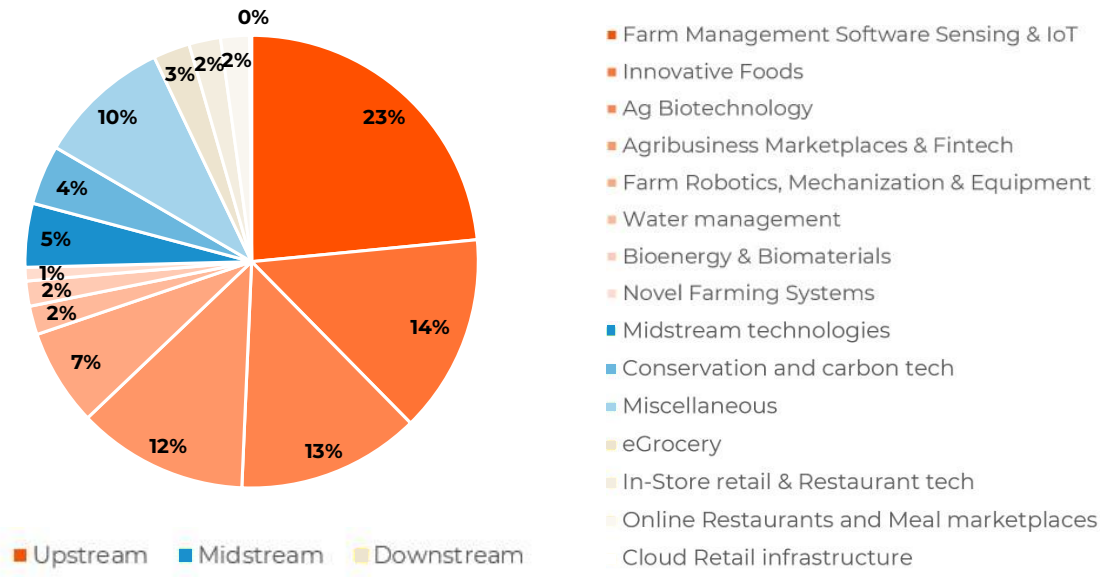


Figure 20: Agrifoodtech Startups in Brazil - Subcategory Distribution

[102] (The World Bank, 2023)
[103] _(Watson K. , 2021)
[104] (Andreoni, 2023)
[105] (Rainforest Alliance, 2023)
[106] (Dias, Jardim, & Sakuda, 2023)

years, from a 72% share in 2020 to a 75% share in 2023. This is further exemplified by the participation of startups in the subcategories, were the ones with the most relevance were Farm Management Software Sensing & IoT (23.5%), Innovative Foods (14.2%), Ag Biotechnology (13.1%), and Agribusiness Marketplaces & Fintech (12.2%) (Figure 20[107]).

The Farm Management Software Sensing & IoT showcases the need for farmers to make better informed decisions that allow them to maximize their crops productivity and sustainable practices. This type of solution is particularly useful in field crops where the ability to capture a significant amount of information is key to make targeted decisions and to optimize resources reducing costs and mitigating environmental impact. Similarly, Ag Biotechnology shows a trend for a necessity to improve crop yields, which is crucial in field crops that usually have lower margins.

One important player in the Upstream and Midstream categories is Solinftec, a company that specializes in AI and Software as a Service for agribusiness, with more than 15 years of experience. The Company manages more than 4.9 million hectares, with operations in 11 countries and oversees more than 90% of the sugarcane operations in Brazil[108]. Another relevant example is Agrosmart, as they use data from soil sensors and satellite images to offer actionable insights on irrigation, climate resilience, and disease management. Agrosmart has raised significant funding and supports over 100,000 farmers, monitoring more than 48 million hectares across Latin America[109].

The relevance of the Agribusiness Marketplaces & Fintech subcategory is mainly driven by marketplaces and sales platforms for agriculture and livestock products, as well as credit. This underscores the need to connect farmers with other links in the value chain to get the best value for their products and have access to financial solutions that are not available through traditional financial institutions.

Lastly, Innovative Foods is also a relevant category in Brazil, confirming the global and local food consumption trends that involve less animal protein, and the promotion of healthy diets and sustainable consumption. For example, the Good Food Institute, is providing research funding of up to USD $26,000

[107] Accenture analysis with information from (SP Ventures, Homo Ludens, & Embrapra, 2023)
[108] (Solinftec)
[109] (Agrosmart, n.d.)

per project[110], to the development of alternative protein ingredients derived from Brazilian plant species[111]. Additionally, major corporations, including 3corações Group, one of Brazil's largest coffee companies, have gained interest in this subcategory, acquiring A Tal da Castanha, a plant-based food producer, in 2020[112].

Conversely, Conservation and Carbon Tech seems to be a Midstream subcategory with untapped potential, accounting for only 4% of the startups. It has become a great tool to face the challenge of deforestation in the country by providing services for restoration, as well as carbon offsets. Recognizing this opportunity, there are four startups in the country that had important deals in 2022. Two startups secured investment deals to grow their operations. First, Re.Green, a provider of ecology restoration of tropical rain forests services had a US$ 76.8 million deal, while Carbonext, an online platform that calculates and offsets carbon footprints, secured a US$40 million deal. Second, two other startups got important deals in the early stages of operation: Mombak, a provider of carbon market services with a US$20 million deal, and Moss, an online platform for the purchase of carbon credits, secured a US$ 10 million deal.

Brazil's Agrifoodtech sector has, in general, experienced a substantial development, particularly in the Upstream category. This could be explained by the strong relevance of the agricultural industry in its economy and exports, which has motivated startups to work toward more productive, efficient, and sustainable farming practices to increase their competitiveness. This becomes very important in low-margin crops, which account for more than 80% of Brazil's production value. Furthermore, the country's successful evolution could be attributed to its strong innovation ecosystem, which is more robust than other countries in the region. The Global Startup Ecosystem index places Brazil as the top country in the LAC region with a score of 9.6, which showcases the country's advantage in innovation[113]. This is further exemplified by the collaborations between

startups, universities, research centers, and their Technological Innovation Centers (NITs), which support early-stage technology development and new tech company formation. Activities include offering innovation and entrepreneurship courses, hosting entrepreneurial contests, establishing technology development agreements with start-ups, and sharing patents and technologies with universities[114]. EMBRAPA and agriculture-focused universities such as Luiz de Queiroz are key to this innovation drive.

Nevertheless, Brazil's Agrifoodtech sector still faces challenges, such as the need to change the traditional farming mindset to embrace new technologies and properly incorporate the new Agtech solutions in operations[115], as well as the lack of qualified professionals[116] to work and develop Agrifoodtech solutions.

Argentina

Argentina follows Brazil as the second most important country in the agricultural industry in the LAC region. It is accountable for 10% of the region's agricultural production and 23% of exports. Similarly to Brazil, most of its production value is concentrated in field crops. Maize (34%), soybeans (25%), and wheat (13%) account for 71% of the agricultural production (tons). On the other hand, Argentina has been an important player in the Agrifoodtech sector and has

[110] (Gallon, 2021)
[111] (García, 2024)
[112] (3corações Group, 2020)
[113] (StartupBlink, 2023)
[114] (Dias, Jardim, & Sakuda, 2023)
[115] (Dias, Jardim, & Sakuda, 2023)
[116] (Dias, Jardim, & Sakuda, 2023)

experienced a substantial expansion of its start-up ecosystem since 2016.

Challenges

Over the last couple of years, Argentina has faced high economic volatility. This has resulted in the agricultural industry experiencing radical changes in margins for agricultural products, which has caused the country to struggle to sustain the supply of wheat, corn, and oilseeds. This is due, among other factors, to adverse weather conditions and political interventions[117]. Considering this, the Agrifoodtech sector has emerged as a key string to pull in the mitigation of the high volatility effects and the establishment of business resilience by helping producers reduce costs through efficient use of inputs, along with better decision-making through platforms that provide market information insights.

On the other hand, the mobilization of venture capital investment is hindered by high inflation and economic volatility. In 2023, venture capital investment in Argentina represented only 2% of all venture capital investment in the region. Comparatively, Brazil, Mexico, and Colombia, accounted for 44%, 28% and 9% of all venture capital investment in the LAC region[118], respectively 8.

Country	2021	2022	2023
Brazil	48%	39%	44%
Mexico	22%	23%	28%
Colombia	10%	15%	9%
Argentina	8%	5%	2%
Chile	6%	7%	6%
Total LAC Investment (US$ million)	$ 16,000	$ 7,900	$ 4,000

Figure 21: Share of Venture Capital Investment by Country in the LAC Region 2023

Agrifoodtech Sector Perspective

Argentina has been one of the pioneer countries in the Agrifoodtech sector with a steady growth of its ecosystem over the past five years, averaging 20 startups per year between 2018 and 2022. The country has 195 startups across the Agrifoodtech value chain[119] as of 2023, with 115 of them receiving funding between 2017 and 2022. In terms of maturity, 18 (16%) of the 115 startups, are just in the MVP stages, 78 (68%) have advanced to early stages, and 19 (17%) are already beginning to scale their businesses and expand in their respective markets. This shows there is still a low maturity level and big potential for growth. On the other hand, Argentina ranked as the fifth most funded country in the LAC region in 2022. The country only represented 3% of LAC's total investment in the Agrifoodtech sector, with 18 deals amounting to US$ 49 million. This may be attributed to the economic volatility challenge previously mentioned, where foreign investors are more hesitant to invest, which is reflected in the VC fund levels shown before.

Additionally, it is relevant to understand the categories and subcategories that have driven the growth of the Agrifoodtech sector in Argentina. In 2022, the strongest category was Upstream with 80% of startups, followed by Midstream and Downstream with 15% and 5%, respectively[120].

Following the category trend, four out of the five strongest subcategories belong to Upstream, while one is in Midstream. Farm Management, Ag Biotechnology, Agribusiness Marketplaces, and Farm Robotics, Mechanization & Equipment were the most relevant Upstream subcategories. The most significant Midstream subcategory was Midstream Technologies.

Farm Management startups showed a 1.5-fold growth between 2017 and 2022. A total of 35 startups were established during this period[121]. Like Brazil, this is the most relevant subcategory in Argentina, aiding producers of field crops to optimize their farm operations by leveraging technologies, such as Machine Learning, to enhance their decision-making.

[117] (Krivonos, n.d.)
[118] (LAVCA, 2023)
[119] (Mac Clay, Feeney, & Sellare, 2024)
[120] (Soler , Arraigada , Krakov , & Fusoni , 2022)
[121] (Soler , Arraigada , Krakov , & Fusoni , 2022)

This, combined with farm automation technologies, which accounts for approximately 7% of Argentinian firms, enables the precise application of inputs, thereby reducing labor and operational costs. The Argentinian success story in this subcategory is Auravant. Founded in 2014, the startup is a digital agriculture SaaS platform to optimize agricultural productivity and efficiency. It is currently in a growth stage, with an annual development rate of 80%. In 2024, it served more than 110,000 users, managing 17 million hectares in more than 145 countries[122]. Argentina has encountered infrastructure and connectivity challenges that restrict the widespread adoption of this subcategory, which is a prevalent issue in the Latin American and Caribbean region. This has hindered the ability of businesses to achieve a relevant scale.

Ag Biotechnology is the second subcategory with the highest number of startups. The subcategory grew from 14 to 37 startups[123], between 2017 and 2022. It shows important potential to generate significant benefits within the next decade. The nutritive quality of produce is essential in a country with a high proportion of low-margin field crops; therefore, genetic modification of crops can help increase yields and improve plague resistance. For livestock, it is also of significant relevance, as it helps identify genetic mark-up of livestock diseases and clone animals with high reproductive potential. Argentina generated 23 new startups between 2017 and 2022. Of these, nine of them are still in MVP stages, 13 are in early stages and only one has managed to reach scale stage[124].

Bioceres, is the most advanced company in the Ag Biotechnology subcategory. It focuses on the development of crop protection solutions (bioinsecticides, biofungicides, bionematicides), crop nutrition (inoculants, micro-granulated fertilizers, biofertilizers) and seed treatment packs. The company developed HB4 wheat, a GMO resistant to droughts and pests. Furthermore, they have created their CVC named Theo, to invest in innovative companies. One example of this endeavor is SF500, a biotechnology investment fund in Argentina. It has been listed on Nasdaq since 2019, and its revenues have surpassed US$ 300 million.

In Argentina, the subcategory of Ag Marketplaces and Fintech is quite relevant. Over the last five years it has founded 10 new startups, and in 2022 accounted for approximately 9% of all startups in the country[125]. Since 2016, Agrofy, Agree, Agrired and Nera have collectively raised approximately US$ 85.5 million. Agrofy has been the one that received the most funding, amounting to US$ 80 million. Agrofy's

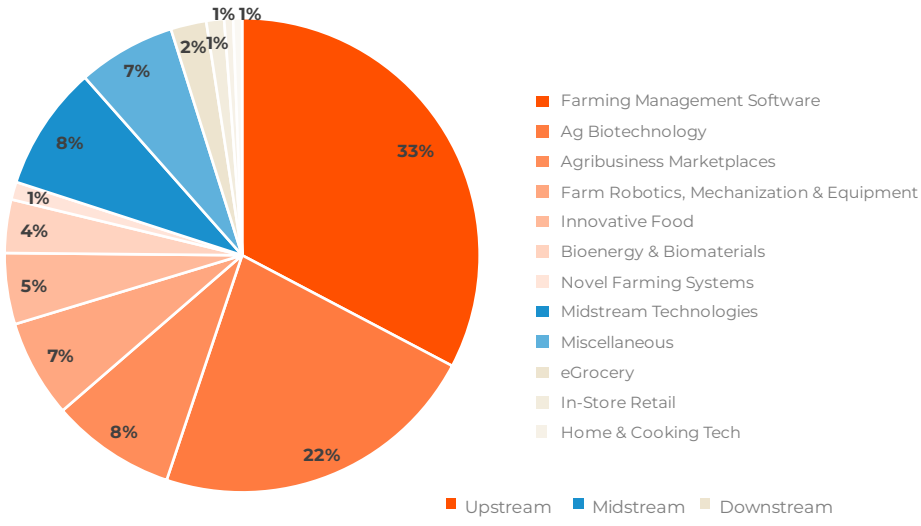


Figure 22: Agrifoodtech Startups Argentina - Subcategory Distribution

[122] (Auravant, n.d.)
[123] (Soler , Arraigada , Krakov , & Fusoni , 2022)
[124] (Soler , Arraigada , Krakov , & Fusoni , 2022)
[125] (Soler , Arraigada , Krakov , & Fusoni , 2022)

most recent funding round was a Series C for US$ 30 million in 2021.

To conclude, Argentina's third most relevant subcategory is Midstream technologies, which accounts for 9% of all Agrifoodtech startups. Similar to Agribusiness Marketplaces, it had a growth of 10 startups over the past five years, two of which are in MVP stages, five are in early stages and two are trying to scale (UCrop.It and Avancargo)[126]. This growth can be explained by the agricultural industry's pressures to provide origin and processing information to final consumers. These technologies can be found in the transport, logistics, and processing segments of the value chain. A notable startup for this subcategory is Avancargo, specializing in digital logistics solutions for the trucking industry. It connects cargo providers with transporters via a digital platform, optimizing load capacity and reducing operational inefficiencies[127].

Overall, Argentina has several success stories across the mentioned subcategories, as well as a thriving startup ecosystem. This growth has been boosted by the presence of a strong agricultural industry, which serves as a natural laboratory to test Agrifoodtech developments, as well as robust public and private institutions that produce specialized human capital and provide a scientific infrastructure, as was mentioned in Chapter 3.

Nevertheless, to continue expanding and growing its startup ecosystem it needs to overcome challenges, such as a lack of infrastructure and connectivity and a difficulty with technology adoption among farmers (mainly in Farm Management and Farm Automation Technologies), and a strong articulation between different stakeholders, including agricultural inputs producers and farmers (Agribusiness Marketplace). The country's VC funding may be hindered by these factors, in addition to an economic volatility challenge. Many startups are striving to expand their operations beyond the country to surmount this last obstacle. In fact, 66% of startups that have been established within the past five years aspire to enter international markets[128].

Mexico

Mexico is the third largest agricultural producer in the LAC region, accounting for approximately 8.2% of the region's production. Similarly, it takes 3rd place in LACs exports with 5%, only behind Brazil and Argentina. sugarcane (39%), maize (19%), oranges (3%), sorghum and wheat (6%), tomatoes (3%), and chilies, peppers, lemons, bananas avocados and mangoes (10% combined) comprise around 80% of the nation's production (tons). This shows a much smaller concentration of crops than Brazil, Argentina and Colombia, and a significant portion dedicated to crops with higher margins.

Challenges

Water scarcity is one of the main challenges Mexico must overcome. In the country's arid regions approximately 35,25 million people live in critical and extremely water-scarce conditions. This has been an escalating crisis, where drought combined with high water consumption has left the country's main cities with inadequate water supplies. The situation is even more critical for rural populations who rely on agriculture and livestock raising for their livelihoods. Water scarcity is a critical factor that affects their living conditions and income sources. Additionally, the problem intensifies with industrial agriculture

[126] (Soler , Arraigada , Krakov , & Fusoni , 2022)
[127] (Avancargo, n.d.)
[128] (Soler , Arraigada , Krakov , & Fusoni , 2022)

companies that place further strain on local resources. Overall, agriculture in Mexico accounts for 70% of all water consumption, evidencing the importance to implement water management solutions[129].

Another main challenge for Mexico is that most agricultural producers are small farmers, who account for approximately 81% of the productive units in the country[130]. While large-scale producers have continuously invested in technologies that have helped to transform their businesses, most family-run farms have struggled to shift their traditional production to high-value crops, which would allow them to access higher-margin export markets[131]. For this, a comprehensive knowledge transfer strategy is needed to foster the evolution.

Additionally, intermediaries pose a significant obstacle to small-scale farmers, as they prevent them from receiving the appropriate value of their agricultural products. Because these rural communities lack access to financing, credit, and overall agricultural markets, they are forced to sell their crops to middlemen at a much lower price than the final price offered to the consumer[132]. This proves unfair, as the producers are the ones who are assuming the high production risk. This leaves farmers with very little income to cover their livelihood expenses, and even less to invest in more advanced farming practices. To face this issue, Mexican farmers require financial resources to expand their operations and utilize solutions that assist them in obtaining the appropriate value for their products in commercial markets.

Agrifoodtech Sector Perspective

As the regional Agrifoodtech sector grows, Mexico is expected to be a key player in the LAC region, given its strong agricultural relevance. Recently, Mexico's Agrifoodtech sector has focused on transport and distribution, the development of organic products, the innovation on traditional methods of farming, and platforms for both traditional and digital sales[133]. In 2022, Mexico received US$ 272 million in investment for the Agrifoodtech sector, which

represents 16% of LAC total investment. It is important to note that almost 80% of Mexico's investment funds in 2022 were directed to only three of the 25 deals. The US$ 214 million were distributed among the startups Justo (US$ 152 million), Zubale (US$ 40 million) and Calii (US$ 22.5 million), all of which are classified as Downstream. Justo and Calii are online platforms and marketplaces to order groceries (eGrocery), while Zubale is a platform that offers retail sales enablement and reward software (Cloud Retail Infrastructure).

However, even with recent focus of investment in the Downstream sector, there are other important startups in the country that are helping address Mexico's agricultural industry challenges. ProducePay, which has headquarters in the US and Mexico, runs an interactive online marketplace offering a variety of services to farmers, including financing and pricing analytics. The service also connects produce growers and buyers, and it underwrites farming and trading risks. The startup has reached US$ 381 million in funding over both equity and debt rounds, with the most recent round being a US$ 38 million series D in 2024. It has helped farmers in making more informed decisions in a volatile market to reduce risk, as well as providing digital tools for procurement, inventory, and sales management[134].

[129] (Pacheco & Manzano, 2024)
[130] (Peréz-López & Mazotti, 2022)
[131] (Oxford Business Group, n.d.)
[132] (Zamarrón, 2023)
[133] (Samper, 2023)
[134] (Zamarrón, 2023)

Another example is MicroTerra an important Mexican startup for efficient water management. Established in 2018, MicroTerra produces a nutritional and functional ingredient for plant-based foods, in an affordable and sustainable way. The company cultivates Lemna, an aquatic plant, while simultaneously reducing effluent output and increasing the income of aquaculture producers by utilizing the infrastructure of existing aquaculture farms and implementing a decentralized production method.

Finally, considering Mexico's significant share of high value products, which are more fragile and highly perishable, Midstream technologies that facilitate improved transport conditions and constant monitoring could be an important subcategory to develop. Similarly, tools that allow for traceability to guarantee sustainable practices and product quality could also be crucial to protect the value of exported crops.

Overall, Mexico is in an excellent position to further develop its Agrifoodtech ecosystem. Its proximity to the United States market enhances its supply chain efficiency and reduces logistics costs for agricultural products and technologies. Moreover, nearshoring fosters foreign investment and technological collaboration, as companies seeking sustainable and reliable agricultural sources further the expansion of the Agrifoodtech sector.

Additionally, technological adoption in agriculture is promoted by the Agrifoodtech ecosystem, which receives support from both academia and government. In Jalisco, the Ecosystem Fund initiative of Danone and the Universidad Nacional Autónoma de México (UNAM) are involved. This initiative improved farmers' technical skills, facilitated access to financing and markets tripling their income and reducing carbon emissions by 13%[135]. Additionally, the Mexican Government promotes the sector by offering open access to agricultural data and, since 2018, has allocated US$ 310.3 million in direct financial support to low-income farmers through the Ministry of Agriculture and Rural Development[136].

Colombia

Colombia is the fourth agricultural producer in the LAC region, accounting for approximately 4% of the region's production. However, it takes 9th place with

1.3% of LACs' exports. The country's top crops are sugarcane (52%), oil palm (12%), rice (4%), potatoes (4%), bananas (4%), and plantains (4%) which collectively account for around 80% of the country's production in tons. This shows a smaller concentration of crops, compared to Brazil and Argentina, while there is still a strong relevance of field crops.

Challenges

Colombia is currently facing different challenges in the agricultural industry. First, financial inclusion, where nearly half of the population has difficulty

[135] (TechnoServe, 2023)
[136] (Oxford Business Group, n.d.)

accessing credit[137]. This prevents farmers and other rural communities from obtaining loans to modernize and incorporate new technologies in their operations. The above is further exacerbated by labor market informality, where half of the rural properties are operated without formal registration in 2019, which is the result of, among other things, inadequate institutional services for property registration[138].

At the same time, Colombia faces an aging agricultural population. In 2021, only 24% of rural the population were young adults[139], a percentage that is expected to decrease. This has been driven by young people's perception of the agricultural industry as a low-tech, low-income field. In addition, the country's armed conflict in rural areas has created high insecurity and the allure of more lucrative illegal crop cultivation, further destabilizing the sector[140].

Agrifoodtech Sector Perspective

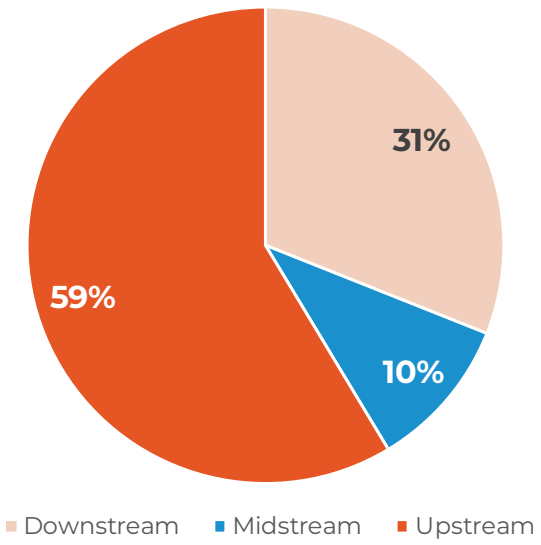


Figure 23: Agrifoodtech Startups Colombia - Subcategory Distribution

Between 2021 and 2022, the Agrifoodtech ecosystem in Colombia grew 44%, from 63 to 91 startups[141]. Colombia was the second country in the region with the most investment in 2022, raising US$ 362 million (22%) distributed among 17 deals. In 2021, the majority of Agrifoodtech startups (59%) were in the Foodtech sector (a predominantly Downstream category). Nevertheless, the majority of Agrifoodtech startups (59%) in the country were in the Upstream sector by 2022, followed by Downstream (31%), and Midstream (10%).

However, the distribution of startups does not follow the same trend as the investment value. Approximately 70% (US$ 251 million) of the funds allocated to the Downstream category in 2022 were distributed in two startups in the eGrocery subcategory and four startups in the Cloud Retail Infrastructure. This difference between startup and investment distribution could be explained by the low maturity of Upstream startups, which are very small and have not achieved significant scale. In contrast, Downstream startups have successfully captured larger markets and even expanded to other countries. The perfect example of an important and successful Downstream startup is Rappi, a consumer tech company that specializes in providing online delivery services in over nine countries. Rappi has managed to secure US$ 2.3 billion in funding over 18 rounds. Furthermore, the Unicorn has had a "multiplier effect" for startups and is the company in LAC with the highest number of startups founded by former employees, consolidating itself as a benchmark of innovation, development, and growth. According to the Marathon Ventures study, there are more than 100 startups in the region founded by Rappi alumni: 46 startups in Colombia, 23 in Mexico, 20 in Brazil, nine in Argentina, six in Chile, two in Peru and one in Uruguay. These startups have created over 14,000 jobs in the technology industry in the region[142].

All the above, showcases Colombia's great relevance in the Downstream category and evidences the gap and opportunity to transfer investment funds to develop the Upstream and Midstream, which are both at a low maturity level. Particularly, the Agribusiness Marketplaces & Fintech, could help address the disarticulation of the different value chain stakeholders, which could provide access to

[137] (Morales, 2022)
[138] (Camacho & Toledo, 2021)
[139] (Buitrago, 2022)
[140] (Pérez-Rincón, Peralta, Méndez, & Vélez-Torres, 2022)
[141] (Cámara de Comercio de Bogotá, 2023)
[142] (Rappi, n.d.)

information and foster greater inclusion for small farmers who have been historically excluded. An example of a startup that aims to play in this field is In-Ova, which provides the implementation of Intelligent Rural Assistance Models based on 4.0 technologies. These models have enabled the connection of rural producers with anchor companies (associations, guilds, corporate agro, financial institutions), making their management much more efficient and sustainable[143].

Additionally, the Colombian government is contributing to the sustainable transformation and development of the industry. The country's multiple agencies now offer open data on agriculture, including soil, weather forecasts, and production information. Moreover, they have also launched programs to assist local farmers, such as providing a 20% rebate on inputs for small producers[144] and a forest incentive certificate that covers 50% of the costs of new commercial forest plantations and up to 50% of maintenance costs for the first five years[145].

Inter-country Analysis

An analysis of selected Latin American countries across several key variables is necessary to gain a more comprehensive understanding of the factors that contribute to the development of the Agrifoodtech ecosystem. First, an analysis may be done to compare the amount of funding and the number of deals each country had in 2022. This can shed some light on the types of deals each country is generating. Usually, more promising and established startups attract larger deals, which suggests a more mature ecosystem.

[143] (Forbes Colombia, 2023)
[144] (Ministerio de Agricultura de Colombia, 2022)
[145] (Ministerio de Agricultura de Colombia, 2020)

Figure 24: Number of Deals vs Investment in LAC Countries - 2022

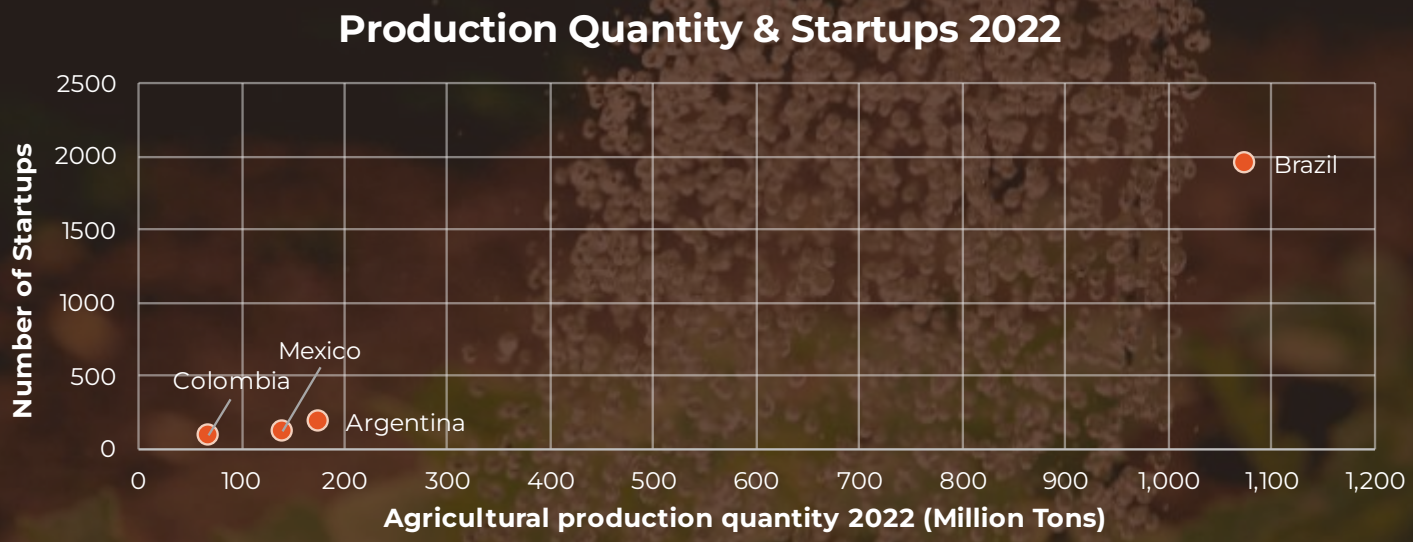


Figure 25: Production Quantity vs Number of Startups in LAC Countries - 2022

Figure 26: Global Innovation Index vs Investment in LAC countries - 2022

As seen in Figure 24 Brazil is the country that seems to have the greatest potential given it has the highest investment and the largest amount of deals. Colombia and Mexico follow, although, as previously mentioned in this report, its potential is mainly concentrated in the Downstream category. Chile and Argentina are the countries at the lower end of the spectrum, with small investment amounts and fewer deals, which shows the sector has great potential for growth.

Moreover, Figure 25 illustrates there is also a positive correlation between agricultural production quantity and the number of startups in the respective countries. This may demonstrate the connection between the Upstream category technologies and the potential market size (in tons of production) for its application, which directly reflects the importance of efficiency and productivity in agriculture to remain competitive. This, considering most of identified startups in the countries are concentrated in the Upstream category, despite their low levels of maturity.

Additionally, it is relevant to understand the correlation between farmer fragmentation (distribution of farmland between small and large farmers) and the advancement of the Upstream category of the Agrifoodtech industry. As shown in Figure 27, the farmland distribution among LAC countries is inconsistent. Argentina, Chile, and Brazil have larger farms, and a smaller share of agricultural land owned by small farmers (>2 ha), whereas Colombia, Mexico and Peru appear to have a higher degree of farmland fragmentation, with smaller farm sizes and a higher share of agricultural land owned by small farmers.

Farmer fragmentation can be a key factor in the adoption of Upstream technologies, where small farmers often tend to struggle in acquiring proper financing for their solutions and achieving economies of scale in their operations. This explains, why Mexico and Colombia have a slower paced growth in the Upstream category than other countries such Argentina, Brazil, and Chile.

Country	Average Farm Size (Ha)	Share of Small Holder Farmers
Argentina	582.5	--
Chile	106.87	24.8
Brazil	67.81	20.32
Colombia	45.99	59.7
Peru	17.51	-
Mexico	16.85	71.8

Figure 27: Farmland distribution between LAC countries[146]

Overall, there is a positive correlation between agricultural production relevance and the development of the Agrifoodtech industry. Brazil's status as the region's leader is further solidified by its robust agricultural sector. With this in mind, Argentina seems to have an important market potential given its strong agricultural production volume, which could be effectively leveraged by an increase in funding. This, in turn, could boost its production efficiency and achieve higher margins.

Lastly, it is interesting to identify the extent of the correlation between the strength of the innovation ecosystem and the investment that Agrifoodtech startups are receiving. The Global Innovation Index 2024 considers three main factors that help determine the level of an innovation ecosystem[147]. First, it considers Quantity (startups, investors, accelerators, and other supporting organizations that

[146] (Gárafo, Ibáñez, Sánchez-Ordoñez, & Ortiz, 2023), *Argentina (Lower et al., 2016)
[147] (StartupBlink, 2024)

provide startups with the necessary resources to develop). Second, it evaluates Quality (investment, number of employees, R&D centers, valuation exits, startup events, among others). Third, it analyzes the overall startup business environment (connectivity, English proficiency, startup-friendly labor laws, availability of technological services, top universities, etc.). When analyzing the Global Innovation Index scores in the LAC region, it is evident Brazil leads the pack by an important margin, occupying 27th place worldwide, followed by Colombia, Chile, Mexico, and Argentina in 38th, 39th, and 41st and 42nd places, respectively[148].

It is evident that countries with a higher score tend to attract higher investment (Figure 26). If compared with Colombia and Mexico, Chile and Argentina appear to have a gap in investment relative to their good innovation ecosystem. Nevertheless, it is important to consider the Agrifoodtech sector is still in its early stages within the innovation ecosystem, particularly those solutions that are closer to the beginning of the value chain in the Upstream category, which are more predominant in Brazil, Argentina, and Chile.

In summary, Brazil is the undisputed leader in the region by a huge margin, leveraging its enormous agricultural relevance and a strong innovation ecosystem. Mexico and Colombia seem to follow, particularly in terms of funding, which is highly influenced by startups in the Downstream sector that have recently represented high investment. Although Argentina seems to be last within these four prioritized countries, the important number of startups in the region and significant agricultural output (tons) positions it as a country with a high growth potential in the Agrifoodtech industry, having an important value to unlock and room for improving competitiveness.

4.2. International Agrifoodtech Industry Overview and Benchmarking

Overview of the Agrifoodtech Industry for Selected Regions

The planet's capacity to produce food for an expanding population is under threat. The world will be unable to establish sustainable agricultural systems unless there are more extensive changes on a socioeconomic and environmental scales. Furthermore, many UN Sustainable Goals are not on track to be met and can only be accomplished if food systems are properly transformed to withstand threats to food security. Agrifoodtech is instrumental in achieving this.

Across the world, the development of the Agrifoodtech industry varies, where some regions have greater advancement than others, and have different focus regarding investing in certain subcategories. This section provides a concise

Region	LAC	USA	Europe	Asia	Israel
Value of Agricultural production (US$ Billion)	453	474	655	3,113	9.5
% Agriculture participation in GDP (2022)	7%	5.50%	1.60%	7.90%	1.26%
Agrifoodtech funding 2023 ($US billion)	0.28	5.4	5.1	3.8	0.3
% Change (2022-2023)	-83%	-58%	-13%	-56%	-66%
Agrifoodtech funding 2022 ($US billion)	1.7	12.7	5.9	8.7	0.9
Number of deals (2022)	176	806	665	659	66
No. Agrifoodtech startups	2500	6585	3540	1574	754

Figure 28: Agrifoodtech Regional Benchmarking

summary of the Agrifoodtech industry's evolution in specific global regions.

United States of America

The agrifood industry in the US is highly productive and resilient, with a consistent focus on technological innovation. In 2022, it had an agricultural value of crops of US$ 246,6 billion, where approximately 70% came from maize, soybeans and wheat[149]. This indicates a strong concentration of field crops. Similarly, in 2022, the US had agricultural exports valued at US$ 190 billion, where soybeans maize, cotton and cattle were among the top products[150]. Moreover, agriculture accounts for 5.6% of the country's GDP and 10.4% of employment.

Although, 97% of the country's 2 million farms are family owned, agricultural production is concentrated in large farms that represent around 3% of all farms. These farms have income of US$ 1 million or more, mostly focus on a single crop, and rely on industrial agriculture to produce high volume at very low cost [151].

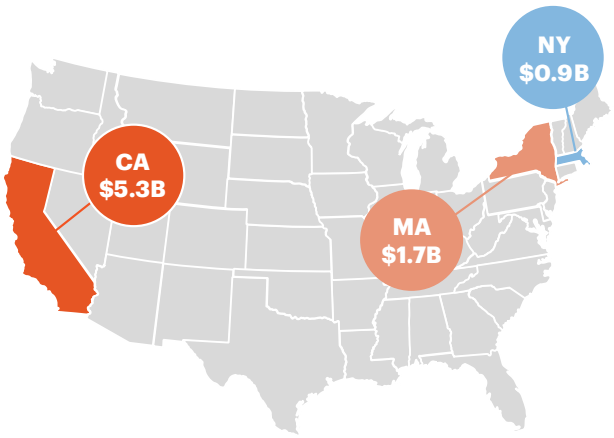
The Agrifoodtech industry has had a significant evolution in the country, contributing to the high levels of productivity and agricultural development, because of its history of strong integration of technologies in the agricultural industry.

The United States has consistently been the most attractive country for investors, surpassing entire continents such Europe, Asia, or Latin America and the Caribbean in terms of funding. Since 2017, it has raised over US$ 63.2 billion, representing nearly 40% of the global industry's funding during the same period. In 2022, it raised US$ 12.4 billion, with 58% (US$ 7.14 billion) allocated to the Upstream category. The most relevant subcategories include Innovative Food (US$ 1.5 billion), Novel Farming Systems (US$ 1.5 billion), Bioenergy & Biomaterials (US$ 1.2 billion), and Ag Biotechnology (US$ 1.2 billion). These subcategories focus on generating new forms of food production to meet growing food demand in a sustainable way. This includes alternative protein production, insect farming, and innovative cultivation systems that reduce environmental impact.

Despite new trends, it is important to highlight some years ago the most relevant subcategories were linked to Precision Farming, where there was a focus on increasing productivity in the US agricultural industry. At that time, the most prominent subcategories were Farm Management Software,

[149] (Food and Agriculture Organization of the United Nations, 2022)
[150] (FAO, 2022)
[151] (Amadeo, 2021)

Top 3 states by funding – 2022 (USD)



Top 8 investments (USD)

1	LanzaTech, IL **$500 million**	**Bioenergy/ Biomaterials**
2	Weee!, CA **$425 million**	**eGrocery**
3	Plenty, CA **$400 million**	**Novel Farming Systems**
4	Upside Foods, CA **$400 million**	**Innovative Food**
5	Xpansiv, CA **$400 million**	**Ag Marketplace & Fintech**
6	Wonder, NY **$350 million**	**Online Restaurants & Meal marketplaces**
7	Gotham Greens, NY **$310 million**	**Novel Farming Systems**
8	Little Leaf Farms, MA **$300 million**	**Novel Farming Systems**

Sensing & IoT, Farm Robotics, Mechanization & Equipment, and Ag Biotechnology. Although these categories remain relevant and innovative, they have reached a high level of maturity and are no longer leading in terms of funding. Many of them have scaled their solutions and established themselves in the market, becoming more efficient and requiring less funding, with some even going public and expanding their operations internationally. Additionally, despite not being the predominant categories, it should be noted that in a market as developed as the US, Downstream and Midstream solutions also have an advanced level of maturity.

Likewise, the US has a robust innovation ecosystem and a regulatory environment conducive to Agrifoodtech advancements. The country is home to internationally recognized innovation hubs and key ecosystem centers including Silicon Valley, New York, and Saint Louis, which play a fundamental role in generating, driving, and scaling emerging technology solutions.

As a result, the United States has one of the strongest innovation ecosystems worldwide, which ultimately fosters Agrifoodtech startups. The states of California, New York, and Massachusetts have the highest investments in the US, as the startup ecosystem hubs are in those regions (in 2022, US$ 5.3 billion, US$ 1.7 billion, and US$ 0.9 billion were funded in California, New York, and Massachusetts, respectively). The figure below illustrates this. Additionally, the top 25 Agtech & New Food startup ecosystem ranking is dominated by North America, with 48% of the investments. Moreover, the US is also implementing robust regulatory frameworks to expedite the consolidation of Agrifoodtech startups and the industry's development.

A good example is the Start-Up NY Program that helps startups through tax-based incentives and innovative academic partnerships. Start-Up NY provides businesses the opportunity to operate tax-free for a period of 10 years inside or near eligible university or college campuses in New York State. Direct access to advanced research laboratories, development resources, and industry experts is provided to businesses through partnerships with these institutions.

Similarly, Massachusetts has programs that are supported by the local government, such as the Massachusetts Growth Capital Lending Products - MGCC and MassVentures Venture Capital

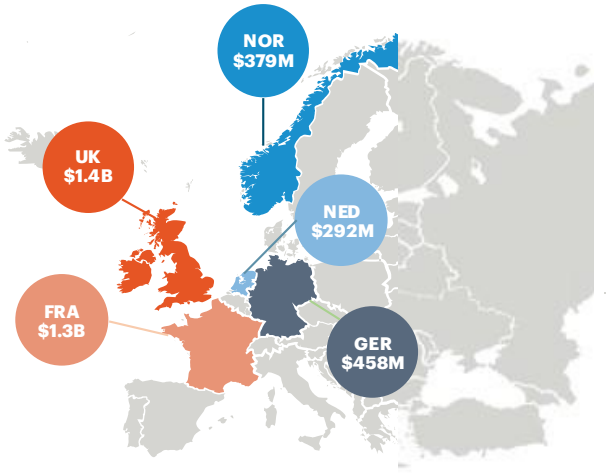
Investments. These programs provide flexible loans to startups and SMEs to break down the barriers to accessing capital. There are also other alternatives such as the Small Business Technical Assistance Grant Programs (MGCC) and the Small Business Development Center Network, that provide technical assistance, advisory, and training to scale business models.

Saint Louis is a key Agrifoodtech hub, ranked among the top 20 globally in growth rate from 2017 to 2023[152]. Its prominence is a result of its location in a major agricultural state, which is home to 100,000 farms that specialize in soybeans, pork, and other products. The city benefits from nationally recognized agricultural programs at Lincoln University and the University of Missouri, which bolster its agricultural expertise. Additionally, major corporations, like Bunge and Novus, headquartered in Saint Louis, enhance the city's agricultural landscape. A primary catalyst for the city's Agrifoodtech sector is Monsanto. Through strategic acquisitions and its venture capital arm, Monsanto Growth Ventures, the company supports and nurtures startups, fostering a dynamic venture capital environment that includes pioneering entities such as The Yield Lab[153]. As a result, the Agtech sector in Saint Louis employs over 7,500 people and boasts one of the highest concentrations of plant scientists in the world, with over 1,000 experts[154].

Europe

Unlike the United States, the European agricultural sector currently represents a small fraction of its economy. In 2022, this sector contributed just over US$ 230 billion to the continent's GDP. Europe primarily focuses on producing cereals such as wheat, corn, barley, rapeseed, sunflower seed, soybean, rice, and sorghum. It's worth noting that the European agricultural industry is considerably less fragmented, as fewer than 5% of farmers own more than 50% of arable land.

Top 5 countries by funding – 2022 (USD)



Top 8 investments (USD)

1	InnovaFeed **$249.3 million**	Novel Farming Systems
2	Rohlik **$210 million**	eGrocery
3	Zapp **$200 million**	eGrocery
4	DNA Script **$200 million**	Ag Biotechnology
5	Deliverect **$150 million**	Cloud Retail Infrastructure
6	Kolonial.no **$150 million**	eGrocery
7	GrowUp Farms **$136.2 million**	Novel Farming Systems
8	ICEYE **$136 million**	Farm Mgmt Software, Sensing & IoT

[152] (Patel, Faber, & Sanders , 2023)
[153] (BioSTL, n.d.)
[154] (Greater St. Louis Inc, 2023)

This concentration, combined with the common characteristics of field crops produced in Europe, greatly facilitates the scalability of technological solutions in the region.

It's important to highlight that agriculture currently represents only 1.4% of Europe's total GDP, a figure that has remained stagnant for the past two decades. This explains why only 4.2% of the European population, approximately 8.6 million individuals, work in the agricultural industry.

This agricultural phenomenon in Europe can be attributed to various factors. On the one hand, the continued dominance of the service sector has relegated agriculture to a secondary role in economic terms. The emergence and expansion of industries such as technology, finance, and tourism have diminished agriculture's importance in the GDP composition.

Additionally, the process of industrialization and urbanization has significantly contributed to the marginalization of agriculture in Europe. As European societies industrialized, labor and resources shifted toward manufacturing and urban sectors, leaving agricultural activities behind.

At the same time, the increasing dependence of Europe on agricultural imports and global competition have further impacted the position of agriculture in the continent's GDP. Importing food from other regions of the world and competing with foreign producers has hindered agricultural expansion.

However, the Agrifoodtech industry is seen as an opportunity to boost the economic contribution of this sector and ensure its long-term sustainability. Europe has been promoting and investing in the Agrifoodtech industry not only for its potential to increase efficiency and productivity in agricultural production, but also because it offers the possibility of improving the quality and safety of food, diversifying the supply, and adding value to European food products. Furthermore, the adoption of technological solutions can contribute to environmental sustainability by reducing the use of natural resources and minimizing adverse impacts on the environment.

In this way, Europe is positioning itself as one of the most relevant players in the global Agrifoodtech

industry, with a 70% annual growth rate from 2018 to 2019. Despite a slight 15% decline from 2019 to 2020 due to pandemic global investment pullbacks, yet again, the Agrifoodtech European market grew 178% from 2020 to 2021. This is evidenced in the funding, the growing number of deals made in the European Agrifoodtech industry, and the accelerated global positioning of the different startup ecosystem hubs of the region.

In 2023, the Agrifoodtech market in Europe, despite a minimal decrease in investment of 13% compared to 2022, managed to reach an investment of US$ 5.1 billion, being one of the ecosystems least affected by the 48% global funding decrease and best able to navigate the current market situation, capturing 32% of the global Agrifoodtech funding.

In addition to the growing maturity of the European Agrifoodtech sector, another factor that cushioned the impact of the crisis in this region was the regulatory stability and the policies promoting sustainable agriculture. Initiatives such as the EU's Common Agricultural Policy and the Horizon Europe program have supported innovation, keeping the industry vibrant. Germany, the United Kingdom, Spain, and France lead in promoting significant Agrifoodtech startups, underscoring the region's commitment to sectoral growth. Europe has demonstrated strength in areas such as Innovative Foods, Ag Biotechnology, and Novel Farming Systems.

Aligned with that, in 2023, five European countries were among the top 10 in industry funding, which is consistent with the growing development of European industry. The United Kingdom ranked second with US$ 1.3 billion, followed by Germany in fifth place with US$ 776 million (a 59% increase from 2022), Spain in sixth place with US$ 683 million (a 348% increase from 2022), France in seventh place with US$ 540 million, and Switzerland in eighth place with US$ 457 million (a 197% increase from 2022).

It is worth mentioning that the growing development of European Agrifoodtech has placed significant emphasis on Upstream solutions, as evidenced by many of the largest deals in key Upstream subcategories that are being conducted by European startups. Belgium, for instance, emerged as a notable player in the Ag Biotechnology subcategory this year, with both Biobest (US$ 129 million) and Aphea.bio (US$ 77 million) securing positions within the top 10 deals in this subcategory. Similarly, Denmark, with Agreena (US$ 50 million), Germany, with Orbem (US$ 32 million), and the Netherlands, with Source.ag (US$ 23 million), made appearances within the top 10 deals in the Farm Management Software, Sensing & IoT subcategories. Moreover, Germany achieved the highest deal in the Innovative Food subcategory, raising US$ 229 million with yfood Labs. Lastly, Europe also played a substantial role in the Novel Farming Systems subcategory, with French startup Ynsect (US$ 175 million), Dutch startup Protix (US$ 61 million), and Italian startup Planet Farms (US$ 40 million) securing positions within the top 10 deals in this subcategory. This reflects the evolution of a mature ecosystem that is currently comprised of over 3,540 startups.

Europe is managing the overall decline in Agrifoodtech investment more effectively than any other region. One reason for this is the maturity of the regulatory framework, which provides a clearer path for investment. Additionally, in 2023, Europe completed a relevant number of late-stage financing rounds, surpassing its own performance in 2022. Europe's robust presence in the top 10 deals across various financing rounds further underscores its ability to attract Agrifoodtech investment, suggesting a stronger ecosystem and greater investor confidence in comparison to other regions such as Latin America and the Caribbean.

Asia

Asia is the highest contributor to the global agricultural output. Nevertheless, it is also the largest net importer, with an increase in agricultural net imports of more than three times between 2011 and 2021. Moreover, it imports between 22% and 24% of its consumption. This shows an enormous challenge to guarantee food security for its immense population.

Regarding its agricultural production, Asia is primarily focused on sugarcane, rice, maize, wheat, as well as vegetables, potatoes, and tomatoes, showcasing an important balance between diverse crops. Furthermore, between 70% and 80% of its farmland is distributed among small farmers, showing a high fragmentation of the agricultural industry. This may present challenges for the scalation of agricultural technologies, like the LAC region. However, it also presents an opportunity for Agrifoodtech solutions to

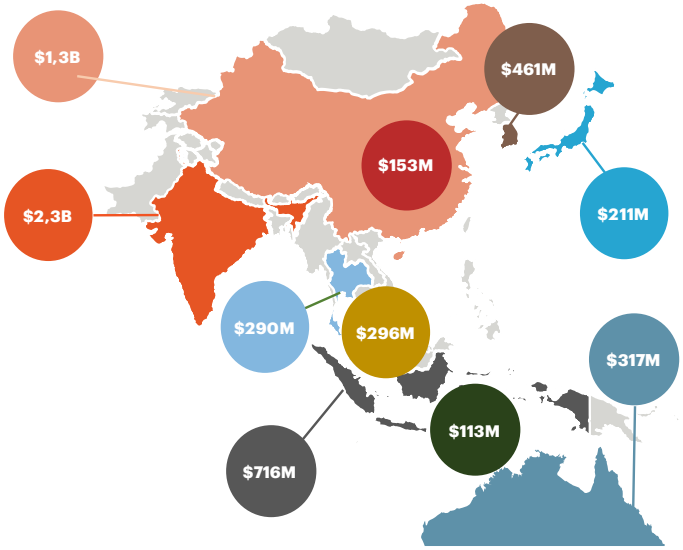
articulate the various stakeholders within the value chain.

Even with its agricultural output relevance, Asia is among the regions with the lowest technological adoption within its agricultural industry. Only approximately 9% of farmers are either using or are willing to adopt at least one technology in their operations[155]. Because of this, the Agrifoodtech sector has tremendous potential for growth.

Currently, Agrifoodtech in Asia is led by India, China, Indonesia, South Korea, and Australia, which combined accounted for approximately 80% of the investment in the region during 2022. The sector has historically been focused on Downstream solutions; however, recent trends have shown a deacceleration in investment and a shift toward Upstream technologies, showing a growth of 24% between 2021 and 2022. The top subcategories that have shown growth over the years have been Ag Biotechnology, Innovative Food and Novel Farming Systems. This indicates a preference for solutions that provide complementary alternatives to achieve food security and reduce environmental impact. Other important subcategories have been Agribusiness and Marketplaces, that have addressed the need for value chain articulation and Midstream technologies.

Additionally, countries in Asia such as China and India have established regulations and government policies that have boosted the Agrifoodtech sector. In 2021, aiming to reduce reliance on agricultural inputs, China announced new guidelines for the animal feed industry to reduce dependance on corn and soybeans, which encouraged innovation in solutions such as phages, probiotics, and novel growth enhancers. Similarly, Singapore accelerated Agrifoodtech innovation by becoming the first to give regulatory approval for cell-based meat in the spring of 2021. In the summer of 2021, it granted a food processing license to Esco Aster for cell-based manufacturing, which has significantly accelerated the time to market for many cell-based tech companies[156]. These types of regulations have been key drivers for innovation in the Agrifoodtech sector of Asia. Lastly, India serves as a significant illustration of a policy that can facilitate the expansion of Agrifoodtech. The country has established Farmer Producer Organizations, which are designed to

Top 10 Countries by Funding – 2022 (USD)



Country	Average Ticket
India	10,6 million
China	11,3 million
Indonesia	11,5 million
South Korea	13,1 million
Australia	8,3 million
Singapore	5,2 million
Thailand	72,5 million
Japan	4,9 million
Hong Kong	11,7 million
Philippines	11,3 million

[155] (Fiocco, Ganesan, Garcia de la Serrana Lozano, & Sharifi, 2023)
[156] (Asia-Pacific Agri-Food Innovation Summit , 2024)

increase the income of farmers, provide access to technology, increase internet penetration and connectivity, and match Ag Tech players with key technology stakeholders who can provide innovative solutions[157].

Israel

Despite the competitive and dynamic nature of Israel's agricultural sector, the country is not self-sufficient, as it relies on net imports of US$ 6.35 billion. This is a result of its lack of arable land and fresh water suitable for agriculture, which affects local production costs, final consumer prices and leaves them vulnerable to price fluctuations of imports[158]. Israel's top crops are high-value, including potatoes, tomatoes, avocados and bananas.

The challenging conditions mentioned before, have driven the need for extensive innovation in the food industry, which has paved the way for Israel's Agrifoodtech ecosystem to be historically recognized as a global center of excellence, driving transformative advancements in food and smart agriculture. In 2022, Israel ranked as the seventh country globally in terms of funds raised, achieving a remarkable figure of US$0.9 billion through 66 deals. This not only positioned Israel as the smallest country within the top 10, but also placed it among the countries with the highest average deal size in the world for that year (US$13.6 million), further illustrating the maturity of its startups. Israel has mostly focused on developing solutions to optimize the supply chain with Data Analytics, Blockchain, and IoT, to enhance traceability, improve inventory management, and streamline logistics.

A significant portion of Israel success has come from its strong innovation ecosystem. The government has consistently and persistently supported the agricultural research and development (R&D) industry over the years, investing substantially in the sponsorship of world-leading research institutions, including the Volcani Institute and the Weizmann Institute of Science.

Moreover, Israel has managed to successfully articulate the different players of the Agrifoodtech ecosystem, connecting startups, research institutions, universities, and the public sector to foster knowledge exchange and accelerate the development of new technologies. Many of the startups that are now established in the Israeli market were mentored and collaborated with prestigious universities, such as Technion or the Hebrew University of Jerusalem, among others.

Important Agrifoodtech startups in Israel (USD)

1	Beliver Meats **$389.9 million**	Cultivated Meat
2	Aleph Farms **$119.4 million**	Cultivated Meat
3	ReMilk **$141 million**	Precision Fermentation
4	Equinom **$75.2 million**	Crop Optimization
5	Steakholder Foods **$44 million**	Cultivated Meat
6	NRGene **$41.6 million**	Crop Optimization
7	Else Nutrition **$30 million**	Plan based Dairy
8	Imagindairy **$28 million**	Precision Fermentation

Nevertheless, market contraction coupled with the complex geopolitical situation Israel is facing led to more than 60% reduction in funding received by Israel in 2023, making it one of the most challenging years for the Agrifoodtech industry. Nonetheless, despite this setback, Israel stood out in the Farm Robotics & Mechanization subcategory, with companies like Beewise (USD $80 million), Bluewhite (USD $39 million) and N-Drip (USD $44 million), who were able to secure major C rounds, demonstrating the ecosystems advancements and relative maturity.

[157] (Madan , et al., 2020)
[158] (International Trade Administration, 2023)

Regional Benchmarking

The disparities in the advancement of the Agrifoodtech industry across various regions are the result of multiple factors. Some of these are related to the development of the industry, such as innovation ecosystem, VC landscape and Agrifood trends. Others consider elements that hinder the adoption of Agrifoodtech solutions, such as farmland fragmentation, margins of agricultural products, financial inclusion, and human talent development. Latin America can learn from the successes and failures of other regions of the world, understanding these factors and how they have influenced the development of their respective Agrifoodtech industries.

Innovation Ecosystem and VC Investment Landscape

The innovation ecosystem within each region is a key driver for the inception of disruptive startups across all industries including Agrifoodtech. Disparities between the innovation ecosystems present within each region, explains the advancement and success of the Agrifoodtech industry. As noted in Figure 29, the US and Europe have leading innovation ecosystems with a greater number of cities in the top 300 of the Global Innovation Index 2023.

The US innovation ecosystem is distinguished by its ability to attract a great number of foreign entrepreneurs, its strong collaboration between the top world universities which provide highly qualified talent, and its policies that protect entrepreneurs from failure, such as bankruptcy laws. Additionally, it is positioned as a prime location for global scaling.

Similarly, Europe has an encouraging innovation ecosystem, characterized by important government support and enabling public policies. Countries such as Germany, France and Switzerland offer incentives to solve high-risk problems through technology and innovation, these include funding, tax breaks for angel investors, policy openness, and flexibility towards change and disruption.

Asia's innovation ecosystem characterizes itself for providing key technological infrastructure and promoting tech development. Nevertheless, even though governments in this region have recognized the value of the startup ecosystem and have allocated significant resources to foster its growth, they have encountered difficulty in encouraging risk-taking among their population, who are typically comfortable in the stable corporate business environment[159]. Additionally, it needs to attract foreign entrepreneurs that bring expertise to continue developing the startup ecosystem, as well as enhance the startup-academia relationship to

	LAC	USA	Europe	Asia	Israel
VC Funding2023 (US$ Billion)	4	170.6	62.3	92.3	1.5
Number of Ecosystem Hubs	77	252	410	159	14
Important Startup Ecosystem Hubs	• Sao Paulo • Piracicaba • Cordoba • Rosario	• Silicon Valley • NYC • Denver • Los Angeles • Boston • Research Triangle • Chicago	• London • Amsterdam • Delta • Paris • Stockholm • Dublin	• Beijing • Shanghai • Bengaluru • Singapore	• Tel Aviv • Jerusalem

Figure 29: Innovation Ecosystem by Region

[159] (StartupBlink, 2023)

strengthen R&D capabilities. Furthermore, although there are public efforts to support the development of startups, a regulatory framework that promotes risk-taking and incentivizes high-risk investment is required, particularly in a highly variable industry such as Agrifoodtech.

In line with the innovation ecosystem analysis, it is pertinent to understand the different venture capital investment landscape among regions, particularly within the Agrifoodtech industry.

First, an analysis of agricultural value of production and Agrifoodtech investment revealed that the LAC region and Asia lag in terms of investment share. Specifically, they are responsible for a very small share of Agrifoodtech investment compared to their share of agricultural value. Regarding the share of agriculture value in Agrifoodtech the United States and Europe have a ratio of 0.27 and 0.39, respectively, while LAC and Asia 4.8 and 2.5[160].

Region	Share of Agricultural Value	Share of AGFT Investment 2023	Ratio AG Value / Investment %
USA	9.2%	34.6%	0.27
Europe	12.7%	32.7%	0.39
Asia	60.2%	24.4%	2.47
LAC	8.8%	1.8%	4.82

Figure 30: Agriculture Value VS Agrifoodtech Investment

In addition, the unique risk profiles of the regions may influence investment in Agrifoodtech technologies. Historically, the United States has attracted a greater amount of investment in Seed stages over other funding rounds. This may be partially explained by the policies that encourage greater risk-taking, while LAC, Asia and Europe prioritize early and later stage investments[161]. The above invites a call to action for LAC and Asia to increase their investments in Agrifoodtech startups, by encouraging greater foreign and local participation, using multiple incentives.

Trends in the Agrifood Industry

In addition to the innovation ecosystem and the availability of VC funding, the Agrifoodtech industry is significantly influenced by the Agrifood industry trends, which exhibit both common and divergent characteristics across regions.

Consumers are under pressure to alter their consumption patterns in a manner that reduces their carbon footprint and promotes sustainable production in all regions. Similarly, individuals are becoming increasingly aware of the ingredients and the nutritional value of the food they ingest, which is also promoted by public policies such as labelling laws in the LAC region. All of this has created an increasing demand for innovative food solutions, particularly in regions such as the United States and Europe. However, the population in the LAC region has been impacted by an increasing cost of food and living, as result of a rise in input prices and high inflation[162] [163]. This, in conjunction with the lower average salaries of the LAC region, restricts the ability of inhabitants to allocate enough cash to spend on healthier and more sustainable products, even if they represent a higher price than traditional alternatives. The former indicates that there is a limited demand for Foodtech solutions, which are presently more expensive than conventional food. Scalability is limited if they are not made more affordable. On the other hand, this increasing need for wallet-friendly food translates into a greater need for cost-effective production, promoting Upstream and Midstream solutions, that improve crop yields, reduce food waste, and lowers costs in production and transportation.

In addition, the emergence of Agrifoodtech technologies that facilitate their compliance may be significantly influenced by government policies regarding sustainable agricultural production practices. Europe, as mentioned, has implemented stringent regulations that have created a fertile

[160] Accenture analysis based on AgFunder and Crunch Base data
[161] (KPMG, 2024)
[162] (Chehtman, 2023)
[163] (Stambuk, 2023)

ground for Agrifoodtech solutions. Similarly, Asia has developed regulations on promoting food sovereignty. The implementation of these policies in the LAC region has the potential to accelerate the development and adoption of Agrifoodtech technologies, an area where LAC is still working on.

Farmland Fragmentation and Production Value

Farmland fragmentation may be a key factor when considering the scalability and adoption of Agrifoodtech technologies. Regions with higher degree of farmland fragmentation, where a higher share of farmland is owned by small farmers (less than two hectares), tend to have a lower rate of adoption of Agrifoodtech technologies.

As illustrated by Figure 31, Europe and the United States, which have a smaller share of farmland operated by small holder farmers (38% and 47% respectively), have higher adoption rates of Agtech solutions. In contrast, regions such Asia have very high farmland fragmentation (78%) leading to very low adoption rates at 9%.

Similarly, adoption rates may be influenced by the margin rates farmers in the region make. Farmers from regions with high average production prices may have greater purchasing power for Agtech solutions. LAC is the region with the lowest productor rice per ton, as is shown in Figure 31, which may generate fewer opportunities for farmers to have enough extra revenue to invest in Agrifoodtech solutions.

The former, in turn, underscores the need for the LAC region to develop and implement Agrifoodtech solutions that promote efficiency and productivity to improve the value of their agricultural products.

Region	Share Small Farmers (2> Ha)	Avg. Productor Price per Ton 2022 ($US)	Adoption of Ag Tech Solutions
LAC	55%	US$ 1,051.5	50%
Europe	38.%	US$ 1,614.5	62%
Asia	78%	US$ 1,972.5	9%
USA	47%	US$ 2,388.7	61%

Figure 31: Farmland distribution[164], Avg. Productor Price[165], and Agtech solution adoption[166]

[164] (Lower et al., 2016)
[165] (FAO, 2022)
[166] (Fiocco, Ganesan, Garcia de la Serrana Lozano, & Sharifi, 2023)

Human Talent

Moreover, the level of education in regions may influence the proper development and adoption of Agrifoodtech technologies. Higher levels of education may promote both the development of disruptive technologies and the adoption of solutions in Agrifoodtech operations.

On the one hand, greater education level of the population, especially in rural areas, is key for the acquisition of skills enabling farmers to adopt and operate Agrifoodtech solutions. On the other hand, greater education, mainly considering specialized agriculture and food science universities, are key to fostering the development of Agrifoodtech solutions by producing founders and developers of startups.

Region	Human Capital Index 2020	Universities in Agricultural Sciences in top 250	Universities in Food Sciences in top 250
LAC	0.56	18	27
Europe	0.70	91	88
ASIA	0.61	71	85
USA	0.70	39	28
Israel	0.73	1	0

Figure 32: Human Capital Index and Universities in Agricultural and Food Sciences in 250 by region

Two primary factors were considered to comprehend the disparities in education levels between regions. First a broader perspective of human talent, which follows the Human Capital Index[167], shows Israel, the US, and Europe as clear leaders.

Furthermore, when considering the sources of agriculture and food science human capital, Europe and Asia are the regions with the highest number of universities within the top 250[168] in the field of agriculture and food sciences. In contrast, the LAC region clearly lags in both. This limits the region's capacity to adapt Agtech solutions and impedes the growth and development of Agrifoodtech technologies, as it requires strong collaboration between universities and startups to effectively develop solutions that disrupt and add value to the Agrifood industry. The former demands the availability of qualified expert talent to develop Agrifoodtech solutions, as an alternative to importing foreign talent through public policy programs and incentives.

[167] Measures the contributions of health and education to worker productivity (The World Bank, 2024)
[168] (US News, 2023)

5

CORPORATE ENGAGEMENT

5. CORPORATE ENGAGEMENT

The collaboration between major agribusiness corporations and Agrifoodtech startups in Latin America and the Caribbean helps develop the ecosystem and boost the sector's growth in the region. This partnership represents a symbiotic relationship where parties can substantially benefit from each other's strengths and, ultimately, respond effectively to global challenges.

Agribusiness corporations typically engage with startups in four different ways: they can collaborate by allowing startups to serve as suppliers of technology and innovation, invest in Agrifoodtech startups through Corporate Venture Capitals (CVCs) or other investment mechanisms, partner to co-develop new technologies, and by integrating startups into the business through mergers and acquisitions (M&A).

The purposes and type of collaboration between agribusiness corporations and Agrifoodtech startups can vary based on the corporation's needs and internal capabilities. First, startups may serve as technology or solution providers for corporations. In this mechanism, startups own a specific Agrifoodtech patented technology that can be useful for agribusinesses in their operations. This relationship involves minimal engagement, and it is limited to a specific transaction. For instance, a startup can develop a visioning technology that takes high resolution images processed by AI/ML codes to differentiate between fruits and weeds, which can be leveraged by robots to automate fruit picking in a corporation's operation[169]. This technology could be utilized in the operations of an agribusiness through a licensing agreement. Agribusinesses can access ready-to-go innovation without significant resource allocation and with easy exit strategies if the results do not meet expectations. Nonetheless, low involvement limits the level of personalization of the technologies.

Second, agribusinesses may consider investing in Agrifoodtech startups. By providing investment funds for the startup's development, agribusinesses can gain access to several benefits, such as preferential access to the solution or technology, which allows them to gain a competitive edge, influence over the product's development to ensure it serves their interests, or even shares in the profits. A common investment mechanism is through Corporate Venture Capitals (CVC), where a specific team within the organization evaluates the startups' potential impact to make strategic investments. Agribusinesses can frequently capitalize on their industry expertise to not only identify disruptive technologies, but also to offer guidance. However, the extent of engagement in startup development is contingent upon the agribusiness's priorities and expertise, which may range from passive to highly active investor roles. One potential drawback of this interaction is the increased risk associated with the significant resource allocation and potentially volatile returns of early-stage startups.

Third, agribusinesses and startups can mutually work on developing innovative technologies or solutions. By highly involving themselves in the development process, they can define key objectives and outcomes. Moreover, they can accelerate the development process by providing key resources to startups, such as product formulation expertise, robust manufacturing capabilities, financial and legal resources, established distribution channels and a customer base that has already been established with trusting relationships[170]. Furthermore, agribusinesses can serve startups with their first big client, helping drive scalability and funding early stages of operation. The Louis Dreyfus Company (LDC) alliance with Temasek Lifesciences Accelerator (TLA) serves as an example of agribusiness and startup collaboration. The alliance was formed to provide LDC with access to disruptive technology from the TLA's startup. It has allowed TLA and its incubates to capitalize on LDC's supply chain and extensive asset network for market penetration and strategic cross-border partnerships. Leveraging TLA's expertise in life sciences and LDC's diverse, global agricultural footprint, they have trialed innovations, emphasizing on the nutrition and life sciences sector[171]. Additionally, corporations can leverage the startup's disruptive know-how and innovation network to develop a new product or service that is specifically tailored to their needs through co-

[169] (Duflock, 2020)
[170] (Fairbairn & Reisman, 2024)
[171] (Louis Dreyfus Company, 2019)

Benefits of Agribusiness Corporations Collaborating with Agrifoodtech Startups

developments. However, to avoid conflicts regarding intellectual property and profit distribution, co-developments require numerous agreements.

Finally, agribusinesses may opt to integrate a startup into their operations by collaborating with it through mergers and acquisitions (M&A). In this case, agribusinesses gain complete ownership over the startup's assets, including their team, their specific know-how, and their products and services. This type of interaction grants agribusinesses control over decision-making and exclusive access to disruptive technologies and solutions, allowing them to quickly diversify their offerings and reach new customer segments and, ultimately, increase their market share. However, as it is expected, merging organizations requires significant efforts to properly integrate diverse cultures and processes, while simultaneously preserving the ongoing agility and flexibility necessary for innovation.

5.1. Benefits of Agribusiness Corporations Collaborating with Agrifoodtech Startups

Agribusiness corporations derive numerous advantages from collaborating with startups in many ways to remain competitive in the ever-evolving market. These benefits are evident in the following ways: access to new markets and customers, the acquisition of business agility and innovation, the improvement of the customer experience, the enhancement of brand and reputation, and the mitigation of risks.

Access to New Markets & Customer Segments

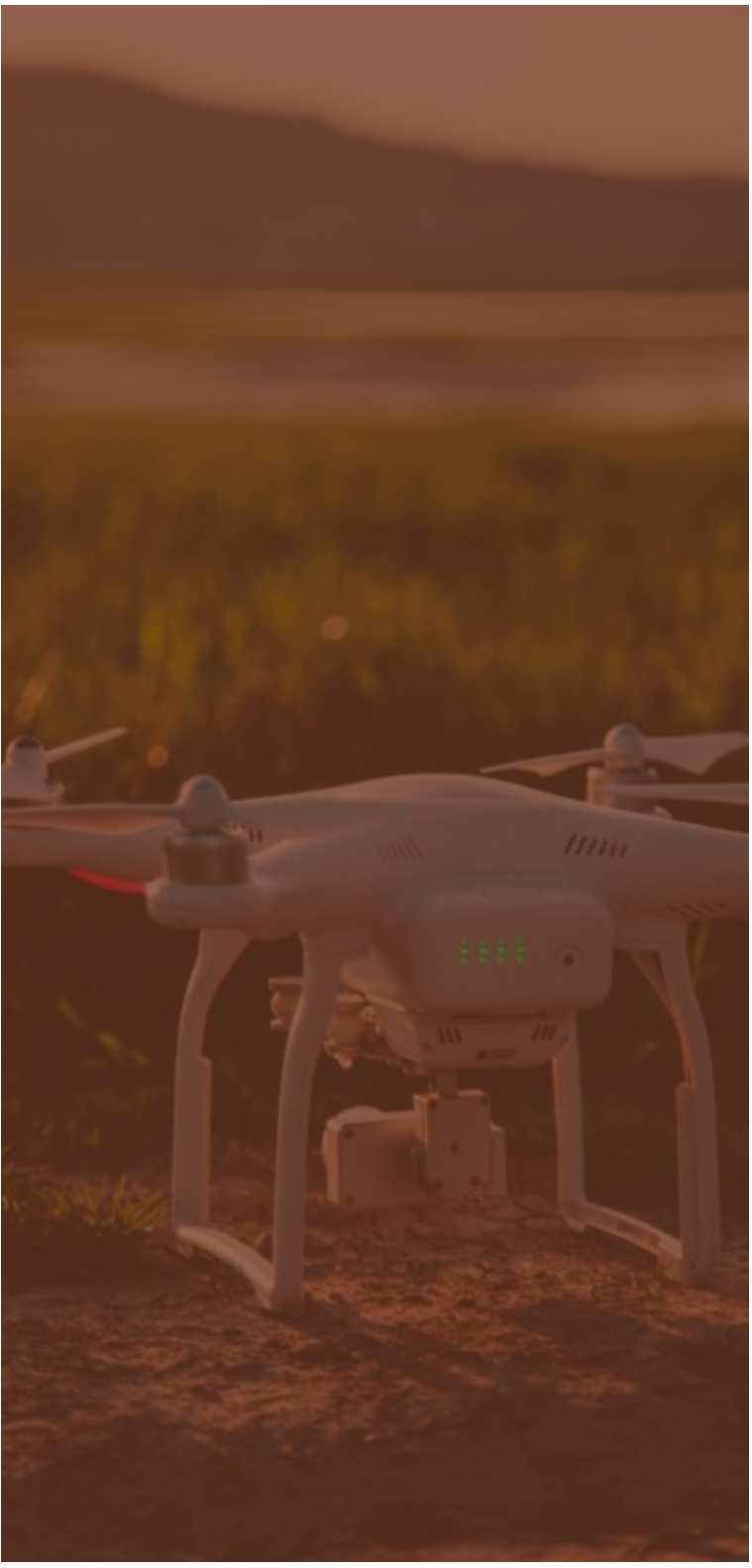
Collaboration with startups allows corporations to explore new markets and expand their business activities beyond their core domains. Startup collaborations can assist agribusinesses in the provision of new and innovative products and services, which can be used to upsell to current clients and to access niche markets often targeted by startups with their customer-specific offerings. Additionally, startups can provide agribusinesses with new distribution channels, such as virtual agricultural marketplaces, which can help their products and services reach new areas and geographies.

For a better understanding of this benefit, consider AgriRed, an online marketplace for agricultural products and inputs exclusively designed for wholesale businesses[172]. This example illustrates how startups can contribute to the corporation's expansion and new market access. AgriRed facilitates market expansion for corporations by allowing them to better commercialize their agricultural inputs and products, thereby making them more accessible to a broader audience in new geographic regions. This eliminates the need for corporations to establish a physical presence in new markets, reducing costs and improving food access in remote areas.

Business Innovation & Agility

Agrifoodtech startups are one of the main drivers behind the transformation of the agrifood industry. Their objective is to address existing inefficiencies through iterative innovation and disruption. This is why agribusinesses can benefit from collaborating with startups by gaining access to cutting-edge

[172] (AgriRed, 2023)



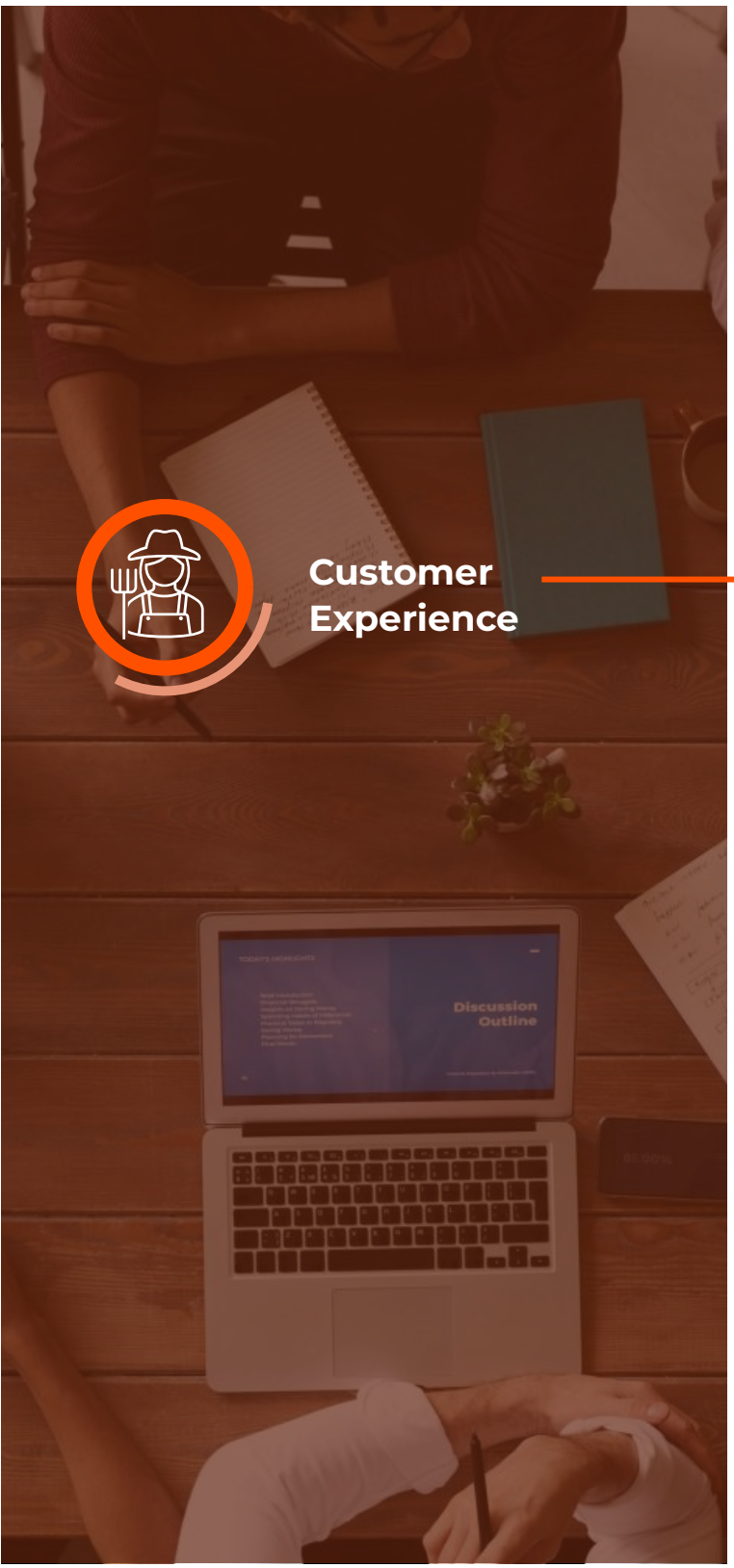
technologies and solutions that can help them address current trends and maintain a strong competitive advantage. The solutions that startups offer have the potential to boost efficiency and productivity in the corporation's operating processes, improve sustainability performances, and provide enhanced products and services to their customers. Additionally, it facilitates the rapid, proactive, and agile completion of the aforementioned objectives by corporations, as well as the reduction of their innovation gaps.

For example, Raízen has allied with Aimirim, a Brazilian startup that provides advanced automation, digital twins processes, IoT sensors and advanced analytics[173]. This partnership has allowed the corporation to reduce the consumption of biomass and the CO2 emissions in 15 of its energy bio-parks[174]. It also enabled the corporation to maintain effective processes without overinvesting internal resources and to engage with novel technologies while meeting current market demands. By allying with startups, agribusinesses can access rapid innovation[175]. Few corporations can radically innovate on their own due to a lack of internal agility. Outsourcing this innovation capability through partnerships with startups is a more efficient and effective option[176] compared to developing new solutions from scratch[177]. This approach not only enables corporations to more effectively use their internal resources and efforts, but also allows them to reduce costs while gaining competitive advantages over competitors, among other benefits.

Having a close relationship with startups also allows corporations to have an active role in the development of innovative technologies to accurately address their specific needs and close their innovation gaps thereby furthering their key strategic objectives. Moreover, this close relationship can provide agribusinesses with access to the startups network, which includes other actors in the Agrifoodtech ecosystem, such as academia and research institutions, which can be leveraged for complementary initiatives.

In addition, strategic alliances with startups allow organizations to acquire new capabilities and skills to

[173] (Aimirim, 2024)
[174] (Pulse Hub, n.d.)
[175] (Brown, Henz, Sibanda, & Wang, 2021)
[176] (Brigl, Gross-Selbeck, Dehnert, Schmieg, & Simon, 2019)
[177] (Brown, Henz, Sibanda, & Wang, 2021)



improve their competitive advantage. Startups provide corporations with a novel set of skills that enable them to create innovative products that corporations can rapidly adopt. Agribusinesses that are fast to adapt and learn the fastest often acquire a substantial advantage, shifting the bargaining power in their favor[178]. This is exemplified by Cinca, a startup that specializes in the production of natural products and snacks made with cauliflower. They possess a unique know-how to create a specific texture and composition of their products, thereby ensuring that they are both delicious and nutritious[179]. Corporations interested in commercializing these types of products can learn from startups like Cinca to leverage manufacturing skills and capabilities in the market and gain competitive advantages.

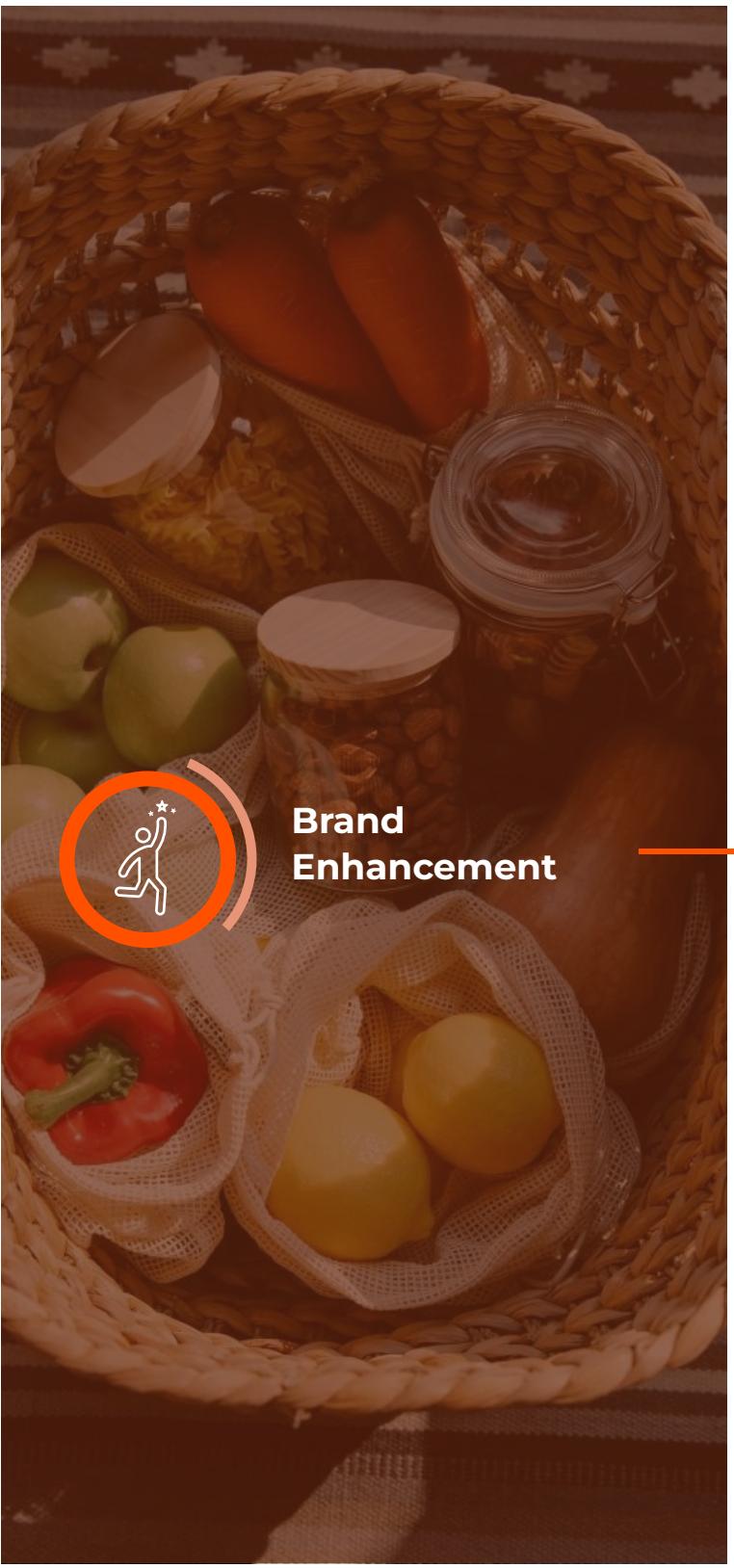
Customer Experience

By collaborating, corporations can adopt startup's technologies to, first, create different ways to reach customers and, second, to enhance their relationships with suppliers in their supply chain.

Typically, startups are dedicated to the development of technologies that focus on offering a more personalized product or service that offers customers greater value. For example, Agroforte is a Brazilian agri-fintech that provides digital credit services to small farmers[180] without collateral and provides customized credit solutions by using data-driven technology. Their offerings are readily accessible to farmers, thanks to the startup's customer-centric approach. By partnering with Agroforte, agribusinesses that focus on selling agricultural machinery could provide their consumers with a complementary service that facilitates the financing of their purchases.

Moreover, startups can provide corporations with new methods to client engagement and enhance the overall experience. For example, startups that specialize in eGrocery services focus on offering the best buying experience for customers. For instance, Rappi Turbo is a service provided by Rappi, a food delivery app startup, which provides great customer satisfaction by delivering products within only 10

[178] (Dasgupta, 2020)
[179] Cinca, 2024)
[180] (PitchBook, 2024)



Brand Enhancement

minutes[181]. This service is a resource that corporations could leverage to optimize the distribution of their products, focusing on enhancing customer satisfaction.

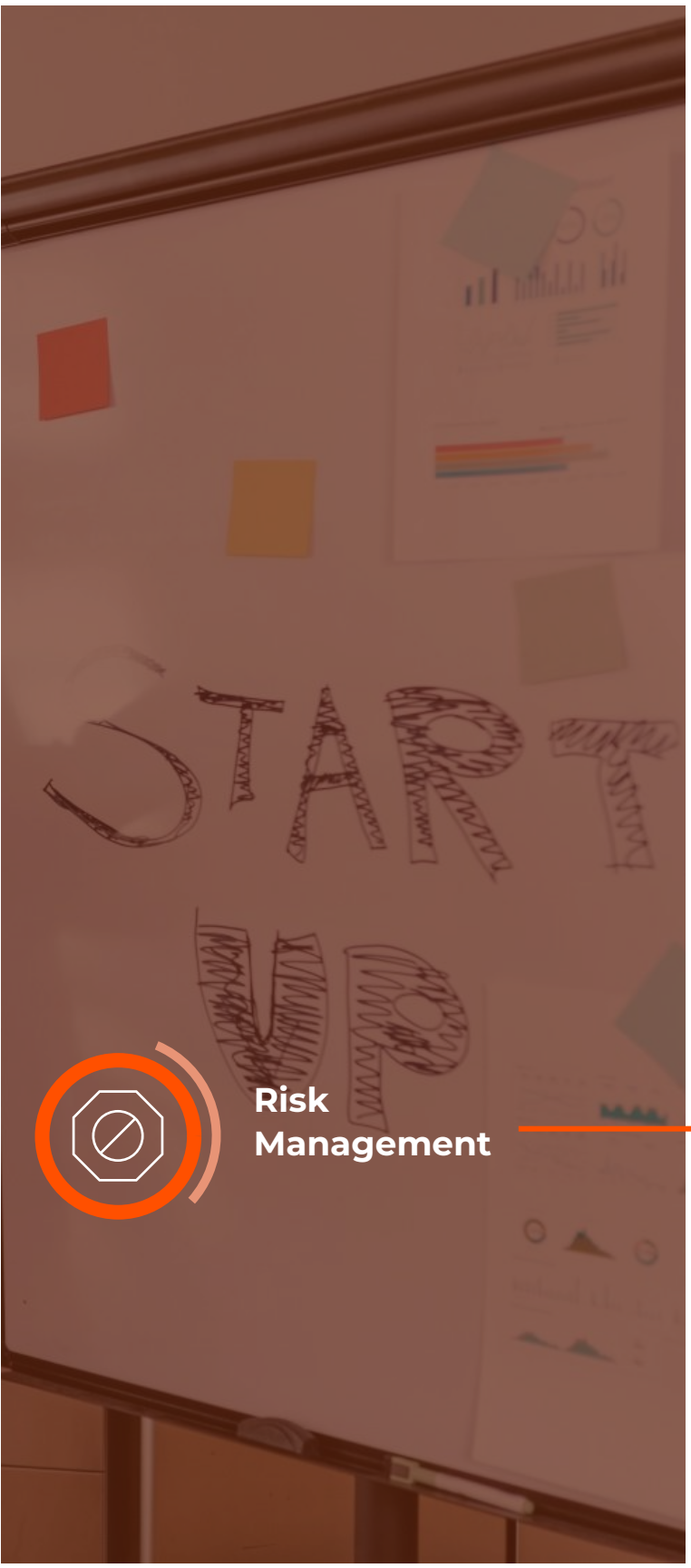
On the other hand, startups collaboration can help agribusinesses offer a better experience for their suppliers. Numerous startups are now providing technologies to enhance distribution, commercialization, and logistics, which can be leveraged by corporations to better interact with their suppliers and, ultimately, provide better products for their customers. To illustrate this, Silohub, an Argentinian startup that provides Agtech platforms, facilitates the exchange of business between farmers and agro-retailers to simplify the process. This platform helps corporations interact more efficiently with their suppliers, which can sometimes be challenging in this industry. Another example of startups facilitating interactions between agribusiness corporations and their suppliers is Circular, another Argentinian startup that offers a smart platform to organize all actors in the grain logistic chain, thereby resolving inefficiencies caused by lack of coordination in transport[182].

Agribusinesses can significantly enhance their brand reputation by collaborating with Agrifoodtech startups, as they can provide technologies that facilitate the adaptation to sustainability trends and project a technology-driven mindset.

On the one hand, many technologies and solutions provided by Agrifoodtech startups help farmers and other players in the agrifood value chain to improve their sustainability practices. By collaborating with these startups, corporations demonstrate their commitment to sustainability and ethical practices, which can significantly boost their brand image. Agribusiness corporations that commit to these values are likely to see steady returns and their brand reputation improved.

Moreover, today's consumers are increasingly aware of the environmental and social impacts of the products and services they use. They are demanding corporations to improve sustainable practices and

[181] (Rappi, 2024)
[182] (Circular, n.d.)



provide transparent evidence of their efforts in the production of their products and services. In an effort to remain competitive and satisfy consumers, traceability startups can guarantee the quality, sustainability, and safety of their products, helping agribusiness in adapting to these preferences. For instance, Agtrace is a startup that provides an integrated platform that ensures reliable, secure, and real-time information. It allows corporations to connect all the links in the supply chain to ensure that the products they are commercializing come from the best sources, are safe for their customers, and are produced using sustainable agricultural practices. Produziendo Certo is another startup based in Brazil dedicated to the verification of agricultural product certification standards and the assurance of compliance with legislation and other rigorous socio-environmental criteria. This startup has partnered with corporations such as Cargill, ADM, and LDC to provide them with reliable information that enables them to meet their customer needs and growing demands.

On the other hand, in an industry such agriculture, which is widely regarded as traditional and conservative, it may be crucial to prioritize technology development to remain competitive in the market. Agribusinesses can position themselves as dynamic, cutting-edge, organizations that champion technology and innovation by proactively anticipating market trends through the establishment of alliances with startups. This approach creates ongoing value for investors and contributes positively to global advancements in Agrifoodtech innovation.

Risk Management

Collaborating with multiple startups allows corporations to mitigate risks associated with innovation. These collaborations can enable corporations improve their resilience and adaptability in a dynamic industry landscape by decreasing their reliance on internal initiatives for innovation.

Moreover, collaborating with startups enables agribusinesses to maintain a competitive edge without requiring extensive transformation to their core operations or significant resource investment. Instead, they can focus on co-developing or acquiring complementary products and services. Ultimately

this approach reinforces their core business, ensuring long-term success[183].

A key example of an alliance aimed at accessing innovations and keeping agribusinesses ahead in the market is Grupo Alpina, a multinational Colombian company that specializes in dairy-based food products. Grupo Alpina has partnered with Rockstart, an accelerator for Agrifoodtech startups, to provide support to a minimum of 18 startups over the next two years. The purpose is co-developing innovations and empowering new ideas, thereby enhancing the sustainability and productivity of the startups[184]. This partnership provides Grupo Alpina with primary access to the top innovations developed by these startups, facilitating the corporation's digital transformation by potentially integrating these technologies. Furthermore, this collaboration mitigates the risks associated with exclusively relying on internal innovation efforts.

5.2. Success Case Studies

In order to gain a more comprehensive understanding of the benefits that arise from these alliances and how agribusiness corporate companies partner with Agrifoodtech startups, some relevant success cases are explored below.

[183] (Brigl, Gross-Selbeck, Dehnert, Schmieg, & Simon, After the Honeymoon Ends: Making Corporate-Startup Relationships Work, 2019)

Case Study

Grupo Bimbo Ventures & Cinca: Innovation in Healthy Snack Products

Grupo Bimbo sought to expand its product range in Mexico by introducing snacks that are not exclusively made from maize, but incorporate other vegetables and grains to enhance nutritional value and diversify their product portfolio. This aligns with the growing consumer demand for healthier and more sustainable food options. **Grupo Bimbo is committed to promoting diverse, nutritious, plant-based diets that emphasize whole grains and superior ingredients.** To meet these goals, they have set ambitious targets for 2025 and 2030, focusing on increasing whole grain consumption and providing healthy plant-based options across all categories. Their nutritional guidelines are driven by four key action axes:

Positive Nutrition

Enhances product nutrition, contributing to 95% of their portfolio meeting positive nutrition standards by 2023.

Clean Labeling

Offers products without preservatives, trans fats, or gluten, in line with natural recipe commitments.

Fortification

Supports accessible nutritious options, reaching over 92.3 million households by 2023.

Smart Portions

Provides portion-controlled, guilt-free snacks for balanced diets.

AGRIBUSINESS ORGANIZATION

Grupo Bimbo is a global leader in the baking industry, renowned for its diverse portfolio of bread, pastries, and snack products. The company is committed to innovation and sustainability, striving to offer healthier options to consumers.

SOLUTION PROVIDER

Cinca is a pioneering startup specializing in the production of tostadas, totopos, and tortillas made from cauliflower. Their innovative approach elevates the nutritional content of traditional snack foods.

WHAT THE STARTUP OFFERS

Cinca's value proposition centers on producing snack products using only natural ingredients without preservatives, trans fats, or gluten. Specializing in products such as tostadas and totopos made from cauliflower, Cinca ensures their offerings are not only delicious but also nutritionally superior. Cauliflower is known for its high content of vitamins C and K, folate, and fiber, making it a nutritious choice ideal to incorporate in daily snacks.

THE ALLIANCE

The partnership between Grupo Bimbo and Cinca has led to the successful launch of cauliflower-based snacks under the **Sanissimo** brand. These healthier alternatives are part of Grupo Bimbo's efforts to meet their nutritional and sustainability goals. **In 2023, Sanissimo achieved over $100 million in global sales**, reflecting the broader success of their health-focused initiatives, with cauliflower products being a part of this achievement.

Case Study

Coca-Cola Chile & Kilimo: Enhancing Water Management in Agriculture

Coca-Cola Chile is committed to sustainability, including water conservation and responsible environmental practices. Water scarcity and inefficient water use in the Maipo Basin, a crucial agricultural region for their supply chain, threaten the sustainability of water resources and farming operations. As part of their global sustainability framework, Coca-Cola aims to return to nature and communities an amount of water equivalent to what is used in their beverages and production.

This includes **improving water efficiency, supporting community water programs, and enhancing water accountability in their supply chain**. Addressing these issues is vital for Coca-Cola Chile to meet its water stewardship goals and support local communities reliant on these water resources.

30% Of water consumption reduction in **Coca-Cola Chile's operation** by using Kilimo's platform.

30 million **Cubic meters of water saved** until now with Kilimo's platform

7 **Countries where Kilimo's platform is used**

2,000 **Farmers have benefited** from Kilimo's platform use

AGRIBUSINESS ORGANIZATION

Coca-Cola Chile is a subsidiary of The Coca-Cola Company, one of the world's largest beverage corporations. The company actively engages in initiatives to reduce its environmental footprint, including efforts to conserve water, reduce waste, and support community development.

SOLUTION PROVIDER

Kilimo is a leading Agtech company focused on enhancing water efficiency in agriculture. Kilimo provides precise irrigation recommendations to farmers. This helps optimize water use, improve crop yields, and promote sustainable agricultural practices.

WHAT THE STARTUP OFFERS

Kilimo's technology platform integrates climate, satellite, and soil data with AI to provide precise irrigation recommendations. **This helps farmers optimize water usage, receive real-time insights on irrigation practices, and reduce water consumption while maintaining or improving crop yields**. Kilimo's platform, which requires no field hardware, can reduce water use by up to 40% and supports a wide range of crops. Farmers can earn cash through water savings credits, promoting sustainable water management and financial incentives.

THE ALLIANCE

Starting in 2022, the alliance between Coca-Cola Chile and Kilimo addressed water management challenges in agriculture. **Kilimo's platform has reduced water consumption, aligning with Coca-Cola's sustainability goals.** Farmers benefit from lower water costs and improved yields. The project aims to recover 1,950,000 m^3 of water annually, benefiting 30 farmers in the Maipo Basin.

Case Study

Pulse Hub by Raízen & Bart Digital: Innovating Agricultural Finance

Raízen, a leading player in the bioenergy sector, faces significant cost pressures in sugarcane production due to leasing land, the cost of cutting, loading, and transport (CCT), and labor overhead. Notably, 50% of Raízen's 852,000 hectares of sugarcane production are managed by third-party suppliers, making their development crucial for Raízen's operations. These challenges necessitate innovative solutions to enhance operational efficiency and sustainability in their supply chain.

Raízen is also committed to a robust sustainability strategythat includes community engagement. This involves supporting local communities through initiatives that promote environmental stewardship, economic development, and social responsibility.

KEY OUTCOMES:

Financial Impact: Formalized over 227 CPRs, servicing 120 sugarcane suppliers, and moving more than USD $140 million (R$ 744 million) in agricultural titles, improving cash flow and operational efficiency.

Enhanced Networking: Fostered stronger connections within the agribusiness sector and promoted broader adoption of digital practices.

Leveraging Bart Digital's expertise, Raízen enhanced supplier relationship management, reduced costs, and achieved greater sustainability.

raízen

bart digital
a garantia do futuro

AGRIBUSINESS ORGANIZATION

Pulse Hub is Raízen's innovation hub, fostering innovation and technology in agribusiness. It connects startups with Raízen's challenges, driving sustainability and efficiency through collaboration and resource sharing. **Raízen is a leading bioenergy company and one of Brazil's largest sugarcane producers.** Committed to sustainability, Raízen focuses on innovative practices to enhance operational efficiency and environmental stewardship.

SOLUTION PROVIDER

Bart Digital specializes in digitizing agricultural processes, automating the formalization of agricultural product certificates (CPRs). Founded in 2017, their platform streamlines workflows, reduces costs, and promotes sustainable practices in agribusiness.

WHAT THE STARTUP OFFERS

Bart Digital is a pioneering startup that specializes in the digitalization of agricultural processes, focusing on creating efficient and secure solutions for the agribusiness sector. Their primary value proposition lies in automating the formalization and verification of agricultural product certificates (CPRs) through a 100% digital process. This innovation brings several key benefits and impacts: Efficiency and Speed, Cost Reduction, Enhanced Security and Compliance, and Scalability.

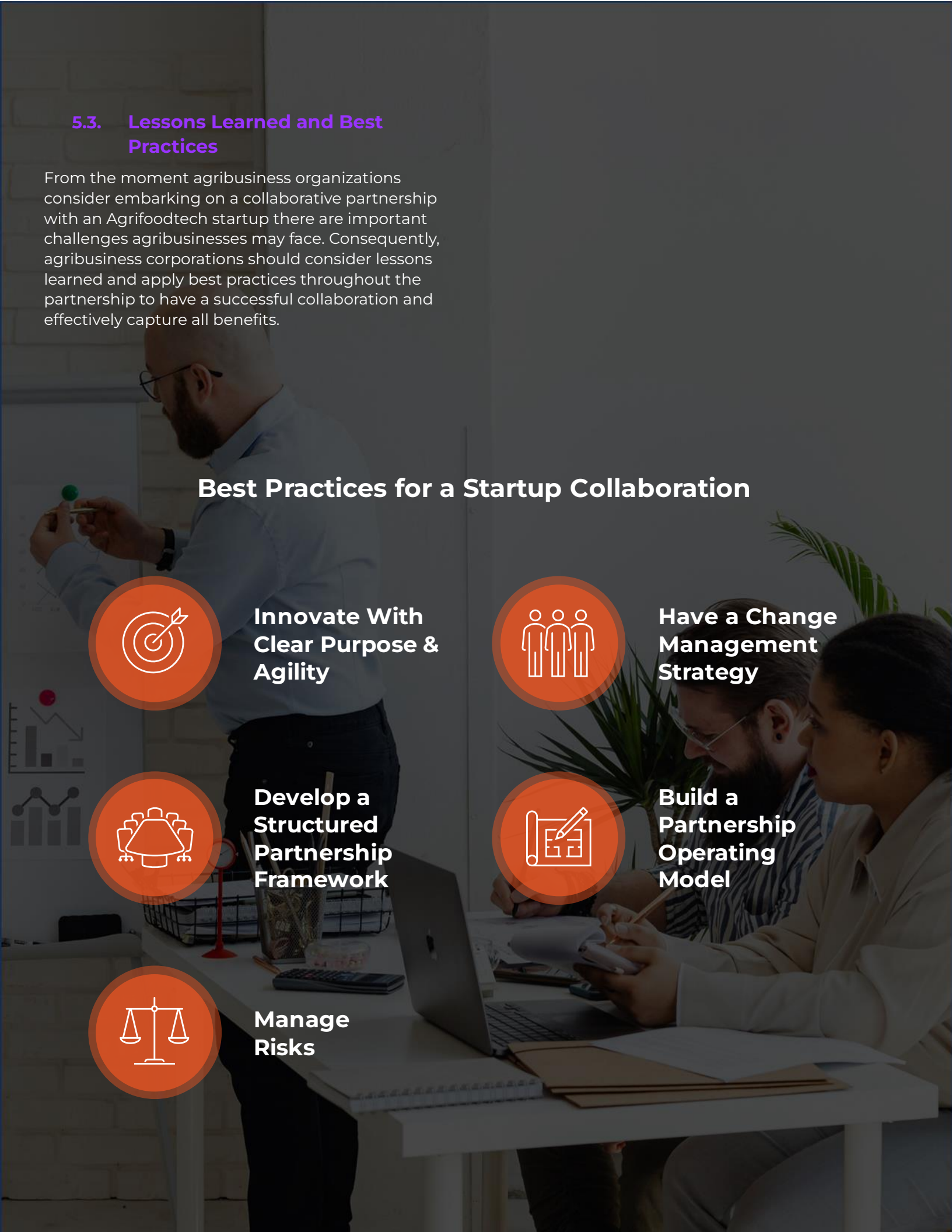
THE ALLIANCE

Pulse Hub, Raízen's innovation hub, partnered with Bart Digital since the foundation of the startup in 2017. By 2020, the project was fully implanted enabling the electronic issuance of documents, collection of digital signatures, and registration in authorized centers.

pulse
HUB DE INOVAÇÃO

5.3. Lessons Learned and Best Practices

From the moment agribusiness organizations consider embarking on a collaborative partnership with an Agrifoodtech startup there are important challenges agribusinesses may face. Consequently, agribusiness corporations should consider lessons learned and apply best practices throughout the partnership to have a successful collaboration and effectively capture all benefits.



Innovate with Clear Purpose and Agility

Challenges and Lessons Learned

When considering pursuing a partnership with Agrifoodtech startups, there are simple mistakes that agribusinesses make that can significantly affect value. First many agribusiness organizations lack a comprehensive digital transformation strategy that clearly identifies key areas where leveraging strong innovation is required. Therefore, agribusinesses can pursue alliances with startups that ultimately fail to align with their overall strategic objectives. This may prevent extracting appropriate value from the partnership and even loss of time and financial resources.

A common error when pursuing a partnership is thinking they can internally develop the solution the Agrifoodtech startups is offering. While it is true that agribusinesses usually have the internal resources to develop the solutions, they will typically fail in the execution. There are two main reasons behind it. First, corporations usually lack certain capabilities to efficiently develop an innovative solution. They are less agile in their ability to iterate and make critical decisions in the development process, and they have a more conservative culture that discourages high-risk behavior. Second, even with everything in place for a successful development, agribusiness organization usually have other pressing matters that take priority over special projects, and therefore it is left at the bottom of the pile and might never get done.

Best Practices

It is critical for agribusiness organizations to ensure that their innovation efforts are focused on the right value levers. Therefore, Agribusiness should have a clear digital transformation agenda that supports the organization's strategic objectives. Moreover, the digital transformation agenda should be built to understand how they can provide value to their organization and their clients.

It is important for agribusinesses to have a previous understanding of the opportunities and incoming technologies that are available to their business, as well as to understand current market trends to identify the incoming requirements of their clients. A broad perspective of available solutions can serve as inspiration and guidance to determine the type of partnerships corporations need to advance their strategic objectives. By doing so, corporations can identify the most relevant and impactful areas for collaboration with startups, ensuring their market competitiveness. For example, a high-value fruit producer may prioritize the commercialization of sustainable products in international markets, for which they need to comply with several regulation requirements. To achieve this, the organization should evaluate the different technologies available in the market that help them adapt to the realities of exporting to international markets.

Agrifoodtech solutions can impact all links of the value chain bringing technology to a predominantly traditional industry.

<u>Upstream</u>

- Design and provide enhanced agricultural inputs to protect and improve crop yields, climate change resistance, and food quality (Ag Biotechnology)
- Reduce transactional costs through supply-demand articulation and new financing solutions (Ag Marketplaces & Fintech)
- Leverage digital tools, data, predictive models, and automation technology to optimize farming and harvest processes thereby minimizing cost, reducing resource consumption, and maximizing yields and crop market value (Farm Management Software, Farm Robotics, Water Management, etc.)
- Develop healthier and more sustainable food though innovative new ingredients and food production methods, such as lab grown proteins (e.g., Innovative food)
- Reduce the environmental impact of agriculture by implementing novel farming systems

<u>Midstream:</u>

- Optimize food transportation and logistics to drive down costs and reduce waste
- Incorporate traceability technologies, such as sensors, IoT, and blockchain to address clients

demands, maintaining access to existing markets and gaining entrance to more lucrative ones

Downstream:

- Leverage digital technologies to address final consumer needs through innovative business models, reducing costs and serving new market segments (e.g., Cloud Retail, E-Grocery, Online restaurants & Meal Marketplaces)
- Improve sustainability performance and reduce costs through waste management technologies

Taking stock of all the aforementioned possibilities and throughout this report, agribusinesses should evaluate their strategic priorities and identify current innovation gaps in their operations. As a result, agribusinesses can enhance their digital transformation agenda by incorporating Agrifoodtech technologies, develop an initiative roadmap and identify key partnerships that will drive them forward. Open innovation can be a critical instrument that corporations could leverage to communicate their main challenges and objectives and foster collaboration from startups.

Develop a Structured Partnership Framework

Challenges and Lessons Learned

Once agribusiness have decided on the type of partnership they wish to have and have selected an Agrifoodtech startup to partner with, there are mistakes made that can cause important problems down the line.

Many times, although agribusinesses make sure the partnership aligns with their own objectives, they fail to align with the startup's interests and expectations. This lack of alignment may generate conflicts of interest caused by incompatible goals and expectations down the line.

Additionally, when considering establishing a partnership, inaccurate startup maturity evaluations may lead agribusinesses to establish partnerships that cannot meet their expectations in the short and medium terms, leaving agribusiness frustrated and disappointed.

Best Practices

To ensure a successful and smooth partnership it is essential to align expectations and design the rules of play from the beginning. Agribusinesses should sign a formal agreement with startups, defining clear objectives, roles, responsibilities, expected outcomes, and timelines. Ensuring that the startup's objectives and interests for the partnership are aligned with the corporation's willingness to provide is crucial. This will prevent future conflicts and guarantee ongoing mutual interest to achieve the best possible outcome. Collaborative goals and role setting are critical to achieve this.

To ensure startups can comply with established agreements, it is essential to assess the startup's maturity and ensure it aligns with the corporation's expectations before going forward with the partnership. Startups in early stages have the potential to offer a significant degree of flexibility to modify their value proposition and therefore fit the agribusinesses' requirements. Nevertheless, they may be riskier and require more time to achieve the

expected results. Meanwhile, startups with higher maturity will have a higher degree of predictability and will be able to offer agribusinesses lessons learned and specific know-how that has already been developed. However, the product or service value proposition will have limited flexibility to be modified to serve the specific needs or interests of the agribusiness given its advanced stage of development. Consequently, the desired level of maturity will vary based on the objectives and anticipated results. For example, a startup that commercializes a fully developed farm management software, with little room for customization, may not be the desired partner for an agribusiness organization that wishes to build a software highly tailored to their complex operations.

For agribusinesses to seek and develop the correct partnerships, a good practice can be to establish a dedicated and specialized team that focuses on researching and developing creative partnership and collaborative models. The former is not conducive to startups, given agribusinesses are very traditional, with limited and usually rigid partnership models and contracts. This approach will allow agribusinesses to interact with startups in a way that captures the venture's flexibility and agility.

Build a Partnership Operating Model

Challenges and Lessons Learned

Working with disruptive organizations and implementing innovative technology within an organization presents an important challenge for agribusinesses, given the need to develop a new culture and operating model that accommodates the partnership characteristics.

Best Practices

Agribusinesses need to adapt and align internal workflows according to the partnership's needs. This involves a variety of domains, including specific business units, the IT department, procurement, legal. For business units, depending on the type of partnership and level of involvement, new processes will need to be defined when novel technologies are incorporated within the organization.

Additionally, if working with the startup team is required, it is imperative to establish working sessions, communications channels, and working dynamics. For this, it is essential to involve the business units in the development of the operating model. In this regard, the implementation and development of new technologies with strong software components will need a strong collaboration with IT, where enabling experimentation environments, identity and access management, API integration, among other key actions, are needed.

Furthermore, agribusiness usually have longer decision-making processes characterized by increased complexity and longer time frames. Establishing especial governance structures that answer to the fast-paced high-risk nature of startups and innovation are necessary to prevent delays, missed opportunities, and hindering innovation. Additionally, establishing agile workflows for procurement and legal processes are essential to quickly respond to unexpected and uncertain circumstances.

For example, an agribusiness corporation may ally with a new Ag Fintech to provide loans to their suppliers, who are small farmers. In order for the IT department to access corporate information for the due diligence process, the software must be integrated with the organization's system. Additionally, legal and procurement need to develop flexible contracts, that account for the startup's early maturity where it may not comply with regular requirements, while simultaneously effectively managing risk.

Additionally, a well-established governance and interactions model is essential for ensuring an effective and agile flow of information, as well as a fast-paced continuous improvement process that maximizes value capture. Fostering regular communication and collaboration between the agribusiness individuals and startups is key to building transparency and trust. Regular meetings, check-ins, and feedback sessions are essential for addressing concerns, ensuring alignment, and reaching milestones in a timely manner. Regularly revisiting and adjusting communication strategies

can further enhance the partnership's effectiveness and adaptability.

In conclusion, a partnership evaluation mechanism that encompasses various levels of the agribusiness organization, should be developed. It can help ensure alignment with the digital agenda objectives and promote commitment from leaders, managers, and individual workers to achieve the desired objectives through the use of specific KPIs. Establishing a partnership management team can be useful to track and review the partnership's progress in relation to defined metrics and promptly identify potential areas of concern.

Change Management Strategy

Challenges and Lessons Learned

Agribusiness corporations and startups usually have very different cultures and processes. Startups tend to be more fast-paced and agile, whereas corporations have more conservative and bureaucratic processes. Most often than not, cultural differences can make working together a very challenging endeavor. Different expectations and ways of working can lead to tensions, frustrations, and misunderstandings.

Best Practices

As with any important change within an organization, for transformation to be successful it is crucial to put people at the center for them to embrace change and fully capture its value. A change management strategy that is comprehensive is necessary when collaborating with startups to introduce a new technology or bring a new team with a different culture into the organization. Change management should include an internal buy-in strategy to communicate the benefits and the rationale for the change, a cultural integration strategy to ensure that the diverse teams' methods of working are consistent, as well as a talent strategy to address critical skill gaps.

First, agribusinesses should develop internal buy-in strategies to facilitate the acceptance and adoption of new technologies and new ways of working among employees when incorporating innovative technologies into their operations or executing a collaboration with an Agrifoodtech startup. For this it is useful to involve individuals that are expected to participate in the day-to-day operations of the partnership, from the beginning of the negotiations. These individuals have the clearest understanding of potential impacts and obstacles for the partnership's implementation. They can provide key insights to define a change management strategy and to ensure a seamless transition during implementation. Moreover, strong, and clear communication of partnership implications and its benefits is crucial to ensure buy-in.

Second, in co-development and acquisition partnerships, agribusiness and startup teams are required to work in close collaboration to achieve a common goal. However, these two organizations usually have quite different cultures and practices. Cultural integration should be properly managed to avoid friction between teams, align expectations, establish new working methods, mitigate conflicts, and effectively leverage each team's strengths.

Moreover, Agribusinesses should conduct regular evaluations to assess the cultural integration between the organizations and develop initiatives to resolve challenges.

Finally, when partnerships are limited to the licensing or supply of a new technology into the operations, agribusinesses should assess talent gaps and implement training programs that incorporate upskilling and reskilling strategies to ensure employees have the required capabilities to adapt to change. For example, acquiring new machinery and robots for fruit picking may imply agribusiness needs to redirect existing employees to new tasks, such as operating these machines. This requires the acquisition of new skills. Another example could be the implementation of farm management platforms on existing processes. Employees should be trained in how to operate these platforms and how to interpret and act upon resulting insights.

Manage Risks

Challenges and Lessons Learned

Given startups high-risk nature, agribusinesses need to manage a certain level of risk and high uncertainty. It is important for agribusinesses to have strong mechanisms in place that can assist them in navigating situations where startups fail to deliver, often due to factors beyond their control. Particularly, startups that serve as solution suppliers may have reliability issues due to inadequate stable supply and customer support.

Similarly, agribusinesses may have experienced a failed partnership as a result of their failure to effectively manage the issues that arise because of the simultaneous implementation of new technologies. Considering the high level of uncertainty when dealing with new incoming technologies which have had limited testing in uncontrolled environments, it is advisable to begin with a modest scale.

Best Practices

Working together with startups will always involve a certain level of risk given their disruptive, fast-paced, and uncertain nature. As a result, it is important for agribusiness corporations to implement different mechanisms that help mitigate that risk.

Agribusiness organizations need to implement and scale Agrifoodtech solutions at a pace that enables them to respond to unexpected results. It is important for corporations to adopt a strategic approach to their partnerships, starting implementation in a controlled and restricted environment. The former enables corporations to evaluate the true viability of the partnership and to validate the startup's technologies without committing substantial resources. This entails starting with pilot projects and limited-scope collaborations. As the corporation gains insights into the startup's operations and the compatibility of their technologies with the corporation's internal gaps, they can gradually scale their involvement.

Conversely, a key method to help mitigate risk is to diversify partnerships and collaborations. By expanding the startups pool, agribusinesses can mitigate their dependence on any single startup for successful outcomes in internal projects, innovation initiatives, or technology/solution supply.

Finally, while fostering innovation and disruption is an important goal of partnering with Agrifoodtech startups, agribusinesses can also help balance risk. Corporations should provide startups with guidance on risk management, which includes the provision of internal corporate tools and strategies for the identification, assessment, and mitigation of risks. For example, agribusiness can provide Agrifoodtech startups methodologies to identify potential ESG risks and devise a contingency plan. This will prevent partnerships from being jeopardized and foster positive outcomes.

6

OVERVIEW OF SELECTED CATEGORIES, INVESTMENT TRENDS AND INSIGHTS

6. SELECTED CATEGORIES OVERVIEW: INVESTMENT TRENDS AND INSIGHTS

Within the Agrifoodtech sector there are various subcategories that have gathered more interest than others. At a global and regional level, up until recent times Downstream solutions have received most of the investment between 2018 and 2023. Nevertheless, since 2021 the trend seems to be reversing, as Upstream and Midstream solutions are attracting an increasing share of investment each year.

Furthermore, Upstream and Midstream, compared to Downstream, are the categories with greater potential to address the global challenges that have repeatedly been mentioned. These categories have a crucial role to promote efficient use of resources, increase the productivity of land, ensure crop resilience to climate change, enhance nutritional value of food, reduce costs associated with production and transportation, and increase sustainable practices in the Agrifood industry. All of this is key to ensure food security by providing nutritious and accessible food, reducing agriculture's impact on climate change through the efficient use of less harmful resources, and improve inclusion and diversity within the Agrifood value chain.

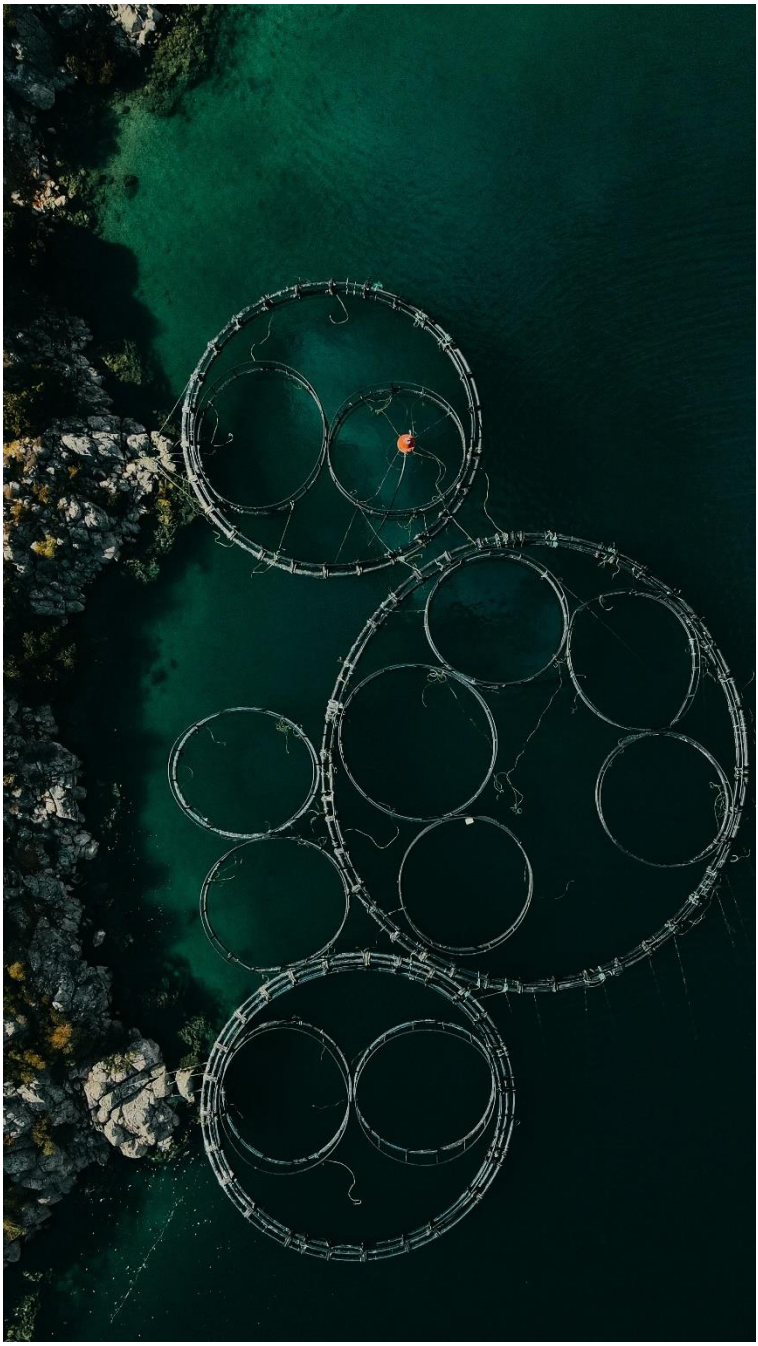
In this section, Upstream and Midstream subcategories are analyzed to understand their potential in the region, and to offer a perspective of the current state of the category, identifying important trends, key players, and recent transactions.

6.1. Subcategory Prioritization Methodology

Two key factors were assessed to understand the potential of each subcategory: the impact potential and the current maturity of the solutions. A value was assigned to each factor to later calculate a weighted average and determine a final score.

The following factors were considered when evaluating the prospective impact:

1. Impact on agricultural productivity



2. Impact on climate change through adaptation, resilience, and the reduction of the environmental footprint
3. Impact on different groups such as farmers, consumers, women, indigenous people, among others
4. Subcategory growth potential within the region

On the other hand, the following elements were considered to measure the maturity of the subcategories:

5. Readiness level to deploy considering the subcategory's technologies relative maturity and the context of the LAC region to enable its deployment (technology, interoperability, infrastructure, customization, etc.)
6. Current adoption rate of the subcategory solutions in comparison to others in the LAC region, considering their achieved market penetration

Figure 33 shows the results for each of the subcategories for both factors: Impact and Maturity:

Quadrant A focuses on the acceleration of innovation and the consideration of subcategories with high impact potential that still have relatively low maturity levels. Startups within these subcategories require considerable R&D funding to further mature their technologies and improve scalability and levels of adoption to keep improving the position they are in. They should partner with academia, research institutions, incubators, and even farmers to develop and validate their ideas in a way that they effectively address end-user needs and achieve their impact potential. Moreover, strong collaboration with the government is required to develop regulatory frameworks that facilitate solution implementation. Subcategories within this Quadrant include Ag Biotechnology, Innovative Food, Bioenergy & Biomaterials, Waste Management.

Quadrant B considers solutions that have a high impact potential and are relatively mature within the Agrifoodtech spectrum. These solutions need capital to grow and expand their operations, as well as to achieve their impact potential. Moreover, investment in this Quadrant is expected to be lower-risk than Quadrant A, given its relatively higher predictability of market fit. To promote the success of this type of subcategories, agribusiness corporations and startups should come together to amplify the solutions' impact and to improve operational efficiency. Additionally, initiatives to promote their adoption such as low interest loans to end-consumers and the development of key infrastructure such as connectivity are important to fully capture their impact potential. Subcategories

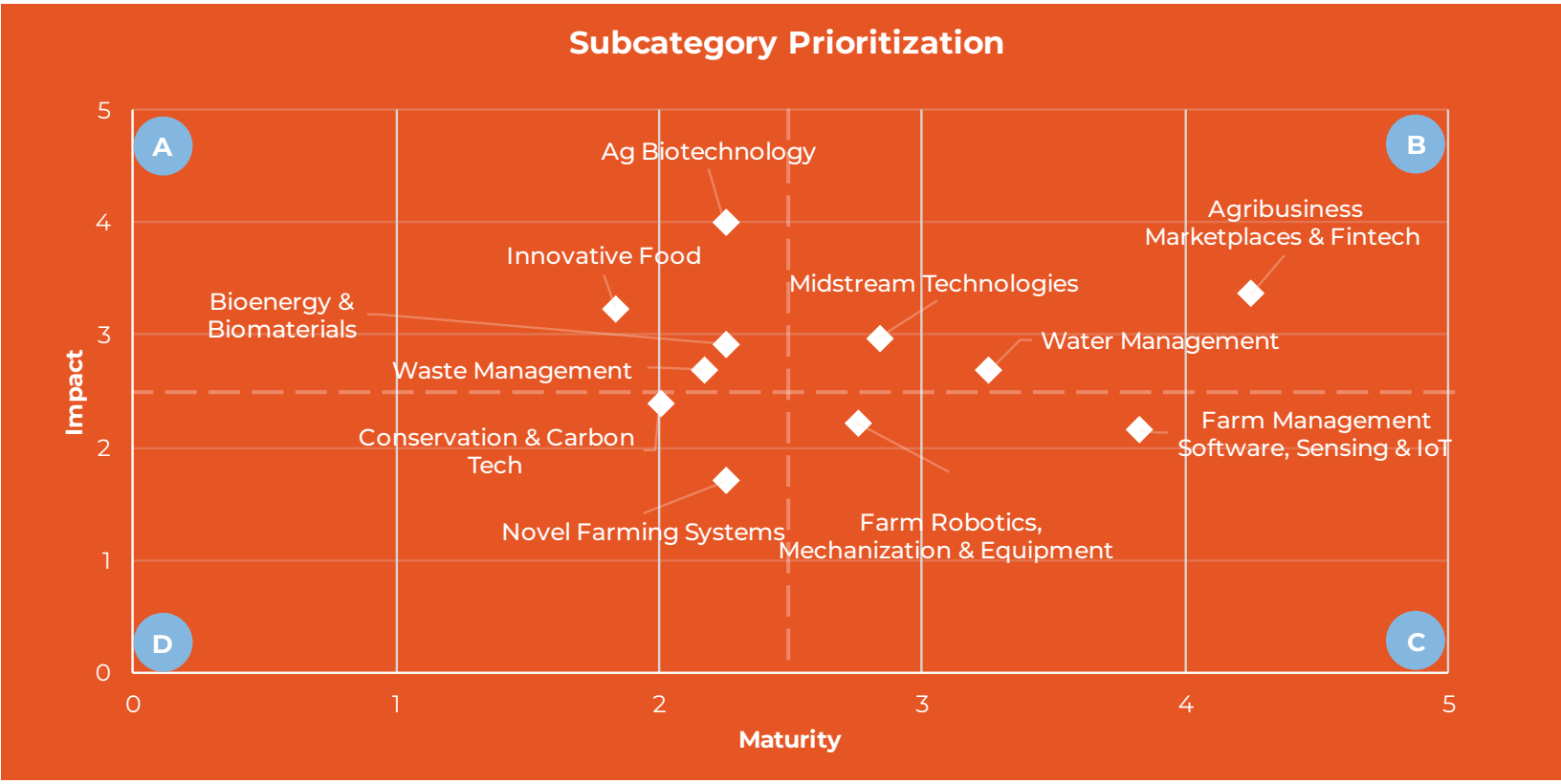


Figure 33: Subcategory Prioritization Matrix

within this Quadrant include Ag Marketplaces & Fintech, Midstream Technologies and Water Management.

Quadrant C considers subcategories with relatively high maturity and relatively lower impact potential, mostly focused on improving efficiency and fostering productivity. To unlock all its potential value, startups within this Quadrant need to expand their market penetration by ensuring greater adoption. Promoting adoption of the subcategories demands collaboration with government, NGOs and associations and guilds to consolidate demand and develop important enablers therefore unlocking their full value. This includes the improvement of digital literacy of farmers and developing the required infrastructure, such as internet connectivity. Currently, there are multiple players aiming to target these subcategories, which are showing early signs of market saturation, mainly in Farm Management Software, Sensing & IoT in Brazil and Argentina. Eventually, multiple small players in these subcategories may consolidate into a few big players that develop the most user-friendly and interoperable platforms, promoting easier adoption among farmers. Subcategories within this Quadrant include Farm Management Software, Sensing, & IoT, and Farm Robotics, Equipment & Mechanization.

Subcategory	Impact Score	Maturity Score	Final Score
Agribusiness Marketplaces & Fintech	3.4	4.3	3.7
Ag Biotechnology	4.0	2.3	3.3
Midstream Technologies	3.0	2.8	2.9
Water Management	2.7	3.3	2.9
Farm Management Software, Sensing & IoT	2.2	3.8	2.8
Innovative Food	3.2	1.8	2.7
Bioenergy & Biomaterials	2.9	2.3	2.7
Waste Management	2.7	2.2	2.5
Farm Robotics, Mechanization & Equipment	2.2	2.8	2.4
Conservation & Carbon Tech	2.4	2.0	2.2
Novel Farming Systems	1.7	2.3	1.9

Figure 34: Subcategories Prioritization - Final Score

Lastly, after calculating a weighted average to determine the final score for each subcategory (Figure 34Figure 34), there are five subcategories across Upstream and Midstream solutions that stand out as the most promising within the Latin American region. These are Ag Marketplaces and Fintech, Ag Biotechnology, Water Management, Midstream Technologies and Farm Management, and Software Sensing & IoT. Over the coming sections a perspective for each subcategory is developed to provide a better understanding of each subcategory's level and position.

6.2. Upstream Subcategories

The LAC region has experienced a significant increase in Upstream investment in recent years, as explained in previous sections. Consequently, the category has secured an increasing share of Agrifoodtech investment. However, LAC continues to underinvest in most Upstream subcategories compared to global standards. The exceptions are Ag Marketplaces & Fintech, Farm Management Software, Sensing, & IoT.

This represents an important gap in investment that must be addressed to capitalize on the agricultural abundance and improve competitiveness,

considering the role and relevance of the agricultural industry in the LAC region. Subcategories such as Ag Biotechnology, Bioenergy & Biomaterials still hold an important potential to unlock in the region. Meanwhile, other subcategory such as Ag Marketplaces & Fintech seems to be gathering growing interest, which could be due to the region's limited access to traditional financial institutions.

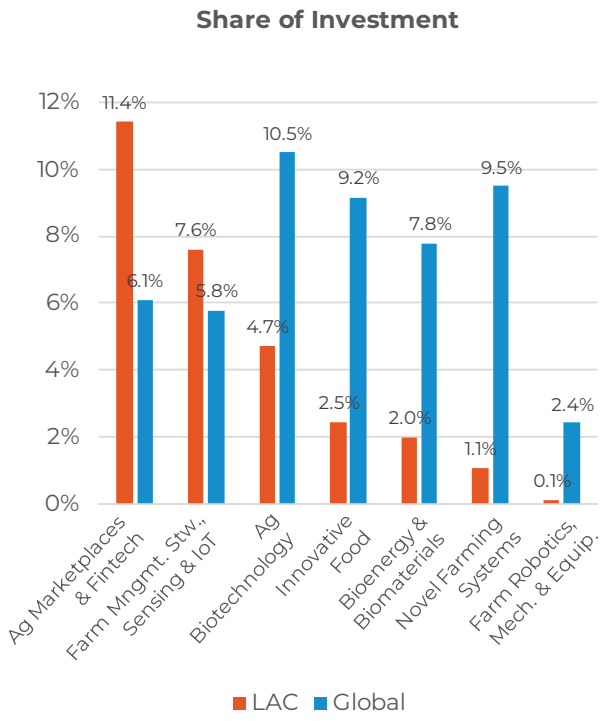


Figure 35: Upstream LAC vs Global: Share per Subcategory

Ag Marketplaces and Fintech

Subcategory Perspective

Solutions within the Agribusiness Marketplace and Fintech subcategory include commodities trading platforms, online input procurement, equipment leasing, and farmer fintech. These solutions have been fundamental in enhancing efficiency, transparency, and market access to the agrifood supply chain, by facilitating the connection of several players, including farmers, input producers, traders, and food manufacturers. Moreover, agri-fintech plays a crucial role in providing credit and financial services to small and medium-sized producers, who often find access to capital challenging. By leveraging technology, agri-fintech companies can offer more efficient and less bureaucratic capital flows to growers, allowing them to invest in new technologies and innovations that contribute to sustainable agriculture[185].

At a global level, Agribusiness Marketplace & Fintech have shown consistent growth from 2018 to 2023. Unlike most other subcategories, they did not experience a significant downturn in investment during the most recent period. In fact, they exhibited a great resilience with the least amount of investment reduction. Overall, this subcategory has attracted US$ 7.4 billion since 2018, represented by 716 deals, showcasing steady performance over the years.

In LAC, this subcategory is the one that attracted the most capital in 2022 within Upstream and third overall. It was responsible for 12% of the region's funding with US$ 191 million across 21 deals. Its average ticket size was among the top four in all categories, showcasing a relatively good maturity level.

Its stronger relevance in the region, compared to global trends, could be explained by several factors. First, the region's value chain fragmentation, characterized by small farmers that own approximately 50% of the agricultural land, has driven growth for this subcategory. Small farmers usually lack access to proper value chain integration to buy agricultural inputs and sell their products at fair value, and are, in general, unable to access adequate financial resources. The region's need for these services is evident, as seen in Brazil, where farmers utilized the entire US$ 75 billion in working capital credit in 2022[186]. This highlights the growing demand and the potential for continued evolution of the subcategory in the near and long terms.

Second, by improving payment methods and the underwriting process, Ag Fintech startups can help different stakeholders, such as traditional financial players, agricultural inputs suppliers and distributors, in gaining access to a wider market and providing new revenue streams. Moreover, they can aid farmers to mitigate high volatility in the commodities market.

[185] (World Agri-Tech South America Summit, 2024)
[186] (AgFunder, 2023)

Finally, these solutions have leveraged the mature Fintech sector in the region, prompting its high maturity and growth in the agricultural industry. Furthermore, these solutions are typically software-based with low capital expenditure, which makes their growth easier and faster.

For these reasons, this subcategory is regarded as the most relevant in the region due to its higher level of maturity and significant impact. With proven technologies, the subcategory has demonstrated strong performance and plays a crucial role in enhancing efficiency and financial access within the agrifood supply chain. It has shown notable impacts in the short, medium, and long terms. The substantial investment figures and successful integration of Fintech solutions highlight that the industry is well-developed and well-positioned for ongoing innovation and expansion.

Subcategory Key Players

Brazil is the strongest country of LAC in this subcategory. Agrolend[187] emerged as a prominent entity in the country in 2022, distinguishing itself by providing essential financial support to small and medium-sized farmers. It operates alongside other fintech-focused entities such as Terra Magna[188], Marco[189], and Traive[190]. All contribute to the agriculture industry by offering services like Farm loans, flexible financing options for exporters, and risk assessment tools. Additionally, marketplaces such as Seedz[191] and Grão Direto[192] play a critical role by enabling farmers to efficiently purchase necessary inputs and sell their goods, streamlining the supply chain and enhancing the operational efficiency within the agribusiness sector. Finally, in Argentina, Agree improves loan access by enabling the purchase of supplies, insurance, and utility payments.

Representative Deals

Among the most representative ventures is Agrolend, which secured US$ 96.2 million between series A, series B and debt financing. The proceeds will enable Agrolend to expand its credit offering to more than 10,000 small to medium-sized farms in Brazil. Similarly, Terra Magna managed a US$ 40 million series B deal in 2022, which facilitated the expansion of its regional presence and diversification of its financial products. Finally, Seedz and Grão Direto secured deals for US$ 16.5 million and US$ 7.9 million, respectively.

Ag Biotechnology

Subcategory Perspective

The Ag Biotechnology subcategory is dedicated to enhancing crop yields, improving resistance to pests

[187] (Agrolend, n.d.)
[188] (TerraMagna, n.d.)
[189] (Marco, 2024)
[190] (Traive, n.d.)
[191] (Seedz, 2024)
[192] (Grão Direto, 2024)

and diseases, and increasing sustainability through innovative biotechnological approaches. This includes the development of Genetically Modified Organisms (GMOs), and novel biopesticides and fertilizers. In 2021, the global Ag Biotechnology market was valued at US$ 4.6 billion. By 2026 it is expected to grow more than 50% and have a valuation of US$ 7 billion. This forecast and growth potential are indicative of the market's future. In terms of the global Agrifoodtech sector, between 2017 and 2023 this subcategory raised a total of US$ 12 billion, making it the sixth largest in funding and the second most relevant in the Upstream category during this period.

Meanwhile, this subcategory has yet to fully exploit its potential in the LAC region, as it has done elsewhere. In 2022, it was one of the least funded, raising only US$ 41 million, ranking fourth in the Upstream category and tenth in the industry. Despite this, the subcategory has managed to grow 250% between 2020 and 2022, given the presence of unique startups such as Puna, Andes and Micro Terra, the support from startup creators and accelerators like GridX and SF500 in Argentina or The Ganesha Lab in Chile, and the high potential benefits of its technologies. Furthermore, 76% of respondents to a survey made in Argentina, Brazil, Chile, and Colombia agreed that biotechnology was one of the most relevant agricultural technologies that had been implemented.

Up until now, Ag Biotechnology in LAC has mainly focused on developing crop varieties that are well-suited to local climates and challenges, such as drought tolerance and pest resistance; it has also developed innovative inputs that reduce the environmental impact and increase efficiency. Argentina, Brazil, Chile, Uruguay, and Paraguay are leaders in the Biotechnology category[193]. A first key example of the development of the region has been the introduction of HB4 drought-tolerant seed in Argentina, being the first genetically modified wheat in the market. The crop has managed to generate regional demand in Colombia, as well as out-region in the United States, Nigeria, Australia, and New Zealand, among others. Similarly, Brazil introduced in 2021 the first genetically modified bean, resistant to golden mosaic virus, further exemplifying the advancement in the category[194]. A 22% growth in

[193] (Roca, Falck-Zepeda, & Paes-Andrade, 2023)
[194] (Norero, 2023)

yields and 22% increase in farmers profit, evidence the notable impact of said technology[195].

Furthermore, it is important to note that Latin America accounts for 45% of the world's cultivated area for transgenic crops. This shows a local openness to implement this type of technology in agricultural production, particularly in field crops such as wheat and beans, that creates an opportunity for Ag biotechnology startups to keep innovating in the sector.

Nevertheless, even with important demand from other countries as exemplified by the HB4 soybean, startups trying to develop new genetically modified crops have an important entry barrier given high sensitivity around this type of technology. Up until now innovation and development in this category has mostly been dominated by strong and reputable agribusiness corporations such as Bioceres. To enter this market, startups face an important challenge to promote growth and scale their businesses; they need to overcome distrust and widespread negative perception among the population especially when it comes from new and inexperienced players.

Conversely, within this subcategory, bioinputs (e.g. biopesticides) have had a good level of adoption and are generally well-regarded by society due to their association with organic production. For example, in Colombia, there is a growing trend in the number of patents filed for bioinputs since 2017[196]. Additionally, unlike synthetic pesticides, microbial pesticides are targeted in their action, can be sourced easily without the need for costly chemicals, and are environmentally sustainable, leaving no harmful residues[197].

The continued development and growth of Ag Biotechnology solutions, both bio-Inputs and Genetically Modified (GM) crops, faces different challenges. First, the R&D resources required for this subcategory are substantial, requiring funding, technical and scientific expertise, and research facilities for testing and pilot projects. The LAC region has both limited infrastructure and trained personnel

[195] (Noreo, 2018)
[196] (Superintendence of Industry and Commerce , 2023)
[197] (Ayilara, Adeleke, Akinola, & Fayose , 2023)

to effectively conduct research, development, and production of Ag Biotechnological products.

Additionally, the lack of a unified and clear regulatory framework in the region has resulted in uncertainty and obstacles for research, development, and commercialization of agricultural biotechnological products. The multiple regulatory approaches among LAC countries add greater complexity to this process. For example, while Brazil, Argentina, and Colombia have more experience around biotech regulation, Mexico, Peru and Bolivia still have systems that strongly restrict biotech development and are not actively adapting or updating their regulatory frameworks, which reduce development opportunities for startups[198].

Despite the obstacles faced by this subcategory in the LAC region, it ranks second in the prioritization method. This high ranking is primarily driven by its significant impact on enhancing crop yields and promoting sustainable practices. Although it is not the most mature subcategory due to high entry barriers for startups, it incorporates proven technologies with substantial potential for both short-term and long-term benefits in daily farming operations.

Subcategory Key Players

There are various prominent players among the category, such as SoluBio in Brazil, which created a bio input solution allowing farmers to reduce their costs up to 70% in soybean, corn, wheat, cotton, sugarcane, and other crops. The company is the leader in its segment as of 2021, with 29% market share in biofactories, and its products have been used in more than two million hectares[199]. Another example is Michroma from Argentina. The emerging seed startup provides a biotech platform for producing natural ingredients in a sustainable, scalable, and cost-effective way. Finally, Agrichem, a former successful startup acquired by Ag Solutions in 2019, specialized in plant nutrition, is one of the market leaders in fertilizers for high-performance agriculture, producing high-concentration liquid fertilizers that meet the right nutrients for the specific needs of each crop.

Representative Deals

The investment received by the Ag Biotechnology sector in 2022 represents 2.4% of the total investments made in LAC's Agrifoodtech sector. Although specific deals in biotechnology were not detailed, the sector's growth is part of the larger trend of increasing investments in Agrifoodtech, highlighting the potential for major deals in Agribusiness Biotechnology.

Water Management

Subcategory Perspective

The emphasis on Water Management in LAC's agrifood sector stems from the urgent need to balance agricultural productivity with water conservation. While LAC is a region highly favored for its biodiversity and abundant natural resources, the climate crisis and the natural resource exploitation awareness has been a major emerging industry issue. Moreover, water scarcity is a pressing challenge across various regions of Latin America, particularly evident during dry seasons or in arid and semi-arid areas found in Brazil and Mexico. The Sertão region in northeast Brazil, for instance, faces recurring droughts, exacerbating water scarcity and impacting agriculture and livelihoods. Similarly, northern Mexico, in the states of Sonora and Chihuahua, contends with arid climates, intensifying the challenge of meeting irrigation demands. Balancing the imperative for irrigation with sustainable water usage proves to be a significant challenge in these

[198] (Zarate, Cimadori, Jones, Roca, & Barnhill-Dilling, 2023)
[199] (SoluBio, n.d.)

places, especially for crops reliant on ample water resources.

Agrifoodtech employs a variety of water management technologies to optimize efficiency and sustainability. These include drip irrigation systems, which minimize water loss by delivering it directly to plant roots; sprinkler irrigation systems that simulate natural rainfall, and soil moisture sensors that inform precise irrigation needs. Remote sensing technologies and drones provide critical data for assessing crop hydration, while automated irrigation systems adjust water delivery based on sensor data and weather forecasts. Water reuse systems conserve fresh water by recycling wastewater, and evapotranspiration controllers use weather data to fine-tune irrigation schedules. Subsurface drip irrigation reduces evaporation and water harvesting technologies capture rainwater for later use. Collectively, these technologies enhance water use efficiency, reduce waste, and support sustainable farming practices, contributing to improved crop yields and environmental conservation.

A key consideration in agricultural water management is that most extensive crops are rainfed rather than irrigated, often resulting in yields up to 50% lower compared to irrigated crops. Climate change exacerbates this by causing erratic rainfall patterns and altering seasonal cycles, creating significant challenges for farmers. Irrigation can mitigate these risks and boost crop yields by providing a consistent water supply. However, the high costs of irrigation systems hinder widespread adoption. Developing scale economies to make these technologies more accessible is crucial, as irrigation is required to achieve the maximum yield potential of 30%-47% of global rainfed agriculture, which includes crops like wheat and maize that are key in the LAC region[200].

Argentina and Chile are leaders in water management in agriculture due to the adoption of innovative irrigation systems which enhance water efficiency and reduce waste. One example is the Chilean startup, Instacrops, present in more than 300 farms across the region. The firm has enabled solutions such as InstaWell designed for monitoring and controlling deep wells in real-time.

In addition, implementing an Irrigation Scheduling Service (ISS) that is comparable to the ISS-ITAP model in Albacete, central Spain, an advanced irrigation scheduling service designed to optimize

[200] (Wang, Muller, & Elliot, 2021)

water usage in agriculture, could provide valuable insights to farmers in Latin America regarding the timing and quantity of irrigation needed. Such services have the potential to enhance water management practices on farms, optimizing water usage. For instance, introducing an ISS program in Colombia's coffee-growing regions, where water scarcity is a pressing issue, could be particularly beneficial. This program would furnish coffee farmers with customized irrigation schedules, tailored to their crop's water needs and the prevailing weather conditions. By doing so, it would enable farmers to maximize water efficiency while safeguarding crop health.

Moreover, insufficient irrigation infrastructure and neglect of existing systems contribute to water losses through leaks, evaporation, and inefficient distribution. Addressing these issues entails improving irrigation infrastructure and ensuring regular maintenance, tasks that can be financially

burdensome and daunting for farmers, particularly smallholders with limited resources.

From this perspective, Water Management is a subcategory that is both developing and impactful in the LAC region. Efficient use of water resources in agriculture is crucial for adapting to climate change and fostering sustainable production practices, benefiting a wide range of populations, especially in areas that are facing water scarcity. Despite the challenges of high costs and infrastructural limitations hindering broader adoption, startups in this subcategory are equipped with tested technologies that hold high potential for significant positive impact.

Subcategory Key Players

WiseConn[201], a Chilean startup, is pioneer in precision irrigation. It provides DropControl, a system that enables farmers to monitor and control irrigation remotely, thereby optimizing water usage and improving crop yields. Another relevant case is Kilimo[202], leveraging big data and machine learning, to provide a decision support tool for precision irrigation, helping farmers optimize water use based on crop water needs and soil moisture levels.

Representative Deals

One of the most representative deals in the LAC region, regarding Water Management is Kilimo. This company has raised US$ 8.9 million over nine rounds, with the most recent one being a Series A round for US$ 7.5 million occurring in 2024[203]. Similarly, WiseConn raised an undisclosed amount in a Series B round in 2022[204].

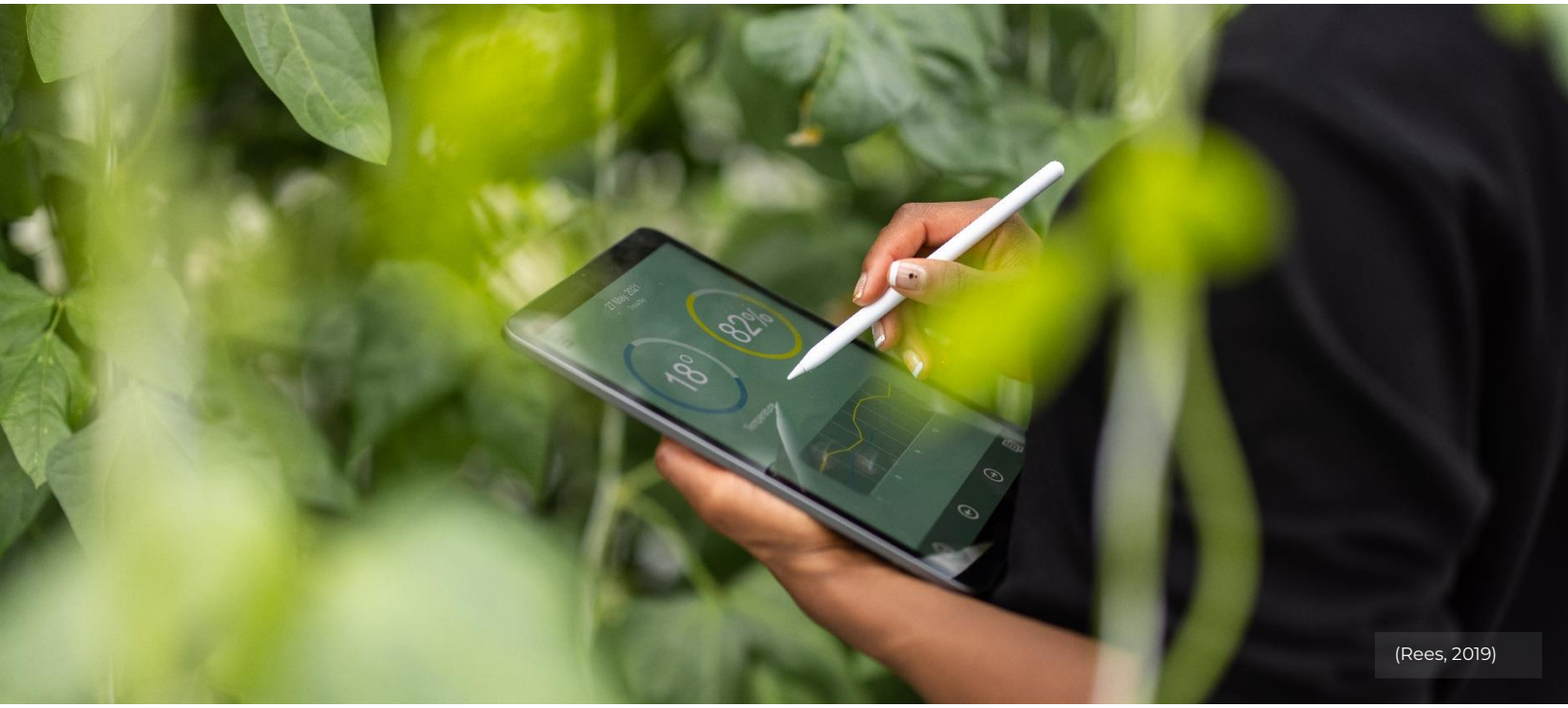
Farm Management Software, Sensing & IoT

Subcategory Perspective

This subcategory focuses on leveraging technology to optimize farm operations through sensors, decision support systems, and data analytics. The adoption of these technologies can provide benefits such as improved consistency in crop yields and enabling traceability practices which facilitate compliance with the increasingly rigorous standards of global markets.

When considering global investment trends, Farm Management Software, Sensing & IoT subcategory is among the least funded within the Upstream and across categories, garnering around US$ 6.8 billion over the 2018-2023 period. This represents only 5.8% of global investment across 1,328 deals. Additionally,

[201] (WiseConn, n.d.)
[202] (Kilimo, n.d.)
[203] (Crunchbase, 2024)
[204] (Pitchbook, 2024)



(Rees, 2019)

the subcategory saw a decrease in funding from US$ 1.7 billion, in 2022, to US$ 716 million in 2023.

In contrast to global trends, Latin America and the Caribbean shows greater interest in Farm Management technologies, being the second most funded subcategory within Upstream in 2022. The subcategory secured US$ 127 million among 23 deals, 7.6% of the total investment in the region.

This subcategory is highly relevant in the region due to the diverse climates and terrains, which create highly volatile conditions that impact agricultural production. Consequently, farmers are compelled to implement solutions that have the potential to reduce uncertainty and maximize efficiency.

Through data collection and prediction models, these solutions can provide farmers with key information to optimize decision-making, forecast a variety of scenarios, and enable them to take timely actions, mitigate impacts and reduce losses. Nevertheless, technologies within this subcategory still have significant room to mature. There is a need for a greater degree of agricultural digitalization to generate the necessary information and refine predictive models.

Furthermore, over the years the subcategory has reached significant milestones in the region, including the integration of precision agriculture in the 1980s, GPS technologies in the 1990s[205], and the establishment of pioneering startups in the early 2000s and 2010s. Notable examples include Agriness, Agrotools, and Auravant founded in 2001, 2007, and 2014, respectively. Moreover, the category has gaining relevance due to concentrated efforts made by leading agricultural countries focused on field crops such as Brazil and Argentina. The first has primarily adopted farm management software to enhance efficiency across the agricultural value chain. Initiatives such AgriHub, supported by the Brazilian government, actively foster growth in this subcategory. Likewise, Argentina has capitalized on its deep sectoral expertise to establish an environment conductive to the integration of these technologies into the daily operation of crops.

Despite the proven benefits, adopting Farm Management Software (FMS) presents several challenges for Latin American farmers. First access to high-quality data is essential for the comprehensive

[205] (Valtra, 2021)

acquisition of the value that these solutions have to offer. They are unable to capture such value if they rely on incomplete or outdated data. Consequently, to enhance the influence of this subcategory, it is imperative to address the challenge of generating, standardizing, and analyzing high-quality data.

Additionally, human talent required for the operation of these technologies must be trained. Digital and data analysis skills must be fostered within both large and small farmers through public and private initiatives. Similarly, developed solutions must be user-friendly and highly customizable as possible, to address specific farmer and crop needs. Lastly, the adoption of FMS may be adversely affected by other cross-cutting factors, including restricted financial access and inadequate internet connectivity. These multifaceted barriers underscore the challenges hindering the widespread adoption of agricultural technology in Latin America.

In conclusion, the subcategory stands out as a mature and thriving sector within the region, characterized by a consistent adoption of cutting-edge technologies that are becoming standard practices in the LAC region. This has generated a competitive environment with the emergence of new startups focused on enhancing established technologies. This competitive landscape fosters ongoing innovation and drives progress in the industry. For these reasons, this subcategory is ranked in fifth position in the prioritization method.

Subcategory Key Players

In LAC, Brazil is a relevant hub for this subcategory, having several startups and companies that are pioneers. However, they may not always receive the same level of visibility as their counterparts in more developed markets. Notable examples could include Agriness, which provides innovative software solutions and services to assists pig producers in optimizing their operations, improving efficiency, and increasing productivity in the pork industry; Agrotools is dedicated to developing technological solutions using Artificial Intelligence, data analysis, and cutting-edge technology to provide tools that assist farmers in optimizing crop management, increasing productivity, and improving decision-making.

Other notable examples currently in the process of consolidation and growth include the Argentine startups Eiwa that offers a comprehensive data management platform which integrates geospatial, tabular data, and sensor analytics for agriculture. Similarly, Auravant has developed an agricultural management platform which enables producers to remotely control all variables affecting their crops, both online and offline, using satellite images, soil maps, weather forecasts, and soil sensors. Finally, SIMA is an Argentinian AgTech startup offering a platform for monitoring, controlling, and analyzing

agricultural data to optimize crop yields with more than 218 thousand fields analyzed[206].

Representative Deals

In LAC, this category was the second most funded in Upstream in 2022, with an investment of US$ 127 million. It also accounted for the most deals in the region, with 23. One of the most representative was Solinftec for US$ 60 million in a late-stage round. In total, this company has raised US$ 146.6 million in five rounds, including Series B, debt financing and private equity rounds[207]. Furthermore, Eiwa raised US$ 1.62 million through a Series A round in 2023, while SIMA raised USD $2 million in 2022[208].

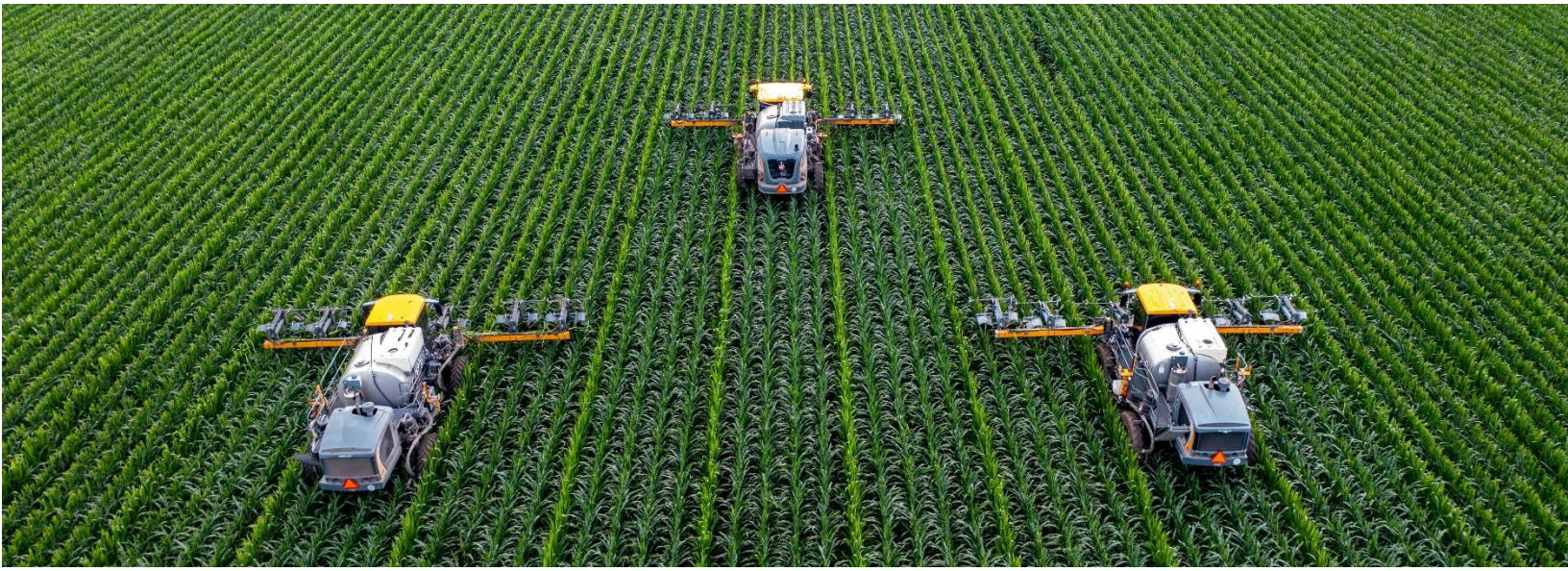
Bioenergy & Biomaterials

Subcategory Perspective

This subcategory includes the production of biofuels from crops, and the development of biodegradable materials from plant sources. Historically, bioenergy has been the primary focus of solutions; however, the emergence of biomaterials, including leather and plastic alternatives, and other bioproducts has been impeded by the availability of more affordable fossil fuel solutions[209].

At a global level, Bioenergy & Biomaterials has been an up-and-coming subcategory, being the only one to show funding growth in 2023. The subcategory was the most funded in 2023, with a total of US$ 3 billion raised, distributed among 176 deals, and boasting the highest ticket size among all subcategories. This shows the potential of the sector given increasing investor interest. Nevertheless, the Bioenergy and Biotechnology subcategory in the Latin America and Caribbean region does not have a significant representation in the sector's funding, despite its obvious potential at a global level. In 2022, the category raised US$ 33 million throughout five deals, which accounts for approximately 2% of the region's investment. It is the fifth most funded in Upstream and the eleventh most funded across categories. This shows there is untapped potential for this subcategory at the regional level.

The bioenergy market in Latin America and the Caribbean region is anticipated to reach US$ 21.6 billion by 2029, with a 9.1% Compound Annual Growth Rate (CAGR) in comparison to its market value of $14 billion in 2024. Similarly, the biomaterials market is expected to reach a value of US$ 13.1 billion in 2025. The promising growth in this sector is due to abundant biomass resources, favorable agricultural conditions, and an increasing focus on sustainable development in the region. Its diversified ecosystems provide a rich base for biomass production, essential for both Bioenergy & Biomaterials.



[206] (Sima, n.d.)
[207] (Crunchbase, 2024)
[208] (Crunchbase, 2024)
[209] (Marston, Data snapshot: Tracking a decade of growth in Bioenergy & Biomaterials, the top-funded agrifoodtech category of 2023, 2024)

In the same way, Feedstock technology in LAC is centered on improving and optimizing the raw materials used for Bioenergy & Biomaterials production. This includes genetic engineering of crops for higher yields of biofuels and enhancing the quality of biomass[210]. Currently, several Latin American countries are implementing programs to encourage the use of biomass to produce solid, liquid, and gaseous biofuels, thus reducing their reliance on oil for energy generation[211]. Moreover, this subcategory can assist in addressing the region's challenge of providing clean cooking technologies for its population, where 37% rural areas still do not have access to them.

As highlighted, this subcategory represents significant untapped opportunities in the region due to its potential impacts on the industry and the environment. However, it faces high entry barriers for startups, primarily due to the need for specialized equipment and extensive R&D, which hinders adoption rates, especially among smallholder producers. The LAC Agrifoodtech ecosystem must increase its R&D efforts, adapt technologies to satisfy the region's specific needs, and allocate additional financing to this category to realize its long-term benefits. This strategic focus will help overcome existing barriers and fully leverage the advantages of this subcategory.

Subcategory Key Players

Since this is still a small sector within LAC's Agrifoodtech ecosystem, there are few startups in the region. First, Sistema.bio[212], a Mexican company, offers a prefabricated modular biodigester package that includes a comprehensive array of biogas appliances and connections. This package converts organic waste into renewable biogas and a powerful organic fertilizer. Other key player is Hiamet, which provides biotechnology-based solutions for specific problems related to bioenergy and environmental impact, particularly aimed at maximizing biogas production and quality[213]. LatAm BioEnergy[214] is another example of a company that implements feedstock technology and bioenergy. GranBio[215], in Brazil, is a pioneer in developing biomass for biofuels. In Mexico, BioFields[216] is notable for producing bioethanol from algae. Finally, growPack[217], a biomaterials startup founded in Brazil, employs agricultural fuse to develop new materials than can be integrated into highly efficient value chains.

[210] (Deakin, 2023)
[211] (Vega, Bautista, Campos, Daza, & Vargas, 2023)
[212] (Sistema.bio, 2024)
[213] (Hiamet, n.d.)
[214] (Latam BioEnergy, 2024)
[215] (GranBio, n.d.)
[216] (Grupo Alego, 2024)
[217] (GrowPack, n.d.)

Representative Deals

Although there's no widely recorded information regarding important deals for this subcategory, Sistema.bio, has had strong funding, with a total of US$ 50.2 million raised over 10 rounds, from Seed A to Seed B, and debt financing, the most recent in 2022[218]. Finally, growPack received US$ 1.3 million in a Seed round funding in 2021.

Innovative Food

Subcategory Perspective

The Innovative Food Subcategory focuses on reducing the environmental footprint of food production, addressing animal welfare concerns, and meeting the dietary needs of a growing global population[219]. A recent study developed by MSCI in 2022 estimated that plant-based proteins are 38%–91% less land intensive, and 53%–95% less water intensive, and 69%–92% less carbon-emissions intensive than meat-based alternatives[220].

In the subcategory of Innovative Food, products include plant-based proteins, lab-cultivated foods, plant-based meat substitutes, alternative dairy products, and nutrient-enriched functional ingredients. Technologies used to achieve these products involve biotechnology for modifying plants and microorganisms, precision fermentation for producing specific ingredients, cellular agriculture for cultivating lab-grown meat, and high-moisture extrusion to simulate meat-like textures in plant-based products. These innovations aim to reduce environmental impact, improve animal welfare, and provide healthier, more sustainable options.

At a global level, between 2017 and 2023, Innovative Food stood out as the Upstream category that raised the most capital, reaching a total of US$ 13.7 billion. The United States has been the region with the most success in this subcategory, as evidenced by it being the second most relevant subcategory in the country in 2022, with a fundraising of US$ 1.5 billion and 109 deals. However, it is important to highlight that 75% of the total funding for this subcategory (US$ 10.2 billion) was raised between 2020 and 2022. This subcategory has not performed well in the past two years evidenced by a 35% contraction between 2021 and 2022, followed by drop of 48% in 2023. A known

(NotCo, n.d.)

[218] (Crunchbase, 2024)
[219] (Precision Business Insight , n.d.)
[220] (Lee & Thwing, 2021)

example in this subcategory, Beyond Meat, experienced a stock decline of 59.44% since its initial public offering at $25 a share in 2019, due to its lower sales and underperformance. This investment downturn can be attributed to unmet expectations because of a global [221]sales reduction, driven by several factors including higher prices of alternative proteins[222].

This trend has also been observed in LAC, where startups are not fulfilling their expectations. In the region, Chile and Brazil are the principal referents due to their startup ecosystems and development of technologies in this subcategory. In the LAC region, the subcategory is the third most funded in Upstream and the eighth most funded overall. In 2022, it secured 11 deals, gathering US$ 79 million, and showing an investment decline from 2021.

However, the production of alternative proteins is still one of the fundamental subcategories in the path to eliminate hunger, which today affects more than 43 million people in Latin America and the Caribbean. This is one of the methods by which the region (and the world) can meet the demand for nutritious food for a growing population, which is expected to reach 700 million inhabitants by 2050.

To drive the development and successful expansion of this subcategory in the Latin America and the Caribbean region, it is necessary to overcome certain barriers.

Initially, the entrenched culture and dietary habits need to be transformed. The LAC region has contributed to a high consumption of animal meat, with annual per capita averages ranging between 80 and 90 kilograms. Argentina is the region's leader, recording an annual per capita consumption average of 125 kilograms, alongside the United States and New Zealand are the top three global meat consumers. This deep-rooted preference makes it challenging for consumers in LAC to become familiar with and adopt alternative food products.

However, startups in this area are largely focused on providing plant-derived proteins to meet new consumer (fit) trends, rather than providing solutions aimed at food security or accessibility. This approach fails to unlock the potential scale and profitability of a larger customer base.

Furthermore, startups dedicated to food innovation face high capital requirements for research and development and prolonged return periods. Moreover, the region lacks the infrastructure and resources necessary for research, development, and production of innovative food products. This gap is compounded by the disconnection between research centers and entrepreneurs, as well as by the shortage of resources, lack of qualified personnel, and limited access to modern laboratories and equipment.

These factors demonstrate that this subcategory has high potential impact, particularly in enhancing food security across the region, though it is not yet considered mature. It is characterized by technologies that are still in the development and testing stages, seeking to accurately address the needs of consumers in Latin America and the Caribbean. Overcoming infrastructural barriers is essential to promote innovation and consolidate these technologies.

Subcategory Key Players

Notable global examples of key subcategory players include, Beyond Meat[223] and Impossible Foods[224] in the plant-based protein segment. In cultured meat Mosa Meat[225] is a notable example. Moolec, an innovative startup that specializes in molecular farming, is another example of a technology that integrates animal genetic information into plant genomes to produce animal proteins within plants. One of Moolec's most notable innovations is the "Piggy Sooy" soybean, which incorporates pig genes to produce pork proteins directly within the soybean[226]. NotCo[227], which uses Artificial Intelligence to create plant-based food and beverages, is gaining prominence and has established itself as leader in the region. Additionally, it has been certified by B Lab Global as a Certified B corporation, which serves as an

[222] (Financial Times, n.d.)
[223] (Beyond Meat, n.d.)
[224] (Impossible Foods, n.d.)
[225] (Mosa Meat, n.d.)
[226] (Watson E. , 2023)
[227] (NotCo, n.d.)

indication of their positive impact on social and environmental aspects.

Similarly, Fazenda Futuro[228] is a Brazilian vegan startup with a line of meat alternatives including burgers, meatballs, and sausages. It has already established a foothold in international markets since its launch, including Chile, Mexico, Uruguay, and the Netherlands. Additionally, The Live Green Co. is a Chilean food tech startup that utilizes AI and biotechnology to develop plant-based, clean-label food alternatives, addressing food sustainability and health. As a Certified B corporation, they are pioneers in the promotion of accessible and nutritious plant-based diets in Latin America, combining ancient plant nutrition with contemporary technology[229].

Representative Deals

One of the major investment rounds that took place in recent years was for NotCo. The company was valued at US$ 1.5 billion after securing an investment of US$ 85 million in 2020[230] and US$ 70 million in a Series D round in 2022[231]. These figures show NotCo as the main competitor in the region, managing to raise almost 90% of the total funding for the subcategory in 2022, while the remaining US$9 million were distributed among the other 10 deals in the subcategory. Similarly, in 2023, Moolec raised US$ 30 million in cash and in-kind contributions through convertible notes[232].


(High Planes Public Radio, 2017)

Farm Robotics, Mechanization & Equipment

Subcategory Perspective

A diverse array of solutions, such as on-farm machinery, automation, drone manufacturing, and grow equipment, are included in Farm Robotics, Mechanization & Equipment. These solutions offer a compelling opportunity to improve cost-effectiveness by reducing input expenses.

At a global level, between 2017 and 2023 Farm Robotics, Mechanization & Equipment raised a total of US$ 3.5 billion being the Upstream subcategory that raised the least amount of capital and the third lowest funding in the entire industry, only ahead of the subcategories of Home & Cooking Tech and Miscellaneous. However, it is important to mention that, despite its low funding volumes, this was one of the only subcategories that did not reduce its funding between 2022 and 2023, but rather increased from US$ 714 million, in 2022, to US$ 760 million, in 2023, showing consistency over the years. Likewise, this is the only category that has experienced an increase in the average ticket, from US$ 3.5 million per deal in 2017 to US$ 7.7 million per deal in 2023, which shows an evolution in the maturity of the deals in the subcategory.

Latin America and the Caribbean follows a similar trend, where investment in Farm Robotics, Mechanization & Equipment was the second to last in the region in 2022, securing only one US$ 2 million deal, which represents 0.1% of the total investment. One reason for this low investment rate is the high capital expenditure (CAPEX) requirements associated with these technologies.

The subcategory can provide the LAC region with tools for precision agriculture, efficient resource use, and reduced physical labor. Technologies such as drones for aerial imaging and soil monitoring, automated irrigation systems, and robotic harvesters are becoming increasingly relevant in the region's push for modernized and sustainable agriculture.

[228] (Fazenda Futuro, n.d.)
[229] (McCord, 2021)
[230] (BusinessWire, 2020)
[231] (Yu, 2022)
[232] (Watson E. , 2023)

Precision agriculture methods, such as drone-assisted crop monitoring and GPS-guided tractors for precise planting, have the capacity to optimize resource utilization and amplify yields, thereby improving the financial prospects of farmers.

For instance, mechanization and automation can be implemented to mitigate labor shortages, which are prevalent in the agricultural sector of the region due to urban migration and demographic shifts. In Chile, a partnership between Chile's Unifrutti and Israel's Tevel, has revolutionize the fruit industry through the implementation of AI driven robotic harvesters which has helped counteract the labor shortages during peak harvest seasons[233].

In Ecuador, one of the world's largest shrimp producers, the implementation of automatic feeding technologies has led to a reduction of up to 30% in feed costs[234]. BlueSensor, a startup in this sector, produces automatic electric and solar feeders for shrimp farming, significantly boosting productivity by up to 60%[235].

Moreover, the use of drones in the region is increasing its importance. One example of this is Brazil, where the subcategory for drones, Machinery and Equipment, includes 98 startups[236].

However, despite the benefits this subcategory generates in the region, there are some constraints that limit its relevance. High costs and implementation standardization complexity are among the relevant factors that slow the expansion of this subcategory.

First, this subcategory is capital-intensive and requires significant maintenance costs[237], given the amount of infrastructure and devices necessary to consistently transform agricultural production processes. These high costs restrict adoption, particularly in a region where 50% of agricultural land is held by small farmers with limited resources and difficult access to appropriate financial instruments. Moreover, the adoption of precision agriculture has been impeded by the lack of clear benefits, mainly for smallholder farmers, as the applicability of certain Farm Robotics & Mechanization technologies is more

(Ingo Willems, 2021)

[233] (Unifrutti, 2023)
[234] (Piedrahita, 2018)
[235] (BlueSensor, n.d.)
[236] (Dias, Jardim, & Sakuda, 2023)
[237] (United Nations, 2018)

suited to large-scale commercial farming operations, which restricts their effectiveness in countries such as Colombia and Ecuador. Governmental support and the emergence of new business models developed closely with farmers, such as shared economy or monthly fees, can play crucial roles in driving the uptake of mechanization within the agricultural sector.

Additionally, the integration of robotics into farming practices requires significant modifications to traditional methods and workflows. It is essential to ensure that these robotic systems seamlessly blend with existing farming practices to facilitate their successful adoption and maximize their potential impact on agricultural efficiency and productivity.

All the above is further challenged by the insufficient infrastructure (e.g. connectivity) that rural areas of the Latin American and the Caribbean region have which severely restricts the performance of Farm Robotics & Mechanization Equipment.

These technologies represent a subcategory that, despite being proven effective, face limited investments due to the region's unique characteristics. Consequently, reducing their level of development and adoption in the LAC region.

Subcategory Key Players

Solinftec is one of the key players in Farm Robotics, Mechanization & Equipment category, providing a variety of agricultural automation solutions, such as real-time monitoring systems and AI-driven insights for farm management[238]. Their goal is to develop robotic technology on a large scale and make it accessible to farmers of all sizes. For instance, they have impacted sugarcane production in Brazil, by providing a tool named Alice AI, which organizes all the routes with autonomy and agility while simultaneously indicating the availability of equipment in real time.

DeepAgro, based in Argentina, develops AI-driven solutions for agriculture, including the SprAI system, which uses intelligent weed detection for selective herbicide application. SprAI employs deep learning algorithms to distinguish weeds from crops, enabling significant reductions in agrochemical usage by up to 90%[239].

Additionally, multinational corporations such as Aerobotics[240] provide drone solutions specially targeted for agribusinesses being present in LAC. In the same way, drone industry leader, DJI, has created a division, called DJI Agro[241]. Despite not being a startup, the Brazilian government's research body, EMBRAPA[242], has played a crucial role in developing agricultural technologies, including customized mechanization solutions specifically for Brazilian agriculture.

Representative Deals

Complementing the factors that constraint the development of the subcategory, it was the least invested subcategory in Upstream sector with only US$ 2 million reported in 2022. Recently, DeepAgro through a Seed round raised USD $2 million in 2023 to expand their operations to Brazil[243].

Novel Farming Systems

Subcategory Perspective

The Novel Farming Systems subcategory covers indoor farms, aquaculture, insect farming, and algae production, allowing for consistent year-round crops production, reduced usage of inputs and environmental impacts mitigation.

At a global level, Novel Farming systems is a growing Upstream category, accounting for 14% of the category's investment between 2018 and 2023 (US$ 9.1 billion). The subcategory has shown steady growth between 2018 and 2022, with a 76% contraction in investment in 2023 (US$ 680 million).

In contrast, indoor farms & novel farming techniques are not considerably relevant nor mature within the Upstream category in the LAC region. In 2022, the subcategory accounted for only 1.1% of total investment with US$ 18 million distributed along 12 deals, evidencing a small ticket size per deal. These results indicate that, although this subcategory has attracted investors, it is still in a growth phase, as

[238] (Solinftec)
[239] (DeepAgro, n.d.)
[240] (Aerobotics, n.d.)
[241] (Dji Agriculture , n.d.)
[242] (Embrapa, n.d.)
[243] (Crunchbase, 2024)

(Bitker, 2019)

most of its business models are still undergoing market testing and scalability.

Experts have determined that Novel Farming Systems approaches, including vertical farming do not generate value in LAC. For instance, one of the key benefits of vertical farming is reducing land usage, which is crucial in regions where land is a limited resource. However, this is not the case for Latin America and the Caribbean, as one of its main agricultural assets is the vast land available.

Nonetheless, some aspects of Novel Farming Systems, such as insect farming, may have significant potential in LAC. Several factors that make it conducive to such initiatives are it boasts rich biodiversity, possesses favorable climate conditions, and has a long history of insect consumption in various indigenous cultures. Moreover, insects represent a source of high-quality proteins and essential nutrients, with the advantage that their farming requires fewer natural resources compared to conventional animal protein production. Likewise, it utilizes discards from other food industries as its main input.

Insect farming aims to produce products for human consumption, fertilizers, and primarily as an alternative feed for other animals. This innovative approach leverages the nutritional benefits of insects, which are rich in protein and other essential nutrients, making them an excellent supplement for livestock, poultry, and aquaculture feed. These characteristics make insect farming a sustainable and profitable option for food production in a region where food security is a major challenge.

For example, ProNuvo is a Costa Rican company that produces sustainable proteins and fertilizers from black soldier fly larvae for livestock and pets. It is relevant for converting organic waste into high-value products, promoting sustainability, and providing eco-friendly protein alternatives for various industries[244].

Nevertheless, it is crucial to acknowledge that insect Farming is an emerging industry in many Latin American countries that faces numerous obstacles, especially for human consumption, including regulatory hurdles and challenges in winning over consumers to broaden the scope from only animal feed products for human consumption. To overcome these barriers, educational campaigns are imperative to raise awareness of the benefits associated with insect farming.

Therefore, despite the potential positive impacts of insect farming in the region, it remains a subcategory with low levels of development, maturation, and benefits, despite the region's specific characteristics, offering just niche solutions.

[244] (ProNuvo, n.d.)

Subcategory Key Players

Ÿnsect, a French company focused on insect farming to produce sustainable proteins and natural fertilizers, continues to be a leader in the industry, despite implementing strategies to tackle rising costs. It addresses global food security and environmental challenges by providing alternative protein sources for humans, livestock, and pet food industries.[245]

Protix, a Dutch company specializing in insect farming, specifically the black soldier fly, to produce sustainable proteins and natural fertilizers[246], is another relevant example.

Meanwhile, in the Latin American region there are startups for vertical farming and aquaculture, with relevant insect farming startups yet to emerge.

Related to indoor farms and controlled environment agriculture (CEA), there is AgroUrbana, a Chilean based startup that created the first South America's vertical farm[247]. Another example related to algae production is AlgaEnergy[248], a Spanish startup with a subsidiary in Mexico, that is at the forefront of exploring algae's potential, from biofuels to food supplements, leveraging the country's rich biodiversity.

Representative Deals

At a global level, the 10-year-old French startup, Ÿnsect, which produces insect-based ingredients for human consumption, animal feed, and plant nutrition is currently at a Series D maturity level, having raised over US$ 580 million throughout its history.

Unfortunately, specific deal information in LAC is not prominently reported, however one of the main cases in the region is AgroUrbana, with a Series A investment of US$ 4 million in 2021[249].

6.3. Midstream Subcategories

The Midstream category has historically been the one with lowest amount of funding across the value chain. Nevertheless, in the LAC region it has been attracting increasing attention, raising its share on investment from 7% in 2018, to 18% in 2022. This growth is strongly influenced by the Conservation and Carbon Tech subcategory which accounted for 8.8% of total investment in 2022, both in growth and early-stage deals. In contrast, Midstream technologies have a comparable global investment share to that of the LAC region. This trend has been primarily driven by the emergence of compliance regulations that require traceability of origin and the development of more efficient transportation technologies to mitigate costs and prevent food loss.

The LAC region has significant potential for waste management solutions, as approximately 15% of the region's total food supply is lost at various points along the value chain. Consequently, these solutions are a valuable instrument for reducing food insecurity.

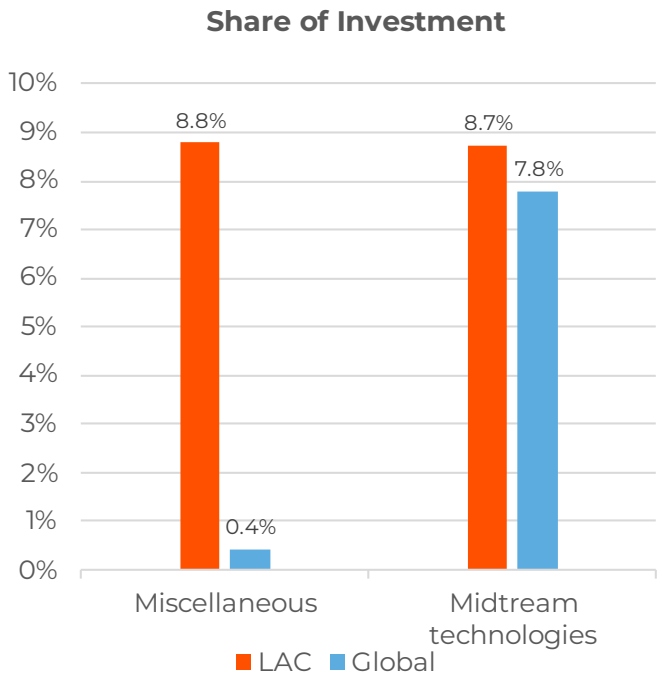


Figure 36: Midstream LAC vs Global: Share per Subcategory

[245] (Ynsect, n.d.)
[246] (Protix, 2024)
[247] (Martyn-Hemphill, 2020)
[248] (AlgaEnergy, n.d.)
[249] (Marston, Freshly funded AgroUrbana could bring more sustainable vertical farming to Latin America, 2021)

Midstream Technologies – Traceability

Subcategory Perspective

Midstream Technologies are solutions focused on Food Safety & Traceability tech, Logistics & Transport, as well as Processing tech. With an emphasis on Traceability, Midstream Technologies can leverage technologies like Blockchain, IoT devices, and AI, to track, record, analyze, and optimize various variables across the value chain (from production to delivery), such as the application of sustainable practices, the condition of goods during transport and delivery.

With this information, stakeholders in the agrifood sector can gain insights that help improve and record farming and transportation practices that assist in the price premium or even access to new markets by meeting the consumer demand for transparency and sustainability in the food supply chain. Additionally, traceability has a positive impact on consumers by ensuring the integrity of food products. This transparency fosters consumer trust and confidence, allowing them to make informed decisions about the products they purchase and consume, thereby enhancing the overall quality of the food supply chain.

Similarly, traceability is pivotal in achieving regenerative agriculture across the region, as it facilitates enhanced monitoring and treatment of soil health[250]. One of the interviewees for this report stated that "regenerative agriculture represents a key area of focus for startups in LAC," emphasizing the critical importance of integrating advanced traceability systems to ensure the health and regeneration of agricultural lands.

In 2022, the subcategory managed to raise US$ 146 million over 17 deals, which accounts for approximately 9% of the total investment in the region. The average ticket deal was $ 8.6 million. This shows an emerging maturity of the subcategory, where deals have significant value to keep developing the emerging businesses. Furthermore, Midstream technologies represent an important market opportunity in the region with an estimated value of US$ 1.12 billion in 2022 and a projected value of 1.53 billion in 2028.

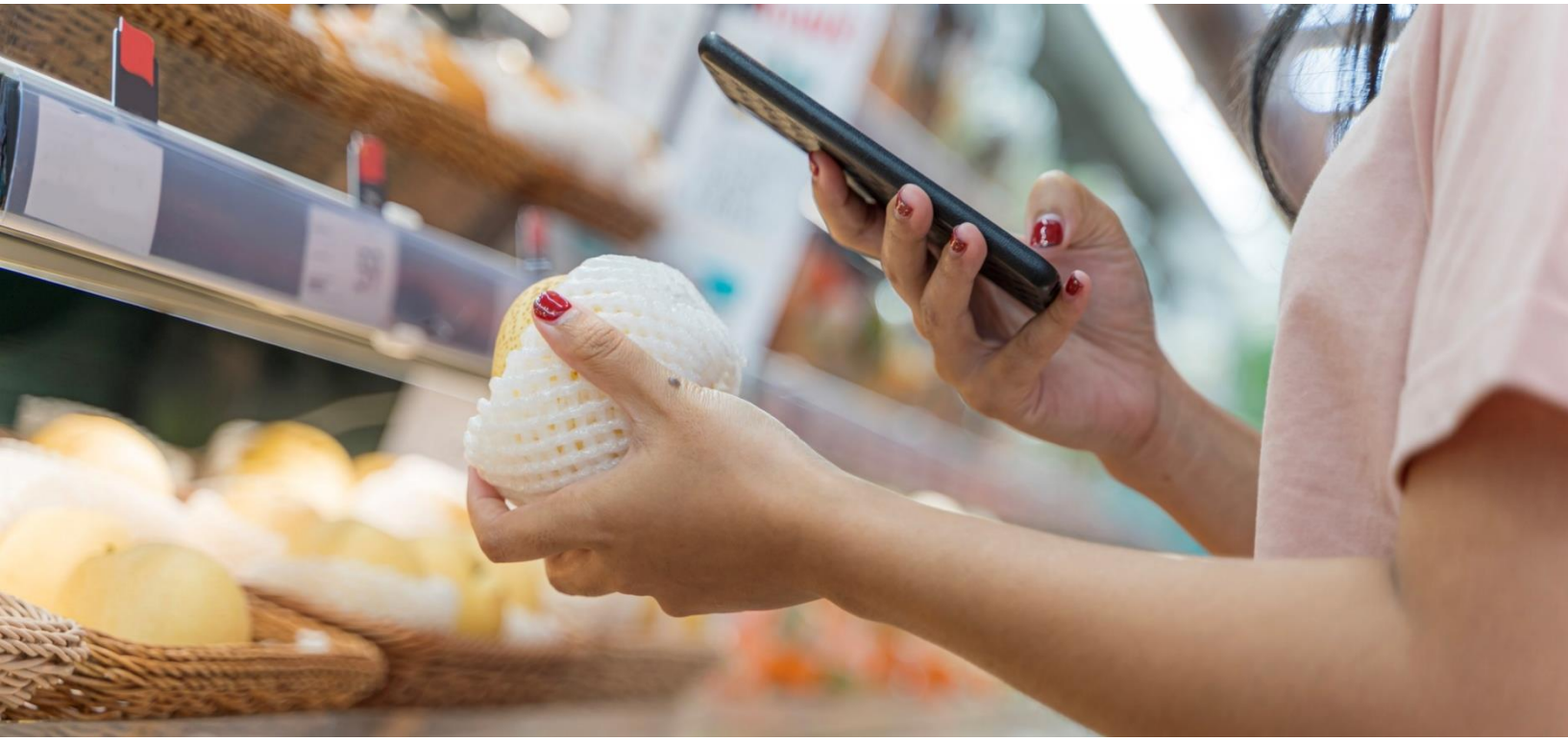
Nevertheless, the implementation of the technology from Midstream solutions still faces some challenges. First, system interoperability is crucial to allow seamless information flow across the value chain and the ability to accurately trace and make data-driven decisions. For this standardization and ecosystem articulation is crucial. Furthermore, accurate and comprehensive data collection throughout the supply chain is an obstacle, particularly for small-scale producers, as they lack the resources or cannot afford the implementation of necessary technologies to assess quality control from production.

The potential impact of traceability in the region is significant, particularly for consumers, as it ensures food integrity and safety. Ranked fourth due to its potential and maturity, this subcategory demonstrates a major potential. However, widespread adoption faces challenges that need to be addressed. The main obstacles include technological integration, cost barriers, and the necessity for standardized practices. Overcoming these hurdles is crucial to fully exploit the benefits of traceability, which include enhanced food safety, increased consumer confidence, and improved supply chain transparency and efficiency. By addressing these issues, the region will be able to fully leverage the potential of traceability, which will be beneficial to both consumers and the broader market.

Subcategory Key Players

In this subcategory, startups exhibit a diverse range of approaches. While some offer comprehensive solutions applicable to a wide variety of crops and environmental conditions, others specialize in niche offerings tailored to address the unique challenges

[250] (USDA Natural Resources Conservation Services , n.d.)



faced by specific segments of the agriculture industry. One example of a comprehensive solution is Agtrace[251], a Brazilian corporation that connects all the links of the supply chain with real-time information. Similarly, Ucrop.it is another notable example, it operates as a blockchain farming and crop traceability platform that delivers certainty across crop cycles. Meanwhile, an example of a niche-focused organization, is the Colombian startup Demetria[252], which employs advanced portable NIR sensors and an AI-driven platform to analyze green coffee beans' biochemical markers.

In Ecuador, the Sustainable Shrimp Partnership has joined forces with the IBM Food Trust ecosystem, utilizing blockchain technology to ensure full traceability of their shrimp from farm to fork[253].

Representative Deals

While specific deals in LAC regarding traceability are not widely reported, there are some cases across the region. Zoomagri is a global AgTech company based in Argentina, which focuses on transforming the testing, inspection and certification of agri commodities and food, has managed to raise approximately US$ 16 million in over five funding rounds, and has used the proceeds to expand geographically and further develop its offerings[254]. EcoTrace has raised USD 1.1 million over three rounds of pre-seed and seed investment[255]. Ucrop.it raised a total of $4.6 million over six different rounds, the latest being in 2023. UCrop.it reported funding was meant for regional expansion, new value-chain alliances, and platform upgrades.

Conservation & Carbon Tech

Subcategory Perspective

The Conservation & Carbon Tech subcategory encompasses solutions that have to do with ecological restoration technologies and tools, such as carbon credit platforms and forestry initiatives. Technologies and solutions in this sector aim to enhance carbon sequestration through reforestation and afforestation projects, implement climate-smart

[251] (AgTrace, n.d.)
[252] (Demetria, n.d.)
[253] (Sustainable Shrimp Corporation, n.d.)
[254] (Marston, AgFunderNews, 2023)
[255] (Crunchbase, 2024)

agriculture practices to reduce emissions and improve resilience to climate variability, develop carbon credit platforms to incentivize and monetize conservation efforts, and employ ecological restoration technologies to rehabilitate degraded lands and protect water resources.

Although Conservation & Carbon Tech has not gathered significant traction at a global level, it has been emerging as a key subcategory in the Latin American and the Caribbean market. This is the result of the region's rich biodiversity and extensive agricultural lands, which highlight the importance of conservation and need for reducing deforestation in the region. In 2022, the subcategory was the fourth most funded across categories, and the first most funded within the Midstream subcategories, representing US$ 147 million distributed among four deals. Furthermore, it had the highest ticket by deal across all subcategories. The large investment rounds in Conservation and Carbon Tech startups, through growth stages, particularly in Brazil, suggest that the sector is attracting significant interest because of its potential for long-term impact in sustainability. However, Conservation & Carbon Tech is a subcategory that still has room for maturity. Carbon credit markets still lack transparency, and traceability and certification are still immature.

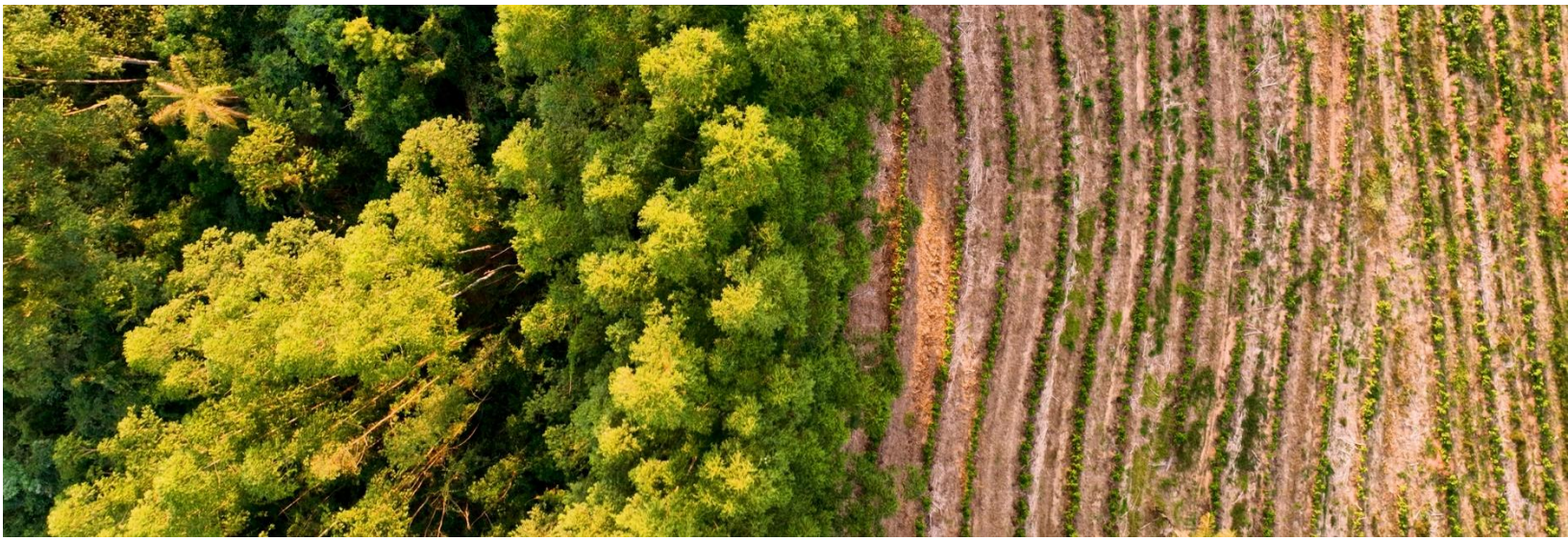
The potential for growth in this subcategory in LAC is quite incredible, where the estimated market size of US$ 362.3 million in 2024 is expected to reach 1.07 billion by 2029. This has to do with the important sequestration and storage expected capacity of Latin America, which stands at around 121 GtC. This further enables a voluntary carbon-offset market that is expected to increase from $2 billion in 2020 to approximately US$ 250 billion by 2050.

However, the region still faces relevant challenges to unlock this value. Transparency and verifiability remain key issues for carbon offsetting, due to the methods for calculating carbon sequestration potential that rely on historical data and reference areas that are not ideal comparisons. This results in a lack of confidence in the ability to use these technologies as compensation tools to achieve emission reduction targets.

In conclusion, this subcategory has gained significant importance in the region, although the technologies are yet to be adopted on a large scale. Smaller farms may need to collaborate with others or join cooperative schemes to effectively participate in carbon offsetting initiatives. This collaboration is essential for maximizing the potential positive impact on climate change and the environment. Furthermore, it remains to be seen whether the substantial investment rounds in this subcategory indicate a speculative trend or if investor interest will persist, thereby further nurturing its development.

Subcategory Key Players

Key players in this category are diverse and include startups, institutes, and transnational programs. EMBRAPA in Brazil leads the Coffee Carbon Project,



integrating climate-smart practices in agriculture to enhance carbon sequestration[256]. In the realm of startups, Re.green specializes in using data-driven technologies and communities to promote carbon emission credits. Lastly, the Selva Maya Program across Mexico, Guatemala, and Belize focuses on sustainable forest management, combating deforestation, and preserving biodiversity[257]. These key players exemplify innovative approaches to ecological restoration and climate action in the region.

Representative Deals

The Conservation & Carbon Tech subcategory's representative deals in 2022 seemed to be limited to a single country: Brazil. The biggest deal in 2022 went to Re.green, securing a US$ 76 million investment to continue its growth trajectory. Second, came Carbonext, which raised US$ 40 million and was funded by Shell Brazil. The investment makes Shell Brazil a minority partner in Carbonext and marks Shell's entry into the nature-based solutions business in the country. Carbonext will use proceeds to develop new business areas, including bioeconomy and reforestation in the Amazon forest, and to provide funds for the implementation of technology embedded in forest preservation products. The startup also plans to expand its team of forestry specialists capable of creating and managing projects to generate carbon credits[258]. Moreover, other startups in early stages such as Mombak and Moss raised US$ 20 million and US$ 10 million, respectively[259].

Waste Management

Subcategory Perspective

The final subcategory within Midstream has to do with Waste Management solutions and is characterized by its diverse approach to tackling waste. It includes prevention technologies and processes aimed at reducing food loss at the source, improving harvest techniques, and extending the shelf life of fresh produce. In the same way, recovery and redistribution platforms facilitate the connection of food businesses with surplus products to organizations and consumers, thereby preventing edible food from going to waste. Additionally, it considers recycling and valorization innovations that transform organic waste into new products, such as composting and anaerobic digestion technologies, which transform agricultural residues and food scraps into bioenergy, bioplastics, and soil enhancers.

Global investment for waste management reached US$ 1.2 billion in 2023, showcasing a 33% increase from 2020. This serves as an illustration of the growing relevance of this technology to reduce food waste, a common global challenge. In Latin America and the Caribbean, this market represents a US$ 50 billion opportunity by 2029, which can be driven by the current losses and/or wastes of roughly 15% of the regions total food supply each year, which occur at every stage of the food chain as follows: 27% in production; 22% during handling and storage; 6% at the processing level; 17% in marketing and distribution; and 28% at the consumer level[260]. The main causes are overproduction, inadequate storage and transportation systems, as well as inefficient distribution networks. This shows key opportunities for intervention through the application of waste management technologies.

Advancing waste management technologies faces significant challenges due to the need for extensive coordination among diverse stakeholders, including entrepreneurs, farmers, suppliers, transporters, CPGs, and consumers. Effective food traceability and timely information sharing are essential to reduce waste, yet achieving this level of collaboration is complex and often hinders technology adoption. Additionally, the success of these technologies depends on the stakeholders' awareness and understanding of the need to implement them. Overcoming these barriers requires a concerted effort to align all parties and promote the benefits of waste management innovations.

In conclusion, this subcategory is still developing across the region, with ongoing efforts to test and adapt technologies to local cultural characteristics.

[256] (Coffee Geography Magazine, 2022)
[257] (Selva Maya, n.d.)
[258] (Kerencheva, 2022)
[259] (AgFunder, 2023)
[260] (Stephan, 2023)

Concurrently, stakeholders are being informed of the importance of these technologies. This dual approach of technological adaptation and stakeholder awareness is crucial for achieving high-impact solutions and increasing adoption rates.

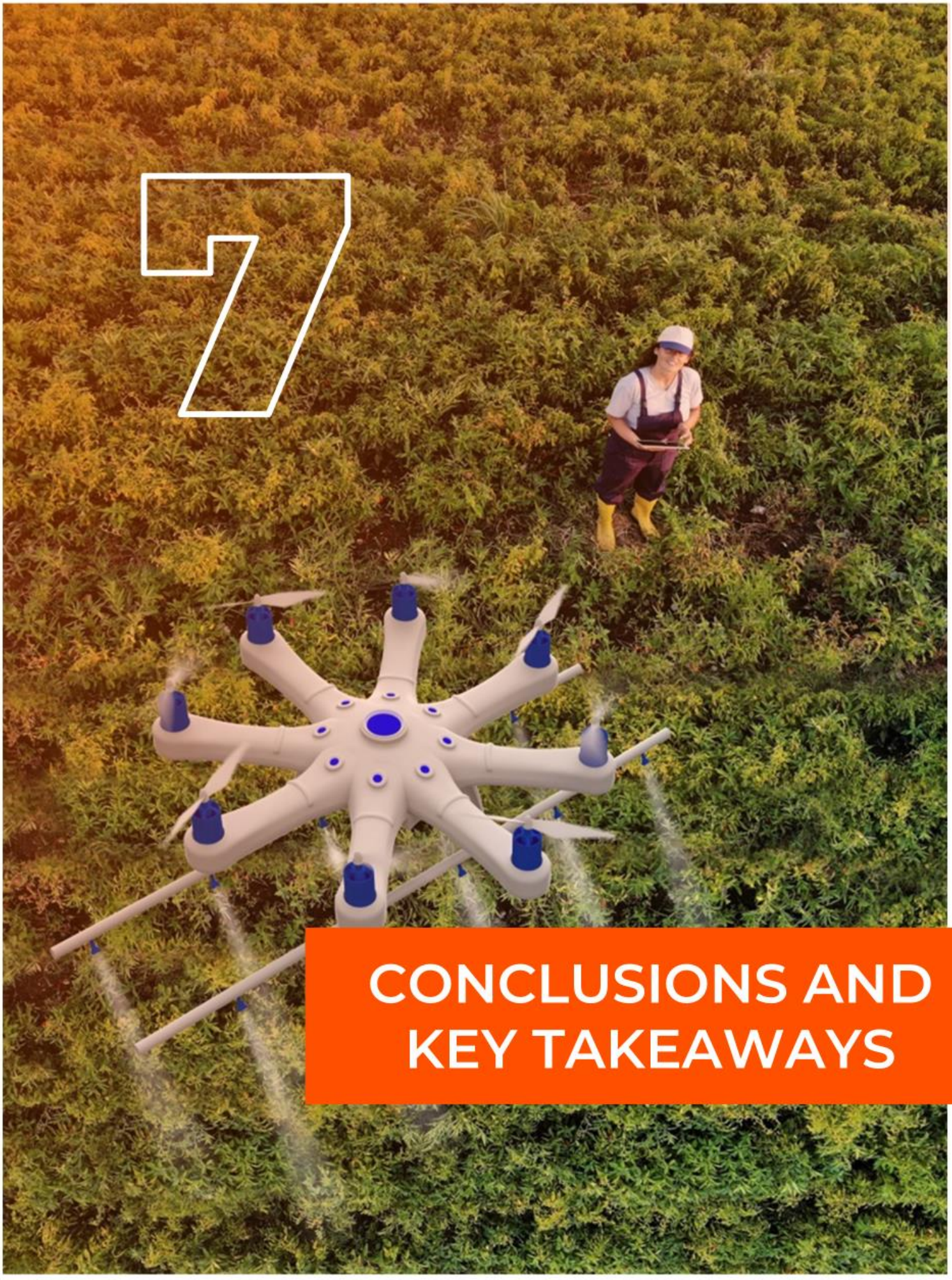
Key Players per Subcategory

There are several relevant players in this sector. One example is Nilus[261], a company based in Argentina that develops technologies to reduce the cost of living for low-income individuals by disintermediating, and rescuing food at risk of waste. Conversely, the Mexican startup SAVEFRUIT[262], has developed a post-harvest product that extends produce lifecycle without incurring in waste or residue during its application, and without affecting produce taste. Even more, corporates are incorporating waste management strategies in their models. For example, Cargill, is providing tools to farmers to facilitate the implementation of upcycling[263].

Representative Deals

The aforementioned companies have had representative deals in this sector. In the case of Nilus, the startup has raised a total of US$ 8.8 million over nine rounds[264]. Globally, one major deal took place in 2023, in which Sevana Bioenergy, a US company, raised US$ 250 million. This company receives organic material waste and then it is broken down in a digester. The resulted output can be used afterwards as biogas or for livestock, agricultural and gardening uses[265].

[261] (Nilus, n.d.)
[262] (SaveFruit, n.d.)
[263] (Cargill, 2024)
[264] (Crunchbase, 2024)
[265] (Sevana BioEnergy, n.d.)



7

CONCLUSIONS AND KEY TAKEAWAYS

7. CONCLUSIONS AND KEY TAKEAWAYS

Today, the world faces important challenges to maintain its ability to feed a growing population. Threats like climate change and food insecurity are driving the need for a comprehensive transformation of food systems that incorporate sustainable practices care for dwindling resources, create more resilient and equitable solutions to address the impact of climate change, and improve agricultural productivity to keep prices competitive and mitigate food insecurity. The Latin American and Caribbean region, which is the world's largest exporter of agricultural products and is increasingly becoming the world's breadbasket, is particularly affected by these challenges.

In all this, the Agrifoodtech industry can be a crucial tool to overcome these challenges by developing and introducing disruptive technologies across the agrifood value chain. These technologies can promote increased efficiency of resource use, optimize agrifood markets, and help reduce environmental and social impact.

Consequently, the Agrifoodtech industry presents an opportunity for Latin America and the Caribbean to address global challenges and improve its competitiveness as a key stakeholder in the Agrifood sector.

Positioning of Latin America and the Caribbean

The LAC region has important advantages for the development of the Agrifoodtech industry. Initially, the Agrifoodtech industry's numerous solutions may be implemented throughout the region's value chain due to the region's extensive arable land, diverse agricultural species, and multiple farming operations. Even more, the region serves as an exceptional testing ground for its continuous development and evolution. Similarly, the region is recognized for its entrepreneurial quality, where long unmet needs by the public and private sector have left space for local entrepreneurs to seize new opportunities and provide disruptive and long-awaited solutions. Moreover, the relevance of the agricultural industry in the region's GDP provides an opportunity to boost its economic development by enhancing its competitiveness. Although these advantages are evident, as shown throughout the report, the Agrifoodtech in LAC is still considered a developing industry with great potential for growth, which is yet to be fulfilled.

In recent years, investment in LAC's Agrifoodtech industry has maintained a growth trend, but still shows early maturity where most of deals have been directed towards early-stage rounds (an average of 88% since 2018). Moreover, the region signals an important level of underinvestment. Despite being responsible for approximately 9% of global agricultural value and 18% of global agricultural crop volume, the LAC region only represented around 5% of Agrifoodtech funding between 2018 and 2022, and only 1.8% in 2022. This can be interpreted as a clear discrepancy between the level of investment and the agricultural potential, indicating that closing the gap will help improve and maintain LAC agricultural competitive positioning in the world.

Additionally, it is important to note the development of the Agrifoodtech industry in the region has not been homogeneous across its countries. Brazil is the undisputed leader in the region, as evidenced by the largest share of funding, which is double that of any other country in the region, and the largest share of deals, with high ticket size. The country has a strong presence in all categories of the value chain, with a special emphasis on the development of Upstream categories.

Meanwhile, Colombia and Mexico follow behind in terms of funding and number of deals. They also stand out with some of the highest average ticket sizes of the region, US$ 21.4 million and US$ 10.9 million, respectively. Nevertheless, it is important to note their favorable Agrifoodtech numbers and maturity has been highly driven by the Downstream sector and its high-ticket deals.

In contrast, although Argentina and Chile have weaker numbers than Colombia and Mexico, there seems to be a stronger maturity of the Upstream category, particularly in Argentina, which has leveraged its strong relevance in agricultural production and research institutions.

International Benchmark

Overall, the LAC region seems to have lower maturity compared to other regions of the world including the

United States, Europe, Asia and Israel. The regional benchmarking results provide an important perspective of the factors behind the relatively lower maturity of LAC's Agrifoodtech industry. On the one hand, the LAC region still has significant work to do to improve factors that contribute toward the development of Agrifoodtech. Specifically, it needs to strengthen its innovation ecosystem and further encourage VC investment in the Agrifoodtech Industry. The LAC region can adopt some of the effective practices from the United States and Europe to enhance its innovation ecosystem. The US is well known for its strong collaboration with the world's top universities, which provides highly qualified talent, its policies that safeguard entrepreneurs from failure, such as bankruptcy laws, and its position as a prime location for global scaling. Additionally, it attracts a significant number of foreign entrepreneurs. Similarly, Europe has an encouraging innovation ecosystem, this one characterized by significant government support and enabling public policy, that offer incentives to solve high risk problems through technology and innovation, these include funding, tax breaks for angel investors, and policy openness and flexibility towards change and disruption. Finally, the LAC region can learn from Asia, which encourages a risk-averse population to enter the startup world through different programs and incentives.

In terms of VC investment in the Agrifoodtech industry, it was identified that LAC and Asia lag in share of investment, where they are responsible for a very small portion of Agrifoodtech investment compared to their share of agricultural value. This may be attributed to the different risk profiles between regions, which are also highly influenced by the innovation ecosystem, as previously mentioned. The Agrifoodtech industry in the LAC region needs to capture a greater share of the region's VC investment by promoting greater foreign and local investment through investment de-risking incentives.

Moreover, government policies around sustainable practices in agricultural production may be a key driver for the emergence of Agrifoodtech technologies that aid in their compliance. As has been mentioned, Europe has a robust regulatory system that has created a supporting platform for Agrifoodtech solutions. Similarly, Asia has developed regulations around promoting food sovereignty. Building these types of policies in the LAC region might accelerate the development and adoption of Agrifoodtech technologies, which is an area where LAC is still working on improving.

On the other hand, farmland fragmentation and talent quality and availability are regional characteristics that explain the disparities between the level of development and scalability reached by LAC's Agrifoodtech industry compared to other regions. Increased farmland fragmentation in LAC and Asia, demonstrated by a higher share of

agricultural land owned by small farmers, seems to be correlated with lower adoption levels. Similarly, lower productor value that farmers in LAC and Asia receive, may contribute to lower disposable funds for investment in new technologies.

Finally, in terms of talent the LAC region lags in education levels, representing the lowest human capital index average among the compared regions and with the fewest agricultural and food science universities within the top 250. As has been mentioned, low education levels hinder adoption of Agtech solutions in rural areas. Additionally, shortage of qualified professionals, and agrifood universities, limit the development opportunities of disruptive technologies in the Agrifoodtech industry, which in turn, restricts the collaboration opportunities between universities and startups.

Subcategories with the Most Potential in LAC

Many Agrifoodtech solutions have the potential to contribute to impact agricultural productivity, climate change, sustainability, food security and inclusion of different populations; however, not all of them have the same level of maturity of adoption to achieve immediate impact in the LAC region. Considering the factors of impact and maturity, three main groups of subcategories were determined.

The first group considers solutions that are designed to stimulate innovation, as they possess a lower relative maturity and high impact potential. Startups within these subcategories require considerable R&D funding to keep improving their positioning, further mature their technologies, improve scalability and levels of adoption. To effectively address end-user needs and realize their impact potential, they should collaborate with academia, research institutions, incubators, and farmers to develop and validate their ideas. Moreover, strong collaboration with the government is required to develop enabling regulatory frameworks for the solution implementation. Subcategories within this group include Ag Biotechnology, Innovative Food, Bioenergy & Biomaterials, and Waste Management.

The second group considers subcategories that can leverage their relative maturity to accelerate high impact potential. These solutions need cash to grow and expand their operations to realize their impact potential. Moreover, investment in this group is expected to be less risky, given relatively higher predictability of market fit. To promote the success of this type of subcategories, it is imperative that agribusiness corporations and startups collaborate to amplify the impact of the solutions and to improve operational efficiency. Moreover, initiatives to

promote their adoption, such the provision of low interest loans to end-consumers as wells as the development of key infrastructure, such as connectivity, are important to fully capture their impact potential. Subcategories within this group include Ag Marketplaces & Fintech, Midstream Technologies and Water management.

Lastly, the third group considers subcategories with relatively high maturity and lower impact potential. These subcategories are mostly focused on improving efficiency and fostering productivity. To unlock its full potential value, startups within this group need to expand their market penetration by ensuring greater adoption. Promoting adoption requires collaboration with government, NGOs and associations and guilds to consolidate demand and develop important enablers therefore unlocking their full value. This includes the improvement of digital literacy of farmers and the development of infrastructure, such as internet connectivity. Currently, there are multiple players in Brazil and Argentina operating in these subcategories, showing early signs of market saturation, specifically Farm Management Software, Sensing and IoT. Subcategories within this group include Farm Management Software, Sensing, & IoT, and Farm Robotics, Equipment & Mechanization.

Finally, by balancing both the impact and maturity level, we signal out five of the most prominent subcategories for the LAC region. The five subcategories are: Agribusiness Marketplaces & Fintech, Ag Biotechnology, Midstream Technologies, Water Management, and Farm Management Software, Sensing & IoT.

The relevance of Agribusiness Marketplaces in the LAC region is primarily the result of local context, which is characterized by a fragmented value chain of small farmers who lack access to integrated value chains and financial resources. The former has resulted in this subcategory holding the greatest amount of funding in the Upstream category and 11% of the region's funding, compared to 6% at a global level. This gives an indication of the enormous potential it holds in the region.

At present, Ag Biotechnology is one of the least funded categories in the LAC region accounting for only 2.5% of investment, the result, in part, of longer development periods and capital requirements. Nevertheless, it is one of the subcategories with the highest expected growth, and the greatest potential impact to improve climate change resilience and food security. Given its relative low maturity, it is key to invest on its development, particularly regarding genetically modified crops, as well as establishing a supporting regulatory framework to improve its adoption in the region.

Midstream Technologies is a subcategory that has been gaining relevance over recent years. Traceability is particularly critical in the food supply chain to ensure food security, sustainability, and product quality in the region. Emerging technologies such as Blockchain, IoT, and AI are being utilized to track and optimize variables throughout the chain, from production to delivery. This not only helps meet consumers' demands for transparency and sustainability, but also allows farmers to improve their practices and access international markets to maximize the value of their products. Similarly, the

optimization of food logistics is crucial to ensure efficient food access to many populations and help keep prices affordable to final consumers, which can be vital for food security. Although challenges like system interoperability and accurate data collection still exist, growth and investment trends in this subcategory indicate clear development potential, also driven by emerging sustainability regulations.

The relevance of water management solutions in the LAC region comes from the imperative necessity to balance agricultural productivity with water conservation, as well as the emergence of water scarcity and changing precipitation patterns due to climate change. The subcategory solutions have a critical role in improving productivity and sustainability; however, they have not yet reached high levels of adoption. Consequently, the subcategory has substantial potential for growth in the region and significant value to unlock.

Finally, Farm Management Software, Sensing & IoT is a highly mature subcategory that has been around for a long time. It is the prevalent solution choice across farmers in the region, and it is gradually becoming standard practice across many farms. Although there is still important room to grow, the subcategory's solutions have the potential to help farmers face high volatility of climate and markets through forecasting and optimization capabilities, by enhancing efficiency, productivity, and sustainability.

This subcategory prioritization identifies key sub-sectors that offer the most impactful solutions, demonstrating an awaiting strong demand for these technologies, with specific focus on the needs of the LAC region.

Key Barriers and Recommended Actions

To keep developing the Agrifoodtech industry, it is key to understand the current barriers preventing it from unlocking its full potential. On the demand side, the barriers are associated to lack of adoption of Agrifoodtech solutions.

First, farmers' reluctance to adopt Agrifoodtech solutions is attributed to an unclear return on investment, low customization of available solutions, complex operability, and a lack of trust between farmers and startups. To address this issue, startups

must develop solutions that are both highly customizable and user-friendly, even promoting integral solutions addressing multiple challenges at once. Additionally, building a strong and trusting relationship throughout the entire purchasing and post purchasing process with farmers can be key to shift agriculture industry dynamics.

Similarly, low availability of necessary digital skills in an aging rural population and low levels of generational replacement has prevented incoming innovations from gaining a proper foothold in the agricultural industry in the region, particularly in small and medium farmers. Government, NGOs and associations and guilds are key players that may be able to address this challenge by promoting educational development in these areas, particularly in digital skills.

Third, limited access to financing in adequate terms and conditions that cater to the characteristics of small and medium farmers, restricts available funds for investment in Agrifoodtech solutions. Improving financial support towards these populations, through new financial instruments, as well as government and NGO programs can help to improve Agrifoodtech adoption.

Fourth, insufficient rural infrastructure might hinder the adoption of Agrifoodtech technologies. In particular, the internet connectivity infrastructure may prevent farmers from acquiring or getting the full value out of Agrifoodtech solutions. Finally, the Foodtech segment of the Agrifoodtech value chain faces a challenge to achieve a good level of consumers' buy-in for certain incoming solutions, such Innovative Food, mainly due to higher prices and taste factors. Developing more affordable solutions will increase market penetration.

On the supply side, barriers relate mostly with strengthening the innovation ecosystem in the LAC region, increasing sources of high-risk funding, as well as qualified and expert talent. Even though LAC has an emerging innovation ecosystem and strong entrepreneurial spirit, it is still lagging compared to other regions.

Corporate Engagement

Finally, a powerful tool to foster quick and impactful growth of the Agrifoodtech industry in LAC is the

engagement with current agribusiness corporations, where this symbiotic relationship offers substantial benefits for both parties.

Through these collaborations, agribusinesses can increase their business innovation capabilities, gain access to new markets and customer segments, offer a better customer experience, enhance their brand reputation, and even better manage innovation risks.

To capture the mentioned benefits agribusiness, need to consider lessons learned and best practices around several factors. First, it is important to innovate with clear purpose and agility by establishing objectives that aim to close innovation gaps. Second, developing a structured partnership framework and building a partnership operating model is key to align expectations and establish key enablers for the partnership's execution. Third, designing and executing a change management strategy that ensures change buy-in, cultural integration and talent development, is critical. Finally, managing risks by starting small and scaling through pilot projects, as well as diversifying Agrifoodtech startups partnerships to reduce dependance.

Final Message

As already addressed, the Agrifoodtech industry in the Latin America and Caribbean region has a substantial untapped potential, particularly in the Upstream and Midstream subcategories, which are expected to have a greater impact on the social and economic development of the agricultural industry and, consequently, the region. Currently, the Agrifoodtech industry is still in early stages and can be further matured by the ongoing development of an enabling environment and collaboration among different stakeholders.

The insights provided in this report are intended to offer players within the Agrifoodtech industry a clear overview of the industry's evolution, as well as to identify key actions to overcome current challenges and capture untapped value of emerging opportunities. Similarly, it is expected this can serve as inspiration to learn more about specific regional challenges and design and implement innovative technologies that will drive the region to competitively fulfill its role as the future breadbasket of the world.

8

APPENDIX

8. APPENDIX

8.1. Data Collection

For this report more than 40 stakeholders of the Agrifoodtech ecosystem were interviewed to gather their key insights about the evolution and potential of the industry. The interviewee selection was designed in a way to include a variety of countries, stakeholders, categories, and subcategories. This diversity helped reduce bias and prevented inaccurate generalizations or conclusions across the region. The following showcases the distribution of the interviewees among countries, types of stakeholders, categories and subcategories.

Country Distribution

For the report, five Latin America and the Caribbean countries were represented. These countries are within the most relevant in the agricultural industry and have had important advancements in the Agrifoodtech, attracting an important share of investment. Furthermore, three global stakeholders were interviewed to gain an external perspective on the current situation and opportunities that can be leveraged from more advanced regions.

Figure 37: Distribution of interviewees by country

Stakeholder Distribution

For the purposes of this report, it was important to include a variety of perspectives from different stakeholders in the value chain, to identify how they can each play a role to further the development of the Agrifoodtech industry. Therefore, interviews were conducted with startups, investors, corporations, innovation hubs, NGOs, academia and government entities.

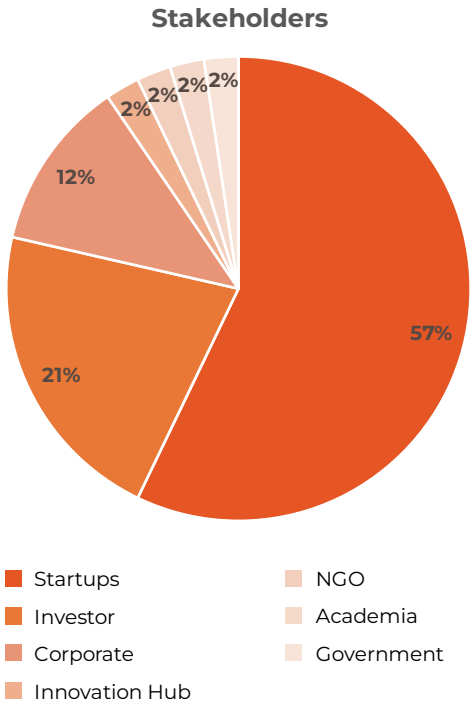


Figure 38: Distribution of Interviewees by Stakeholder

Category Distribution

Considering the different levels of advancement within categories, as well as IDBI's impact priorities (Food Security, Climate Change and Productivity), interviewees for this report were mostly concentrated in the Upstream category, followed by Midstream and Downstream.

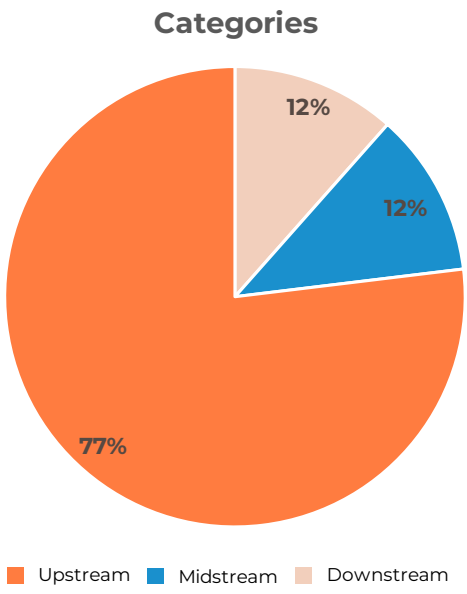


Figure 39: Distribution of Interviewees by Category

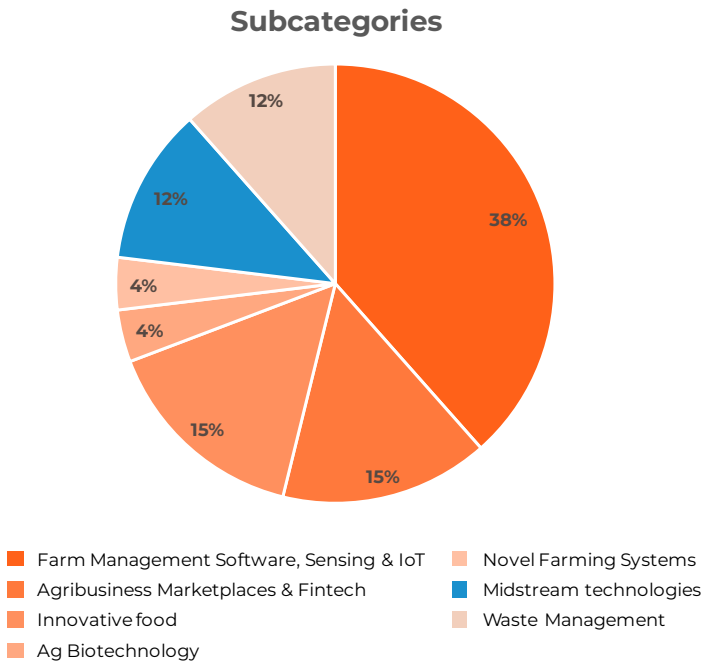


Figure 40: Distribution of Interviewees by Subcategories

8.2. Mapping of Interviewed Stakeholders

All stakeholders interviewed for this report are listed in the following table.

Logo	Organization	Stakeholder type	Subcategory
		Brazil	
	Agriness	Startup	Farm Management Software, Sensing & IoT
	Agrolend	Startup	Ag Marketplace & Fintech
	Agrosmart	Startup	Farm Management Software, Sensing & IoT
	AgTrace	Startup	Midstream technologies
	Aqua Capital	Investor	Cross
	Aravita	Startup	Waste Management
	Barn Investimentos	Investor	Cross
	Cellva Ingredients	Startup	Innovative Food
	GoFlux	Startup	Midstream Technologies
	Mastera	Startup	Farm Management Software, Sensing & IoT
	Raizen	Corporate	Cross
	Rumina	Startup	Farm Management Software, Sensing & IoT
	Seedz	Startup	Ag Marketplace & Fintech
	SP Ventures	Investor	Cross

Argentina			
	Auravant	Startup	Farm Management Software, Sensing & IoT
	Glocal	Investor	Cross
	GridX	Investor	Cross
	Grupo RIA	Innovation Hub	Cross
	Kilimo	Startup	Farm Management Software, Sensing & IoT
	Marea Venture	Investor	Cross
	Michroma	Startup	Innovative Food
	SF 500	Investor	Cross
	SIMA	Startup	Farm Robotics, Mechanization & Equipment
	Tomorrow Foods	Startup	Innovative Food
	Xperiment	Investor	Cross

Chile			
	Agroprime	Startup	Farm Management Software, Sensing & IoT
	AgroSmart (Chile)	Startup	Farm Management Software, Sensing & IoT
	Arpegio	Investor	Cross
	Botanical Solutions	Startup	Innovative Food
	Laurens Klerkx	Academia	Cross
	Polynatural	Startup	Waste Management

Colombia			
	Comfama	Corporate	Cross
	Demetria	Startup	Midstream technologies
	Fundación Fomenta	NGO	Ag Marketplaces & Fintech
	Ministerio de Agricultura	Government	Cross
	Sioma	Startup	Ag Marketplaces & Fintech

Mexico			
	Grupo Bimbo SAB. CV	Corporate	Cross
	Kigui	Startup	Waste Management
	Sistema BioBolsa	Startup	Ag Biotechnology

Global			
	Wholechain (USA)	Corporate	Novel Farming Systems
	Hispatec	Startup	Farm Management Software, Sensing & IoT
	Technoserve	NGO	Cross

8.3. Stakeholder Overview and Opportunities for Collaboration

The following section provides a comprehensive overview of the diverse stakeholders within the Agrifoodtech ecosystem in the LAC region. There are seven main key players within the ecosystem: farmers, startups, innovation hubs, academia, investment funds, corporates, and government, as well as other less common such as NGOs, associations and guilds that may also play a role to enable the Agrifoodtech ecosystem.

Stakeholder Mapping

Figure 41: Stakeholder Mapping

The objective of the stakeholder mapping is to identify relevant players within the Agrifoodtech ecosystem and recognize the role they intend to play in advancing and evolving the sector in the region.

Farmers

Farmers are among the main clients of the Agrifoodtech solutions, mainly within the Upstream category. They benefit from the development of key technologies that enhance their crops productivity with higher yields, provide greater efficiency through cost reduction and give market access by enabling and certifying sustainable practices withing their production. They also benefit from solutions that give them access to markets and decision-making tools, as well as financial alternatives.

In Latin America and the Caribbean there is a strong heterogeneity of the agricultural producers. The FAO estimates 16.6 million family farms or smallholder producers in the region, with and average size of 2.5 hectares[266]. In 2022, these farms were responsible for approximately 50% of the total production in LAC[267]. The traditional agricultural methods employed by these farmers are characterized by having a low level of technological adoption. This is mainly the result of several limiting factors such as possessing limited land, restricted access to capital, and low innovative capabilities. In the future, these farmers are anticipated to be in a vulnerable position, as they will lose access to markets and a competitive advantage as new regulations requiring sustainable practices arise, if the adoption of technologies is not stimulated. On the contrary, large-scale producers have more resources, including extensions of land to experiment with innovations, greater financial support to withstand a failed investment and better access to capital for pilots and high-cost technologies. These characteristics allow them to enjoy advanced technologies and novel practices.

Startups

Agrifoodtech startups are pivotal in revolutionizing the agricultural and food industry by disrupting existing and dominant systems through the introduction of innovations that can radically change the way the market operates. They identify challenges in the value chain and develop technological solutions that are instrumental in enhancing the efficiency, productivity, and sustainability of food production and distribution, thereby benefiting both small and large-scale farmers. They can achieve this, by successfully scaling their products and services to become established players in the industry and compete with or even replace existing firms. Furthermore, startups can articulate cross-system and cross-sector collaboration (e.g., digital agro-ecology, circular food systems, energy sector) which may create novel technologies[268].

Considering local country sources, the Agrifoodtech ecosystem in Latin America and the Caribbean comprises over 2,500 startups, spread across the region and the value chain. Of these, 1,500 specialize in Agtech and over 1,000 in Foodtech. Brazil has the most startups of the region, mainly in the Upstream category[269]. Argentina, Chile, Mexico, and Colombia follow.

Innovation Hubs

Innovation hubs are crucial to create collaborative ecosystems where various stakeholders meet to share resources such as funding, mentorship, and infrastructure. These hubs support startups by helping them to develop and validate ideas, find partners and investors, advance on business propositions and models, identify and access markets, and provide regulatory support. Through assistance programs and knowledge exchange, they enable technology use for improved outcomes, contributing to economic growth by creating jobs, attracting investments, and fostering regional development[270].

In this context, Brazil leads the way in integrating innovation hubs into the Agrifoodtech ecosystem across the region. Like most innovation hubs, those in Brazil aim to help businesses offer innovative and sustainable solutions. However, a notable distinction is that certain hubs in Brazil integrate startup services across corporate value chains. Pulse Hub serves as a

[266] (ECLAC, FAO, IICA, 2018)
[267] (J.P. Morgan, 2022)
[268] (Klerkx & Villalobos, 2023)
[269] (Dias, Jardim, & Sakuda, 2023)
[270] (Klerkx & Villalobos, 2023)

prime example of this approach[271]. Other notable examples in this country are FoodTechHUB Latam and Cubo. International associations also play a transversal role in the integration of innovation hubs, such as the innovation accelerator program by the World Food Programme (WFP), which is dedicated to fostering development to achieve zero hunger. In the region, this program established Farm Direct in Peru to increase digital tools adoption[272].

Academia

Leading Agrifoodtech ecosystems have close collaboration between startups and academia, which provides research support and scientific expertise to develop solutions that require profound agricultural knowledge, especially for specific regions or specific technologies. A key example of a fruitful collaboration between startups and academia is the Netherlands, where the Wageningen University & Research (WUR) is well known by its intensive collaboration with businesses, governments, and civic organizations to deliver value. WUR operates a Digital Innovation Hub for Agri-Food, offering business innovation services, ecosystem building, technical development, and training[273]. Additionally, WUR partners with StartLife, an Agrifoodtech accelerator, fostering innovation development and impacting over 400 startups[274].

In Latin America and the Caribbean, a notable academia player in the Agrifoodtech industry is Universidad Austral in Argentina. Since 2018, this university has contributed significantly to the ecosystem through in-depth analyses and strategic recommendations, leveraging collaborations with institutions such as the Washington University of St. Louis and Babson College[275].

Additionally, the region is home to specialized agricultural educational institutions such as Luiz de Queiroz College of Agriculture (ESALQ) in Brazil. This institution covers diverse research areas including biotechnology, bioenergy, crop science, food science and safety, and environmental management[276]. Similarly, Zamorano University in Honduras collaborates strategically with the Inter-American Institute for Cooperation on Agriculture (IICA) to

[271] (Pulse Hub, n.d.)
[272] (World Food Programme, 2022)
[273] (Wageningen University & Research, n.d.)
[274] (StartLife Agrifoodtech Accelerator, n.d.)
[275] (Agro&Economía, 2021)
[276] (Luiz de Queiroz College of Agriculture University of Sao Paulo, n.d.)

promote agricultural research, digitalization, and coffee production[277].

Investment Funds

Investment funds provide essential funding, foster important collaboration, and support startups to scale and innovate. First, investment funds are instrumental in the industry's overall development by providing funds to conduct research, develop prototypes and bring innovative solutions. Second, investment funds also play a role in connecting startups with industry experts, in establishing partnerships, and in assisting with market entry strategies, which help accelerate market adoption of startup solutions. Finally, investment funds support startups in mitigating risks and nurturing growth by contributing their expertise and experience to offer strategic guidance, mentorship, and support[278].

While capital may come from all types of funds, there are a few investment funds which specialize in the Agrifoodtech sector within the region. Typically, these funds focus on early-stage investment rounds, aiming to enhance startups' operational models and scale their solutions. Furthermore, a common thread among these funds is their commitment to investing in startups that are actively engaged in addressing the social and sustainable challenges that are prevalent in the region. Notable examples include the Yield Lab, Latam, SP Ventures, Arpegio, SF500, Barn Investimentos, Glocal, GridX, and Xperiment, among others. The portfolios of these investment funds comprise some of the most innovative and impactful startups in the region.

Corporates

Large corporations are pivotal in transforming the Agrifoodtech landscape in the region, not just as commercial entities, but also as agents of change. They provide critical access to advanced technologies and innovations for producers of all sizes, enhancing efficiency and productivity. Moreover, by collaborating with governments and NGOs, these corporations facilitate rural development, thereby ensuring small producers have access to training, financing, and market opportunities, thus playing a key role in promoting a more inclusive and technologically advanced agricultural sector.

In the LAC region, the advancement of the Agrifoodtech ecosystem is notably driven by three main types of corporations. First, global life sciences corporations such as Bayer[279] are instrumental in their comprehensive involvement in crop protection, seeds, and digital farming innovations. Second, agribusiness and commodity trading giants, including Bunge[280] and Louis Dreyfus Company[281], excel in grain trading, oilseed processing, and enhancing food supply chain efficiency. Finally, specialized agribusiness, focusing on animal nutrition and health, and those dedicated to precision agriculture and data-driven solutions, target specific segments within the ecosystem. Similarly, another example of the impact of corporations in Agrifoodtech development is seen with the creation of the Tropical Food Innovation Lab, a project in development by leading global companies Givaudan, Bühler, and Cargill in Brazil. The lab is designed to connect and develop a sustainable future food and beverage products[282].

Moreover, corporate organizations may actively work with Agrifoodtech through what is known as corporate venturing (CVC). CVCs assist startups with their business needs of raising money, finding customers, developing their products and services, hiring people and eventually an exit[283]. In exchange, corporates are granted an area for exploratory innovation and experimentation that aligns with their existing business units and strategic objectives[284].

Some examples of corporate ventures are Leaps by Bayer, Nestle Ventures from Nestle and Syngenta Group Ventures by Syngenta. Similarly, in the LAC region, there are important food companies that have adopted this model including Agrosuper in Chile, which has worked with 250 startups, developed 90 pilot projects, and incorporated 20 startups into its business[285]. Similarly, CMI Ventures from CMI Alimentos and Nutresa Ventures from Nutresa. CVCs in the region need to keep emerging to potentiate

[277] (Inter-American Institute for Cooperation on Agriculture, 2020)
[278] (Rodller, 2024)
[279] (Bayer Global, n.d.)
[280] (Bunge Global, n.d.)
[281] (Louis Dreyfus Company, n.d.)
[282] (Givaudan, 2022)
[283] (Global Corporate Venturing , n.d.)
[284] (Klerkx & Villalobos, 2023)
[285] (Agrosuper, n.d.)

the synergies between incoming, high disruption and transformative startups with key agribusiness corporations that can provide enabling resources for development and scalability.

Government

Governments play a key role in fostering the Agrifoodtech ecosystem by implementing supportive policies, providing financial assistance, and developing essential infrastructure in rural areas. Favorable business regulations encourage innovation and entrepreneurship, while government funding helps startups scale[286].

In LAC, government policies targeting the Agrifoodtech industry are still in development; however, in Brazil, government initiatives are driving innovation in agriculture. For instance, the Ministry of Agriculture's AgroHub Brazil program connects farmers with innovation centers, providing access to databases, financing, and news on innovation. Specifically, the AgroHub initiative offers ecosystem management technologies to improve efficiency. Some of the benefits include real-time monitor processing, mapping of farm areas and crops, keeping records of agricultural operations, financial operations, and cash flows, and digital data security, among other benefits. Furthermore, Brazil's National IoT Plan promotes IoT development with an emphasis on data security and privacy[287].

Additionally, on the demand side, public initiatives to promote development of the rural regions and remove barriers for technological adoption are also crucial for the Agrifoodtech sector development. One example is the Promotion of Resilient and Sustainable Agri-food Systems for Family Farming Programme (PROSAF) in Argentina, where the UN's International Fund for Agricultural Development (IFAD), the Government of Argentina and FONPLATA Development Bank launched a rural development initiative to help smallholder farmers transition to more resilient agroecology-based production while also taking advantage of digital technologies to improve their livelihoods and income[288].

NGOs

NGOs in Latin America and the Caribbean are key players in the Agrifoodtech industry, as they advocate for environmental sustainability, aid small farmers, and address food insecurity. By collaborating with various stakeholders, NGOs help promote growth and increase impact coverage of the region's Agrifoodtech industry, ensuring equitable and sustainable development. The relationship between NGOs and Agrifoodtech tries to address specific challenges that the industry also aims to tackle.

A clear example of the collaboration between NGOs and the agricultural sector are the programs promoted by the Inter-American Institute for Agriculture (IICA), which have played a fundamental role in supporting agricultural development in Latin America and the Caribbean[289]. IICA has established partnerships with public organizations, research centers, and private entities to tackle climate change, food security, and innovation challenges. Other, key collaborations include the Green Climate Fund, focusing on agricultural resilience and food security projects in Latin America and the Caribbean, and the Banana Consortium with Bayer, Catie, and Fontagro, which aims to develop sustainable banana production practices, promoting good agricultural methods and food security for small and medium-sized farms[290].

The intersection of the objectives of NGOs and Agrifoodtech startups are an opportunity to continue collaborating, especially in developing the right conditions in rural areas to encourage the adoption of technology that enables regional development, more sustainable farming practices, and address food security.

Associations and Guilds

The development of associations and guilds within the Agrifoodtech industry is still in its early stages, as most existing organizations are oriented towards traditional farming methods. However, established organizations play an essential role as they ensure a fair distribution of profits, where farmers get a fair value for their products in the market and enhance the adoption of new agricultural practices. Despite

[286] (The World Bank, 2020)
[287] (Digwatch, 2019)
[288] (International Fund for Agricultural Development, 2022)
[289] (Inter-American Institute for Cooperation on Agriculture , n.d.)
[290] (Inter-American Institute for Cooperation on Agriculture, 2023)

this, there are emerging examples of associations and guilds that are beginning to focus on Agrifoodtech, indicating a gradual shift towards embracing technology and innovation in agriculture. These pioneering entities represent the early steps towards establishing a more structured and supportive ecosystem for Agrifoodtech, highlighting the evolving landscape of the agricultural sector towards modernization and technological integration.

One relevant example of associations and guilds that are directly involved in the Agrifoodtech industry is the Brazilian Association of Precision and Digital Agriculture, founded in 2016 to contribute to scientific and technological development, innovation, and dissemination of the use of practices, techniques, and technologies of Precision and Digital Agriculture (PA). Currently, the organization has 41 associates[291]. Another example is CropLife Latin America, an association with a presence in eighteen countries of the region. Its mission is to advance sustainable agriculture and productivity by promoting solid legal and scientific regulatory frameworks in the region[292].

[291] (Agrileao Agricultural Solutions, n.d.)
[292] (CropLife Latin America , n.d.)

Collaboration within the Ecosystem

As mentioned in the previous section, each player within the Agrifoodtech ecosystem has its own role to play. Most of them use their own influence, resources, and expertise to remove barriers and enable the development and expansion of agrifood technologies. Nevertheless, it is relevant to consider how these stakeholders interconnect to boost startups' quick development and performance.

These collaborations and the role each stakeholder play within them, are determined by the state of startups along two distinct categories: the technological maturity level of the offered solution and the adoption readiness level for the offered solution. These categories can assist in understanding business maturity and the adoption complexity of the business models it provides.

Figure 42: Ecosystem collaboration framework

Collaboration According to Startup Offering

The nature of the product or service that startups offer has a direct effect on the required collaboration for its development. In the proposed framework startups can be characterized by two variables: offering maturity and adoption readiness. The offering maturity has to do with the technology readiness level of the product or service the startup is expected to offer. Adoption readiness, on the other hand, is the identification of the barriers faced by customers the solution will serve. Considering the ends of both spectrums, startups can be categorized in four main segments shown in the matrix of Figure 42. Hence, an analysis of the type of collaboration that is appropriate for each type of startup is developed.

Group A considers startups with offerings that have low maturity and high levels of adoption readiness. These are technologies that have not yet been widely used and which benefits have not been clearly identified, but with low levels of adoption complexity. For this type of startup, the key players are farmers, academia, R&D institutions, government and corporates. In first place, Group A startups need to mature their offerings to produce a product that effectively address the needs of their customers, for which academia and R&D institutions play a key role by providing deep scientific and technical expertise, development methodologies, and testing facilities. Similarly, including farmers and corporates in the early stages of development helps iterate the offering in a more accurate way by applying their experience and lessons learned in their productive operations. Meanwhile, governments are required to encourage this innovation and development of technologies through enabling regulation (e.g., new agricultural inputs such as Ag Biotechnology) as well as funding for research and pilot projects.

Group B considers a low maturity level and a low level of adoption readiness. Similarly, to Group A, participation of farmers, academia, R&D institutions, government and corporates is key to keep developing an assertive and cost-effective product. However, the low adoption readiness levels present additional challenges that require the involvement of more actors to overcome them. Low adoption readiness may be due to several factors such as a great heterogeneity of farmers (both large and small), high crop diversity, high level of talent required for the solution, high costs combined with limited access to capital, and insufficient infrastructure such as low connectivity. To overcome these types of challenges the key players are the government, corporates, associations and guilds, and NGOs. On the one hand, these players can assist in the articulation of farmers within the value chain through associations and guilds, as well as government-sponsored programs, to reduce the fragmentation of the value chain and identify opportunities for collaboration that reduce high cost (economies of scale). This will increase access to capital and promote standardization of practices to foster the articulation and implementation of different solutions. On the other hand, government, NGOs, and corporates can work together to fund, develop and deliver technical and digital training programs to farmers or other types of customers. This will facilitate the dissemination of the required skills for the implementation of Agrifoodtech technologies. Finally, the government and corporates (from different sectors) play a key role in building and improving the necessary infrastructure for the implementation and adoption of technologies. Alliances can be reached so corporations help develop infrastructure, such internet connectivity in rural areas through new business models like shared economies.

Finally, Groups C and D require a combination of the collaboration needed for Groups A and B. To overcome adoption barriers such as value chain fragmentation (high farmer heterogeneity and crop diversity), talent development, distribution of high costs, and greater access to capital, Group C, which has a high level of maturity and low level of adoption readiness, will require a greater level of involvement from players such as the government, association and guilds, and NGOs. Furthermore, public-private partnerships can help build and improve insufficient infrastructure. In contrast, Group D startups, with high maturity and high adoption readiness, will have fewer challenges on their way to maturity, mostly focused on the typical startup stakeholders' ecosystem collaboration required for their acceleration.

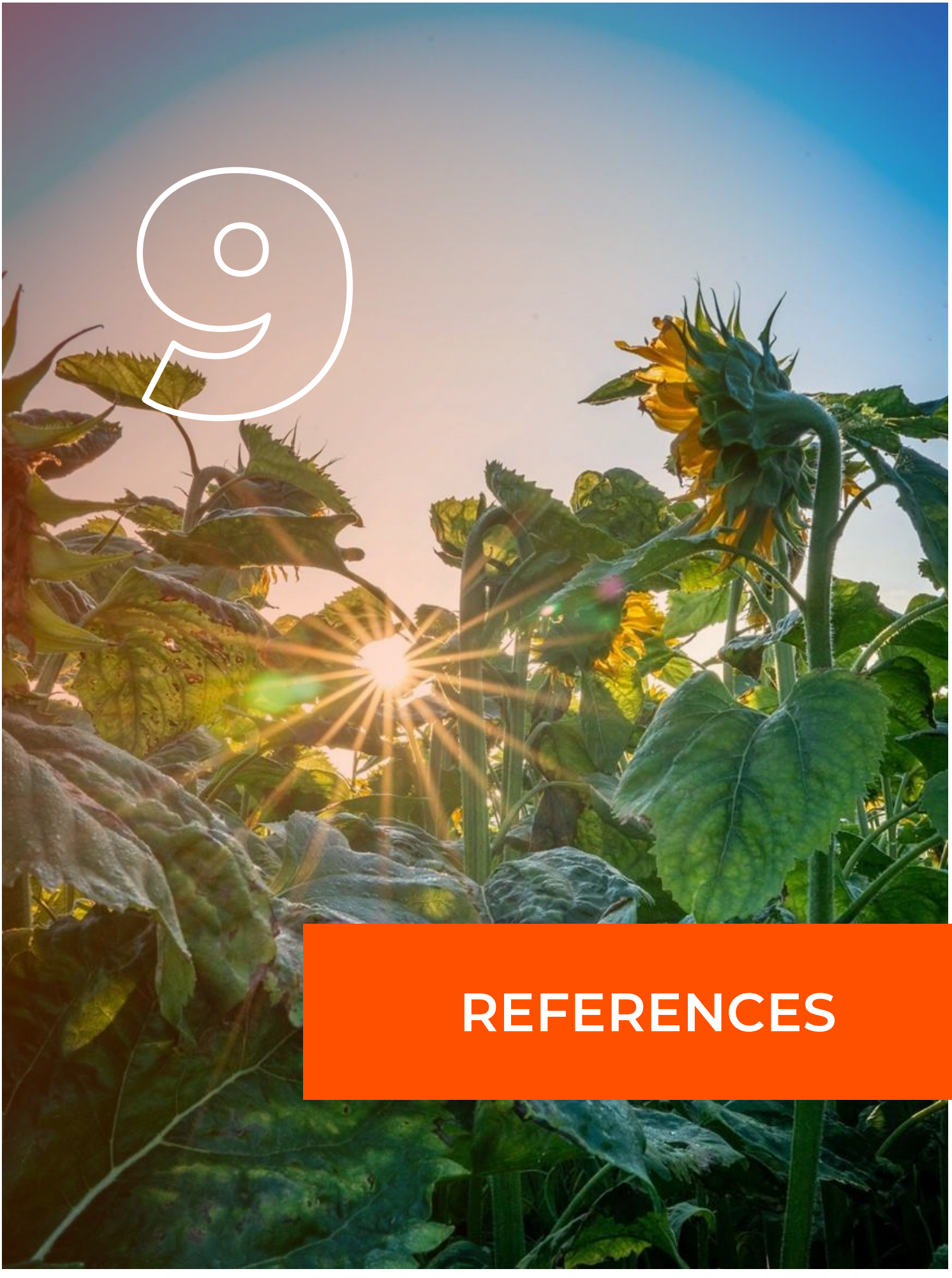
Role of IDBI in Fostering the Development of the Ecosystem

The IDBI is instrumental in fostering collaboration across the ecosystem to promote the development of the Agrifoodtech industry. Particularly, IDBI can help ensure a holistic development in the industry, by considering both corporates (established agribusinesses) and small farmers are considered. This is quite important in a region where 50% of agricultural production comes from small farmers.

First, it is important to understand the relationship between startups and corporates and the role the IDBI can play in promoting it. Even though they are often competitors, they can mutually benefit from one another. On the one hand, startups provide corporates with innovative technologies without the need for internal development. Corporates can use CVCs to stay up to date on incoming new trends and make sure their company maintains a competitive edge. Furthermore, startups act as a crucial talent provider for innovation, given they currently attract the best talent by promising early employees important payouts which corporates cannot compete with. On the other hand, startups can gain access to resources that help them navigate the complexities of the agricultural industry to enable rapid growth. Corporates can provide access to funds, development infrastructure, product-specific knowledge, manufacturing facilities and distribution channels. Moreover, given an important share of Agrifoodtech clients are small farmers, a strong social infrastructure is key for the scaling of products. The former is very relevant as small farmers are highly concerned with reliability, customer service, and overall prefer to work with people who already have a track record in the industry. Corporates help startups with a shortcut to the time-consuming process of building trust with consumers. Finally, corporates can provide startups with their first big client, ensuring a stable demand that enables the company's growth.

The IDBI can serve as a market maker, by articulating the relationship between the supply (startup innovation) and demand (corporates) by identifying key opportunities and sponsoring partnerships. This will foster the relationship between startups and corporates. Additionally, they can help promote the creation of CVCs and provide funding mechanisms that can help with de-risking of investment. This, considering corporates may have a higher tolerance to longer investment returns than VCs.

Second, the IDBI plays a key role in ensuring an equitable development of the Agrifoodtech industry across big and small farmers, given the high level of fragmentation in the value chain. Currently, in South America, approximately 50% of farmers have yet to implement any digital technology in their production process. As mentioned, this low level of adoption is due to a variety of factors including difficulty for small farmers to acquire the funds to invest in innovative technologies, and a need for greater rural development such as insufficient connectivity infrastructure and digital talent. In this landscape, the IDBI can work with financial institutions, agricultural cooperatives, and anchor companies to expand access to financing, promote rural development, and integrate small producers in the value chain. Specifically, fostering the development and expansion of certain subcategories, such as Agribusiness Marketplaces & Fintech, Ag Biotechnology, and Bioenergy can promote the economic and social development of small farmers, by improving their access to financing, appropriate marketplaces to buy and sell agricultural products, improve their crop yields, and be more cost efficient.



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