CONSULATE GENERAL OF BRAZIL IN SYDNEY

MARKET STUDY

AGRICULTURAL TECHNOLOGY (AGTECH)

JUNE 2021

Innovation Diplomacy Program

CONSULATE GENERAL OF BRAZIL SYDNEY

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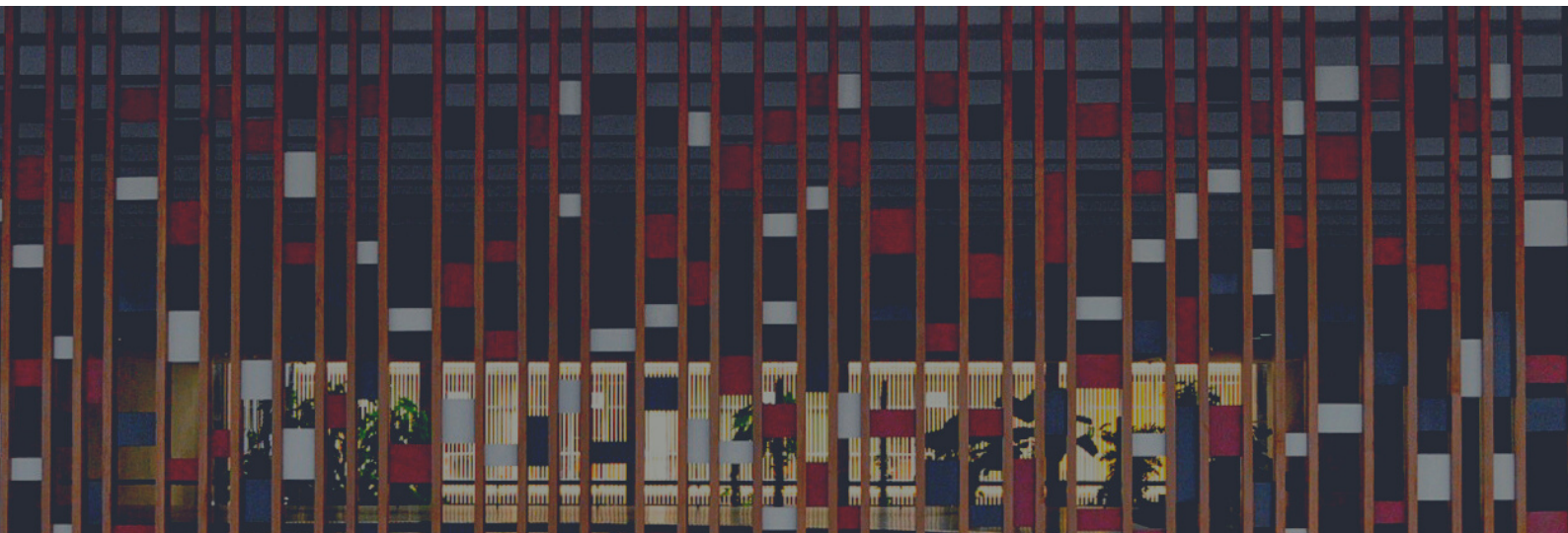
About the

INNOVATION DIPLOMACY PROGRAM

Launched by the Brazilian Ministry of Foreign Affairs in 2017, this program was designed to help promote the image of Brazil as a country of origin of several technology-intensive industries and services. The program encompasses activities such as (i) elaborating market intelligence studies; (ii) identifying potential trade partner and attracting investments; (iii) supporting the internationalization of Brazilian companies and startups; (iv) helping mobilize the Brazilian scientific diaspora abroad; and (v) fostering collaboration with technology districts and innovation ecosystems in other countries.

More information on the Innovation Diplomacy Program is available at: https://www.gov.br/mre/pt-br/assuntos/ciencia-tecnologia-e-inovacao/programa-de-diplomacia-da-inovacao.



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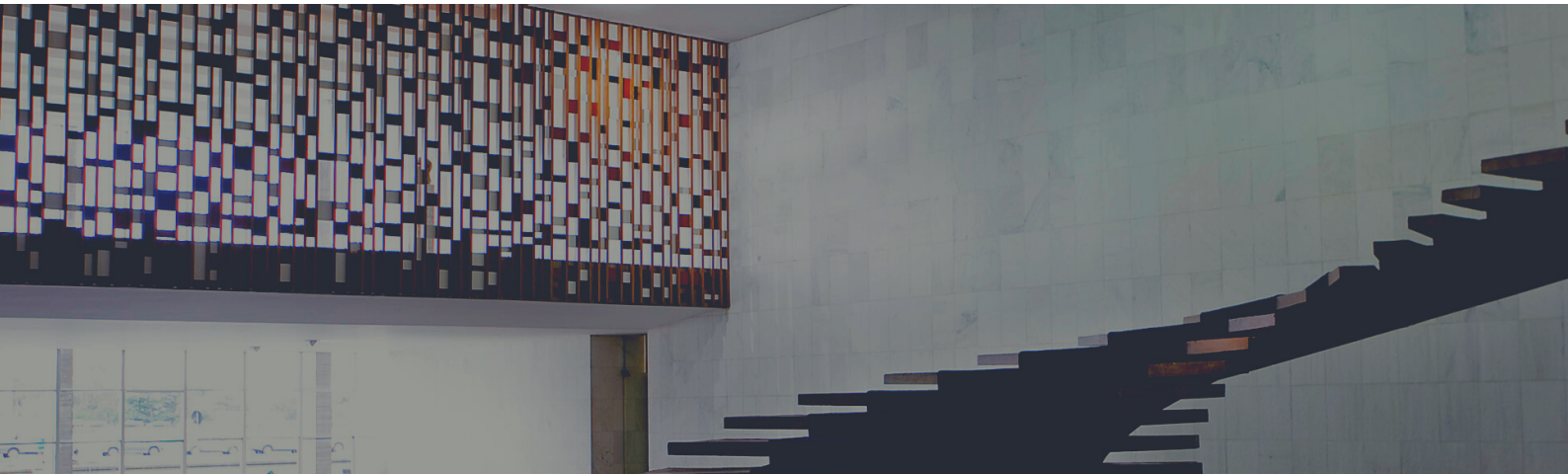
LIST OF ACRONYMS

ABARES – Australian Bureau of Agricultural and Resource Economics and Sciences
AgTech – Agricultural Technology
ASIC – Australian Securities and Investments Commission
AUD – Australian Dollars
CRC – Cooperative Research Centre
CSIRO – Commonwealth Scientific and Industrial Research Organization
FAO – Food and Agriculture Organization of the United Nations
GDP – Gross Domestic Product
GST – Goods and services tax
GVP – Gross Value of Production
RDC – Rural Research and Development Corporation
R&D – Research and development
UNE - University of New England
USD – US Dollars



BRAZIL - AUSTRALIA

AGTECH

Foreword

Brazil and Australia are the two largest economies in the Southern hemisphere. Often seen as competitors in resource-intensive sectors such as agriculture, mining and energy, Brazil and Australia have enormous potential for partnerships and business in technology-intensive sectors.

In 2017, Brazil and Australia signed an Agreement for Cooperation on Science, Technology and Innovation in areas of mutual interest, including agriculture, bioenergy, bioeconomy, prevention of natural disasters, water, space and education. Another agreement signed by Embrapa and the Commonwealth Scientific and Industrial Research Organization (CSIRO) in 2019 provides for cooperation in areas such as water scarcity, climate change and digital agriculture.

Despite the distance, Australia is an attractive market for Brazilian Agtech companies due to governmental incentives to the development of a leading digital economy and to an ambitious plan to increase the country's farmgate production to AUD 100 billion by 2030.

This market study provides an overview of the Australian Agtech market and outlines the opportunities for Brazilian companies and startups.

Executive Summary

Australian agriculture faces extraordinary challenges such as drought, bushfires, and climate change, overlayed with a global pandemic and increasing competition from global producers. The agricultural sector accounts for almost 2% of the Australian GDP and represented 11% of all goods and services exported in 2020. Total production at farm-gate reached AUD 61 billion in 2020.

Global demand is expected to recover from the COVID-19 pandemic, positively affecting sector revenue over the period. The gross value of production is forecast to grow 1.5% per year over the ten years through 2030, to AUD 71 billion. The emphasis on reducing per-unit costs and increasing efficacy is likely to grow as players face rising competition from large scale producers such as Brazil and the United States. Therefore, investments in technology and streamlining production processes will remain crucial to the success of operators in the segment over the next ten years.

In October 2020, the Australian government published a vision to expand agricultural production in the country to AUD 100 billion by 2030. Ag2030 is an ambitious plan that includes investments in trade, infrastructure, technology, preservation, and legislation with the aim of developing the sector in order to increase productivity and land yields.

Given the growth targets, greater access to AgTech and improved adoption are essential. In this context, research and development, and entrepreneurial activity are growing in multiple areas. Efficient water use, robotics, traceability and food waste are among several areas of interest for government and the private sector alike.

Finally, Australia offers an attractive destination for Brazilian companies willing to access larger international markets in Asia. For companies interested in developing and commercialising AgTech, Australia is a unique launchpad due to the presence of world recognised universities and research corporations such as CSIRO, abundant funding, government support, and good intellectual property protection systems in place. The diverse production systems that range from arid and temperate farming systems through to sub-tropical and tropical agriculture provide an ideal testing location across a range of agricultural commodities, each with production challenges to be solved.

1. Overview of the Australian Agriculture

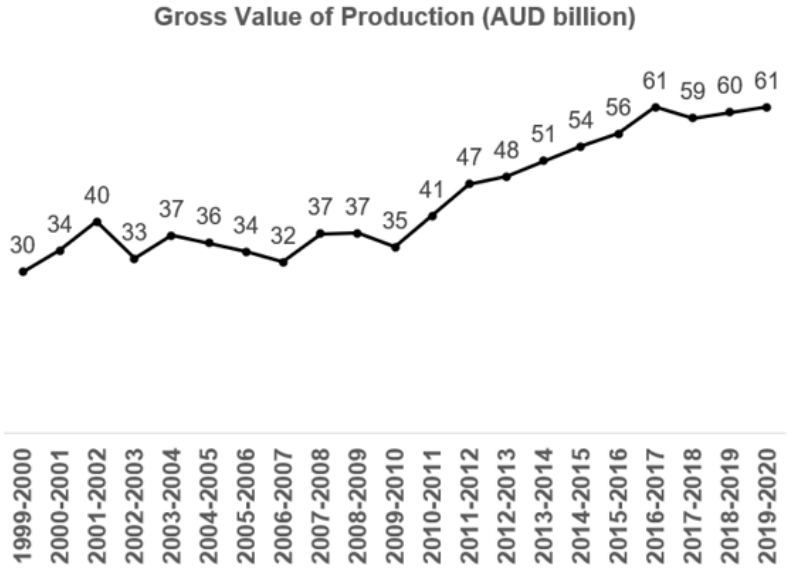
Much of Australia's vast continent is characterized by extensive central arid and semi-arid regions where low intensity cattle and sheep grazing operations predominate. Higher intensity agriculture is limited to coastal and southern regions, along with irrigated regions inland in south-eastern Australia. The main source of water for irrigation in the country is the Murray-Darling River basin.

The mix of Australian agricultural activity is determined by climate, water availability, soil type and proximity to markets. Livestock grazing is widespread, and occurs in most areas of Australia, while cropping and horticulture are generally concentrated in humid regions relatively close to the coast. About 70% of Australia's farm-gate production is exported to international consumer markets [1].

According to ABARES, the national agricultural statistics agency, as much as 55% of the national territory is used for agricultural activities. Land use by sector is split as follows: livestock 332 million hectares; cropping 28 million hectares; and horticulture 0.4 million hectares [2].

The country reached AUD 61 billion of Gross Value of Production in 2020 (GVP). The chart below displays the evolution of gross value of production (GVP) of the Australian agriculture industry, excluding fisheries and forestry, in the last 20 years.

Figure 1: Evolution of Gross Value of Production (GVP)



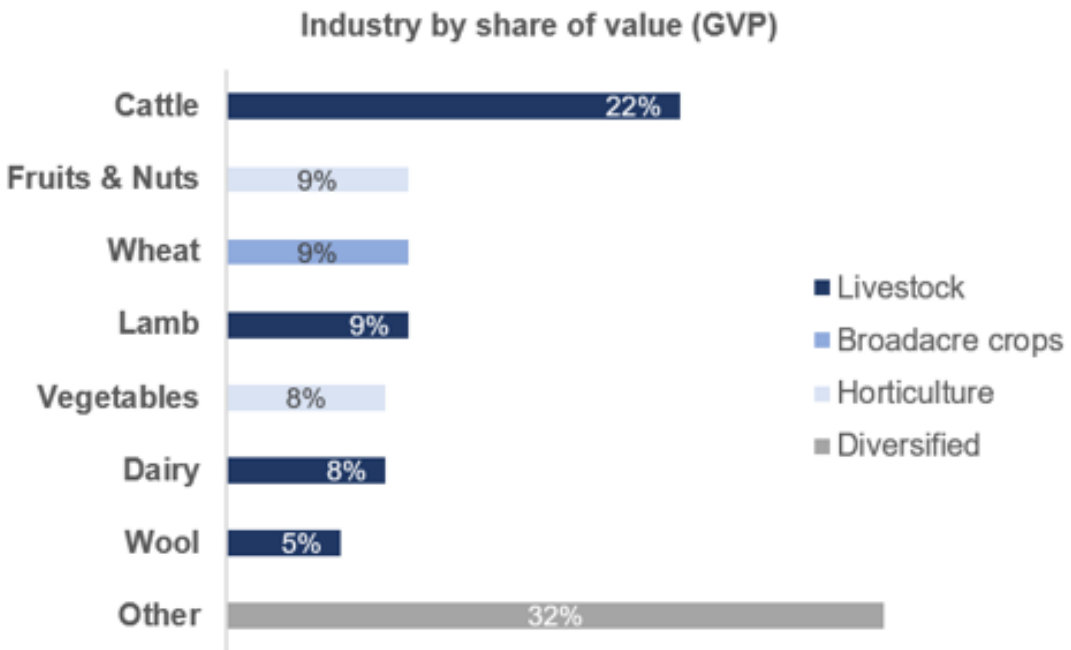
[1] Brown, A, De Costa, C & Guo, F 2020, Our food future: trends and opportunities, ABARES, Research Report 20.1, Canberra, January, DOI: 10.25814/5d9165cf4241d. CC BY 4.0.
[2] Australia, Australian Bureau of Statistics, Value of Agricultural Commodities Produces, 2018-2019 financial year. Retrieved 3 of June 2021, from https://www.abs.gov.au/statistics/industry/agriculture/value-agricultural-commodities-produced-australia/latest-release#data-download.

Three distinct patterns can be observed in the above chart. Between 2000 and 2010, Australia production was stagnant and GVP fluctuated between AUD 30 to 40 billion (USD 23 to 31 billion). Between 2010 and 2016, the country almost doubled the total value of production and reached a peak of AUD 61 billion (USD 47 billion) in 2017. Since 2017, GVP production seems to have plateaued again for a total GVP of AUD 61 billion (USD 47 billion) in 2020 and Australia seems to be facing growth further challenges as will be further discussed in this report. For reference, Brazil produced AUD 242 billion (USD 186 billion) in GVP in 2020.

Despite the considerable land area occupied by livestock (332 million hectares), productivity is extremely low, and the gross yield only averages USD 83 per hectare. This low yield is characteristic of low-density grazing activities in marginal farmlands. Occupying another 28 million hectares, cropping is no different and produces USD 489 per hectare, a low yield per hectare for the industry. On the other hand, horticulture is a high value industry which produces an average gross yield of USD 22,250 per hectare. For comparison, the corresponding figures for Brazil are USD 405 for livestock, USD 1,337 for cropping and USD 9,452 for horticulture.

Cattle production for beef and dairy is Australia's largest agricultural activity, by value, followed by fruits and nuts, wheat cropping, sheep grazing, vegetables production and mixed farming (grazing and cropping) operations.

Figure 2: Largest Agricultural Industries



Traditionally owned and operated by families, Australian farms have gradually consolidated over the past three decades and small family-operated farms are losing ground to large scale professional agriculture. In 1990, small farms covered a total of 250 million hectares, an area that has been gradually reduced to circa 50 million hectares today. On the other hand, large farms grew from 75 million hectares to over 200 million hectares in the same period [3].

Growth through capital formation and productivity are a priority for the agricultural sector. However, Australia suffers from well-known and chronic water scarcity, a problem aggravated by climate change. Extreme events such as droughts, floods and bushfires are increasing in frequency and gaining the attention of the public and private sectors. In addition to drought, ten other priority areas have been selected for further discussion in the following paragraphs.

Ag2030: A Vision for 2030

The Australian government articulated an ambitious vision, named Ag2030, to achieve AUD 100 billion (USD 77 billion) of gross production value at farm gate by 2030 [4]. Nonetheless, economic modelling suggests that a business-as-usual approach would only see agriculture grow to AUD 71 billion by the target date. Consequently, the sector needs to increase its current annual growth rate, from 1.5% to 5.1%, to get to the stated goal of AUD 100 billion.

According to AgriFutures, a research corporation, Australia needs to reach an average of AUD 8.7 billion (USD 6.7 billion) in annual net investment in the sector to reach the Ag2030 goal. This would entail mobilising huge volumes of public and private capital if compared to the country's 30 years average of AUD 1.2 billion (USD 923 million) in net investments. In fact, over the last ten years investment has not kept up with consumption of capital (depreciation) and the net investment has been negative [5]. Therefore, delivering Ag2030 will require a substantial change in direction and the rapid expansion of investment in agriculture.

Primary industries are a core economic sector in Australia and agriculture, more specifically, is a key activity in terms of land usage, economic value, employment, and cultural significance.

[3] Bennett, M. The future of farming is big, literally. Blue Notes. (2019). Retrieved 19 May 2021, available at https://bluenotes.anz.com/posts/2019/01/The-future-of-farming-is-big-literally?fbclid=IwAR0wrOSI0LHrcEalggGY8sVygyuDZL5WSVHTsuL4sckDKsX-C0uapXul_L0.
[4] Australia, Department of Agriculture, Water and the Environment. (2021). Delivering Ag2030. Canberra: Australia. Retrieved 19 May 2021, from https://www.agriculture.gov.au/ag-farm-food/ag2030.
[5] Natural Capital Economics (2020). Capital requirements of Australia's agriculture, fisheries and forestry sector. Project number: 0920016. Retrieved 3 June 2021, from https://www.agrifutures.com.au/wp-content/uploads/2021/01/20-140.pdf.

Consequently, the federal and local governments offer various levels of support to farmers, companies, research corporations and startups large and small working to develop the sector. Unlike in other countries where subsidies are offered to producers, Australian farmers receive no or very few subsidies and must keep up with international competition through efficiency gains.

To lay the foundations for Ag2030, the Federal Government committed this year to releasing a National Agricultural Innovation Policy Statement and to a multi-year growth plan covering the entire agricultural industry. This plan includes legislation and public investments in trade and exports, water and infrastructure, biosecurity, innovation, and human resources. The recently approved Federal Budget 2020-2021 comprises AUD 867 million (USD 667 million) in public investment in agriculture, of which only AUD 35 million (USD 27 million) are destined to AgTech [6].

Figure 3: Ag2030, front page

[6] Australia, Department of Agriculture, Water and the Environment. (2021). Agriculture 2030 2021–22 Budget. Canberra: Australia. Retrieved 19 May 2021 from https://www.awe.gov.au/sites/default/files/2021-05/ag2030-factsheet.pdf.

Furthermore, federal and state governments continually engage to support the sector through a network of federal and state executive departments, government-backed agencies, and industry companies. Australia has a large ecosystem of governmental and quasi-governmental agencies providing planning and regulation, research, marketing, and other services to the agricultural sector. The list below contains the six most important government bodies for the industry:

- **Federal Department of Agriculture, Water and the Environment:** The Department of Agriculture, Water and the Environment is Australia's peak government body in charge of protecting and strengthening agriculture, water resources and the environment. The department is a parent organisation to several government agencies and is responsible for oversight and regulation of key industry areas such as agricultural operations, water policy, biosecurity, and conservation.

- **VictorState Departments:** Most Australian states and territories have their own executive bodies in charge of supporting the industry. They are the Department of Primary Industries in New South Wales, Agriculture Victoria, the Department of Agriculture and Fisheries in Queensland, the Department of Primary Industries and Regions in South Australia, the Department of Primary Industries and Regional Development of Western Australia and the Department of Primary Industries, Parks, Water and Environment in Tasmania. In the Northern Territory, Agriculture and Fisheries is a sector focus within the Department of Industry, Trade and Tourism.

- **Lot Fourteen:** One of the largest innovation districts in Australia, located in Adelaide, with 35,000 m2 dedicated to innovation and entrepreneurship companies. In addition to hosting accelerators, incubators and startups, the district is also home to the Australian Machine Learning Institute, which attracts researchers, companies and investors specialized in finances and mega data.

- **Murray-Darlin Basin Authority:** Affiliated with the Federal Department of Agriculture, Water and the Environment, the Murray-Darling Basin Authority is in charge of sustainably managing the Murray-Darling Basin's water resources. The basin is home to the Murray and Darling rivers and is Australia's largest source of fresh water, responsible for 40% of the national produce.

- **Australian Bureau of Agricultural and Resource Economics and Science:** The Bureau is the research arm of the Australian Government and provides professionally independent data, research, analysis, and advice that informs public and private decisions affecting Australian agriculture.

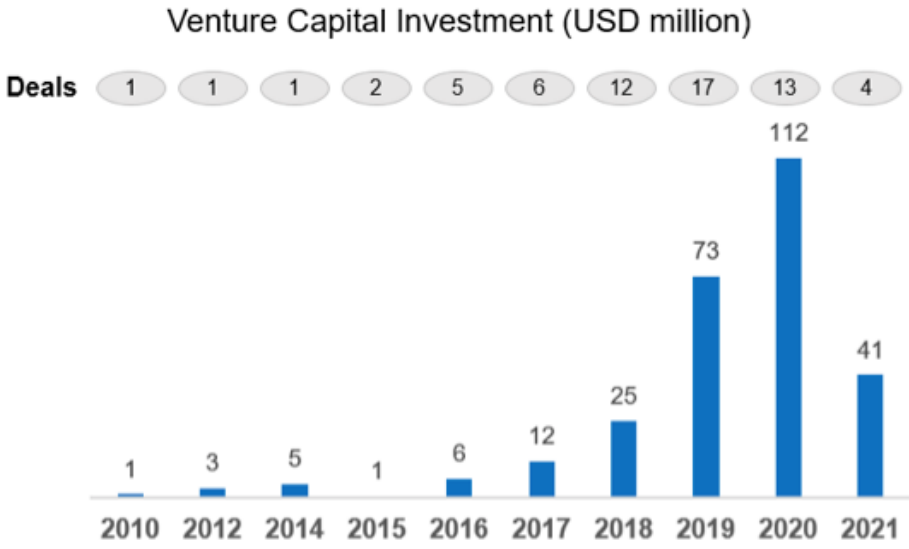
- **Rural Research and Development Corporations (RDCs):** Australia has a network of 15 rural research and development entities funded by industry levies and matched funding by the Australian government. The agencies provide research and development services, funding, and marketing services to the industry. Appendix B of this document contains a comprehensive list of RDCs.

- **Cooperative Research Centres (CRCs):** Under the federal Department of Industry, Science, Energy and Resources, the 24 Cooperative Research Centres provide funding to support Australian industries' ability to compete and produce. Appendix C of this document contains a list of CRCs related to agriculture.

2. The Innovation Ecosystem

The Australian AgTech innovation ecosystem has rapidly gained momentum since 2016, with the sector seeing a sharp increase in capital invested, a significant rise in new incubators and accelerators, an increasing number of startups, as well as corporates which supports innovation and entrepreneurship [7]. The chart below provides detailed information about investment activity in the AgTech sector in Australia [8].

Figure 4: Venture Capital Activity in Australia



For a granular review of the Australian AgTech ecosystem, a comprehensive list of startups is provided in Appendix D to this report. The companies included in the list were screened according to the following criteria: (i) revenue, (ii) fundraising, (iii) leadership and domain expertise. After screening, the list contains more than 50 startups and scaleups.

Notably, several companies included in Appendix D are no longer headquartered in Australia. These are companies whose activities were initiated in Australia and later expanded internationally. In fact, larger international markets appeal to Australian entrepreneurs and it is a common pathway for startups to relocate to the United States after achieving product-market fit and early traction.

[7] Maughan, S. McFarland C. et al. Australian AgTech: Opportunities and Challenges as Seen from a US Venture Capital Perspective. (2018). Retrieved 19 May 2021, from https://www.ussc.edu.au/analysis/australian-agtech-opportunities-and-challenges-as-seen-from-a-us-venture-capital-perspective.
[8] Elaborated by the author based on information collected on Crunchbase on 3 June 2021.

While the exact number of AgTech companies and start-ups in Australia is not easy to determine due to a highly dynamic business environment, industry experts estimate Australia has over 300 AgTech startups, and this number is continually increasing [9].

Notwithstanding, the national peak body AusAgriTech recently issued a statement challenging the government and private sector alike to do more to develop and adopt agricultural technologies needed to achieve the country's ambitious Ag2030 goals [10]. Furthermore, AusAgriTech highlighted that Australia may be missing an opportunity to export AgTech. The global AgTech industry is estimated to be AUD 700 billion (USD 538 billion) in size.

AgTech and the Government

The Federal and State governments, through an intricate network of governmental and para-governmental entities, sponsor several support programmes for private-sector entrepreneurs developing innovation. The two foundational programs backed by the Australian government are the Research and Development Tax Incentive and the Entrepreneurs Programme:

- **Research and Development Tax Incentive:** The Research and Development Tax Incentive supports entrepreneurs by offsetting some of the costs of research and development. Eligible companies can offset as much as 43.5% of their research and development costs [11].

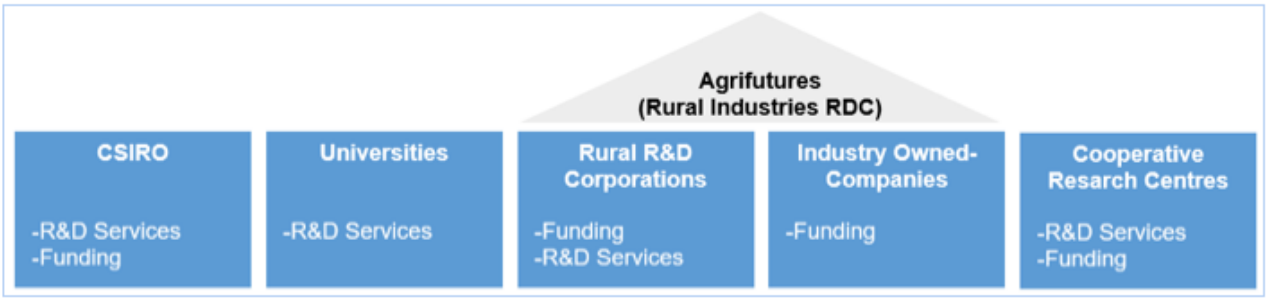
- **Entrepreneurs Programme:** The Entrepreneurs Programme provides grants to early-stage startups throughout their journey from launch to research and development to commercialisation of innovation [12].

More information about government grants and investment opportunities can be found through Grants & Programs Finder [13] and Grant Connect [14].

Australia has several entities that support innovation in agriculture. The following image provides an overview of the key governmental and quasi-governmental agents and their roles in providing research and development support to the agrifood technology ecosystem.

[9] Rounding Up, Estimate and database, retrieved 19 May 2021, from https://rounding-up.com/agtech-startup-database-listings/.
[10] Nolet, S., & Pryor, M., Australia risks missing out on $700b agrifood tech industry. Australian Financial Review. (2021). Retrieved 19 May, from https://www.afr.com/technology/australia-risks-missing-out-on-700b-agrifood-tech-industry-20201108-p56cma.
[11] Accessible through https://business.gov.au/grants-and-programs/research-and-development-tax-incentive.
[12] Accessible through https://business.gov.au/grants-and-programs/entrepreneurs-programme.
[13] Accessible through https://business.gov.au/grants-and-programs.
[14] Accessible through https://www.grants.gov.au/.

Figure 5: Government-backed AgTech Ecosystem in Australia



CSIRO

With over 5,300 staff and AUD 1.2 billion (USD 923 million) in revenue, CSIRO is Australia's leading science agency and innovation catalyst. The government agency has an extensive track record of producing high-quality research and is well-equipped to solve technical and business challenges through innovative science and technology. Outside of agriculture, one of CSIRO's most globally recognised developments is Wi-Fi.

CSIRO owns and operates research facilities across the country and internationally. It offers infrastructure, research, commercialisation and ancillary services to companies and entrepreneurs designing and commercialising innovative solutions. In agriculture, CSIRO has expertise in crop improvement through breeding and genomics, livestock and aquaculture breeding, health and nutrition, innovative farming systems and sustainability.

In food, the company has expertise in process engineering, advanced separation, food ingredients, among other areas. In partnership with the federal government, CSIRO launched the Future Protein Mission [15], a research and development program designed to support the private sector in developing the necessary capabilities to build a AUD 10 billion (USD 7.7 billion) protein industry by 2027.

CSIRO offers multiple grant programs for small and medium enterprises as well as startups interested in engaging with the agency to pursue research and development opportunities. Their flagship program is CSIRO Kickstart, which offers up to AUD 50,000 (USD 38,000) in matched funding for innovative research projects [16].

[15] CSIRO, Future Protein Mission: helping Australia capture high-growth global protein markets. Retrieved 19 May 2021, from https://www.csiro.au/en/about/challenges-missions/future-protein-mission.
[16] Accessible through https://www.csiro.au/en/work-with-us/funding-programs/programs/CSIRO-Kick-Start.

Universities

Besides CSIRO, Australia's university system contributes an additional AUD 12 billion (USD 923 million) annually in research funds destined to research and development work. According to the Australian Bureau of Statistics, 4% of this budget or AUD 488 million (USD 375 million) was invested in agricultural and veterinary sciences research by Australian universities in 2018 [17].

Clusters

Over the past ten years, a significant portion of total Australian investment in AgTech went into companies located in Sydney alone. An elite group of 18 startups based in the city raised a total of AUD 233 million (USD 179 million), an average of AUD 13 million (USD 10 million) per company.

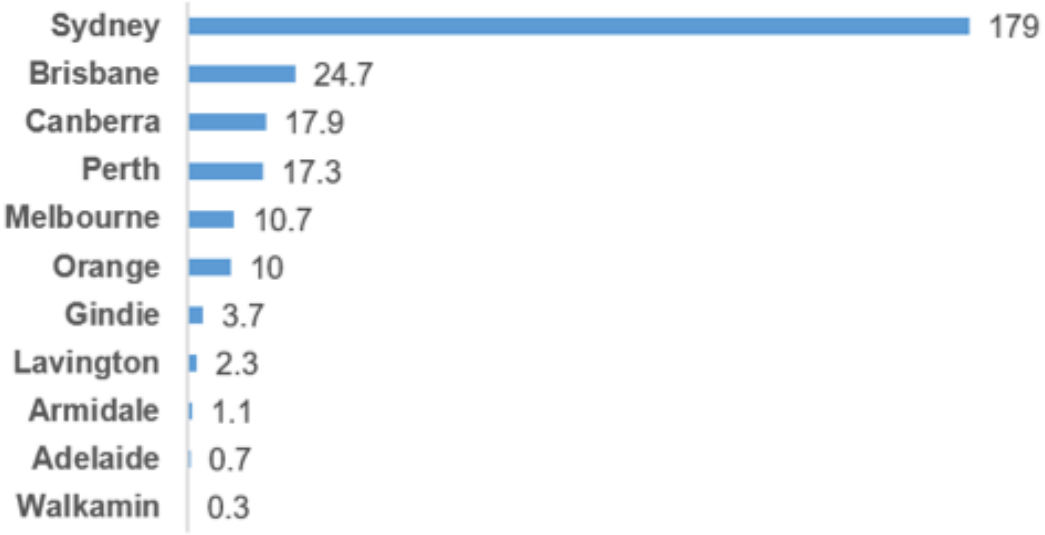
Other AgTech clusters in Australia include Brisbane, Canberra, Perth, Melbourne and Orange. A group of 19 companies based in these cities raised a combined amount of AUD 105 million (USD 81 million), an average of AUD 5.5 million (USD 4.3 million) per company.

The federal and regional governments have invested significant resources to develop regional innovation clusters through the launch of incubators, accelerators and funding programs. Some examples of these programs include AgriStart (regional Western Australia), UNE Smart Regional Incubator (Armidale, New South Wales), The Gate (Orange, New South Wales), AgFrontier (Emerald, Queensland). However, the outcomes of such programs have not been of significance.

The following chart contains the amount of funding raised by Australian startups by city. As much as 67% of the total funds raised by AgTech startups went to Sydney-based companies [18].

[17] Parliament of Australia. (2021). University research funding: a quick guide. Canberra: Parliament of Australia. Retrieved 19 May 2021, from https://www.aph.gov.au/About_Parliament/Parliamentary_DepartmentsParliamentary_Library/pubs/rp/rp2021/Quick_GuidesUniversityResearchFunding#:~:text=The%20two%20main%20sources%20of,14%20per%20cent%20of%20HERD).

Figure 6: Investment by city (USD million)



Accelerators and Incubators

Growing investment and interest in AgTech has also sparked a burgeoning support ecosystem and Australia has a myriad of incubators and accelerators supporting the agrifood sector. A list of incubators and accelerators is provided in the Appendix C of this report.

Venture Capital and Private Equity

As the industry develops and companies mature, larger sums of capital have been invested in Australian AgTech companies. A full list of venture capital, government entities and private equity investment groups active in the AgTech sector is provided in the Appendix F of this report.

[18] Elaborated by the author based on information collected on Crunchbase on 3 June 2021.

3. The AgTech Sector

This section presents the top Australian companies in the agritech sector, grouped into eleven categories that correspond to the different issues facing the agriculture and livestock sectors in Australia.

3.1 Water Scarcity

Australia is the world's driest inhabited continent with a variable climate and many competing uses for water including urbanisation. A growing population, economic activity as well as consumer interest on the impacts of agriculture on water quality, such as nutrient and salt levels, have driven up costs of water for agricultural use. As a result, it is a priority to increase productivity and profitability as well as to develop agricultural systems in arid areas.

Leading Companies:

- Sundrop farms produces high-value crops through an indoor agricultural system fed with desalinated seawater and powered by a solar farm.
- Swan Systems commercialises water and nutrient management systems.
- Observant helps farmers reduce costs and improve productivity through water consumption optimisation.
- Farmbot uses IoT technology to monitor and manage water assets.

3.2 Livestock Productivity

Operating in marginal hinterlands, Australian livestock producers face some of the most severe climate and environmental conditions on Earth. Therefore, gross land yields are extremely low and international competition imposes cost pressures on Australian producers. As a result, animal nutrition and health, risk and herd management are key areas of interest.

Leading Companies:

- Agersens is helping livestock producers monitor and manage their herd remotely using virtual fences and a GPS-enabled collar for cows.
- ProAgni produces antibiotic-free animal feed for better animal health and nutrition.
- PairTree offers data integration and visualisation tools for data-driven decision making.

3.3 Broadacre Productivity

Broadacre crop farmers trade commodities have limited pricing power. Hence, farmers need scale and technology to play in a competitive global market where marginal yield gains can make a significant difference. Important technology areas in this industry include precision farming, herbicides, pesticides, fertilisers, data-driven tools, and robotics.

Leading Companies:

- Regrow is a precision agriculture platform helping farmers manage crops and conservation practices.
- The Yield commercialises microclimate sensing and artificial intelligence solutions for corporate operations.
- Agerris and Swarm Farm are developing robotics and autonomous solutions for agriculture.
- RapidAim offers pest-surveillance sensors.

3.4 Horticulture Productivity

Despite recent advances in fruit picking technologies, horticulture is still a high-cost and labour-intensive agricultural activity. In addition, Australian producers have suffered from a shortage of labour supply for many decades.

This issue has been aggravated by the COVID-19 pandemic, which further limited the supply of labour. Therefore, innovation in farming systems, robotics and labour-saving solutions, and workforce training are priorities for the industry.

Leading Companies:

- Agerris creates field robotics solutions for agriculture.
- Sprout Stack grows fresh produce through vertical indoor farms.
- RapidAim produces pest surveillance sensors.
- BioScout develops technology to detect and prevent airborne diseases.

3.5 Cellular Agriculture and Plant-based Meats

Research has shown that the agrifood system is responsible for a significant share of global greenhouse gas emissions. Consumer awareness about the environmental impact of our foods is growing and more informed consumers look for sustainable foods such as plant-based meats and cellular agricultural products.

Leading Companies:

- v2Food is a plant-based meats company which produces legume-based foods.
- Australian Plant Proteins commercialises plant-based protein ingredients sourced from pulses.
- Nourish uses fermentation to create fat compounds comparable to those found in animals.
- Vow is a cellular agriculture company claiming to own the world's largest cell library of non-traditional animal species.

3.6 Resilience, Natural Hazards and Insurance

- Scientific research has proven that climate change is increasing the frequency and severity of natural hazards across the globe, and Australia is no different as the frequent droughts, floods and bushfires have proven. In this context, technologies that increase resilience and preparedness for natural hazards are of prime concern.

Leading Companies:

FloodMapp

DAS DIGITAL AGRICULTURE SERVICES

- Digital Agricultural Services uses artificial intelligence to provide rural intelligence to governments and companies.
- FloodMapp is a startup which offers real-time forecasting and mapping solutions to improve emergency management: preparation, response, and recovery.

3.7 Sustainability

As discussed above, awareness about the environmental impact of our foods is growing and consumers are concerned about the impact of their consumption choices on forest preservation, greenhouse gas emissions, biodiversity and environmental pollution.

Leading Companies:

greencollar FutureFeed Soil Carbon Co.

- GreenCollar specialises in carbon markets and reducing greenhouse gas emissions in agriculture.
- Future Feed uses the algae Asparagopsis as a natural ingredient for livestock to significantly reduce carbon emissions.
- Soil Carbon Co is developing tools to help farmers restore soil carbon.

3.8 Farm, Trading and Supply Chain Management

Commodities trading and supply chain management are a crucial part of the agrifood system and yet farmers and logistics operators still lack software and digital tools to efficiently manage their products and make data-driven decisions that have an enormous impact on profits.

Leading Companies:

AgriWebb Agworld AgriDigital

- AgriWebb is a farm management platform for livestock producers.
- AgWorld is a farm management and data integration platform serving the needs of growers, agronomists, retailers and traders.
- AgriDigital is an integrated commodity solution for the grains industry, it manages the supply chains and trades for the farmers.

3.9 Efficiencies in Distribution

The wholesale distribution of produce to restaurants, cafes and the hospitality industry is widely regarded as a traditional and inefficient industry. Two common side effects are the high levels of food waste and the added costs of labour to restaurant operators.

Leading Companies:

foodbomb Ordermentum Ordering • Payments • Insights HiveXchange

- Foodbomb and Ordermentum address this issue by creating a marketplace with integrated logistics operation where hospitality businesses can buy produce directly from wholesalers.
- HiveXchange is a marketplace focused on perishable produce.

3.10 Food Traceability

Australia is widely regarded internationally as a high-quality producer of food products and the “brand Australia” drives a premium in international markets.

But just like other segments, food is prone to counterfeiting and traceability technologies are crucial to reassure clients and trading partners, and protect Australian producers from fraud.

Leading Companies:

- Lumachain develops blockchain-based food traceability and supply chain management tools.
- Fresh Supply Co develops digitization tools based on blockchain to support supply chain finance.

3.11 Food Waste and Recycling

Research has shown that Australia wastes millions of tonnes of food per year, which causes a major monetary and environmental cost to the country. As a result, it is a priority to address food waste, according to the government. That is due to the environmental and resource-related costs of food waste.

Leading Companies:

- GoTerra has reinvented waste management and has developed modular robots filled with maggots that process food waste and turn waste into high-protein animal feed.
- Natural Evolution recycles green banana to produce resistant starch and other consumer products.

4. Opportunities for AgTech companies

Australia is a continental country with a diversified and large-scale agriculture, whose expansion will depend on its ability to solve chronic problems such as climate constraints and water and rural labor shortages. In this sense, Australia is a perfect sandbox for AgTech companies interested in testing their technologies and business models.

Four times smaller than Brazil, Australia is the 19th largest agricultural producing country based on gross value of production according to FAO [19]. However, its neighbours China, India, Indonesia and Japan generate a combined 47% of the world's produce. These countries are also Australia's key trading partners and markets where Australian technology and products are highly regarded. The following paragraphs will discuss opportunities for Brazilian AgTech companies interested in establishing a presence in Australia.

4.1 International Expansion

The country has ambitious goals for agriculture and has a relevant volume of financial resources to invest. Despite the favorable context, the agritech sector in Australia is still at an early stage of development. The volume of private and public investments already made is considered low, and the pace of adoption of new technologies by farmers in all segments (livestock, agriculture and horticulture) is still slow, compared to other major food exporters, such as the USA, Canada and Brazil. In this context, there is still ample room for competition and for the entry of foreign companies offering innovative technologies.

Another benefit of expanding to Australia is ease of access to larger agriculture markets such as China, India, Indonesia and Japan. A well-established footprint in Australia may open doors to a larger clientele located in the Asia-Pacific region where the "brand Australia" is highly regarded.

[19] FAO, FAOSTAT, Value of Agricultural Production, Retrieved 3 June 2021, from http://www.fao.org/faostat/en/#data/QV/metadata

4.2 Mergers and Acquisitions

Given its small size and relatively late development, Australian AgTech startups may be attractive acquisition targets for larger Brazilian companies willing to expand internationally or complement their portfolio of products and services.

4.3 Joint Ventures, Partnerships or Distribution Agreements

Alternatively, Brazilian companies may prefer to establish a joint venture, partnership, or a distribution agreement with a local partner to reduce risks. Exchanging information and intellectual property with local partners, service providers or event competitors with complementary capabilities may provide an initial advantage and mitigate risks before committing to larger investments.

4.4 Research and Development Partnerships

Australia has outstanding capabilities and infrastructure to perform research and development work through CSIRO, its extensive network of universities as well as public and private sector research organisations. Rural Development Corporations, Cooperative Research Centres, the federal and state governments also have large budgets available for research and development work.

4.5 Relocation

Finally, a growing market and ease of doing business make Australia an attractive destination for entrepreneurs and companies looking for a stable business environment, access to capital and low risk levels. Venture capital is abundant and access to capital markets is easy with more than 2000 listed companies in the Australian Stock Exchange (ASX).

5. Trade Barriers

Doing business in Australia is easy and the process of starting a company is simple, affordable, and fully digital. All companies in Australia are accountable to the Australian Securities and Investment Commission (ASIC), established under the Australian Securities and Investments Commission Act 2001, which determines ASIC's authority and scope. ASIC acts primarily as the regulator of Australia's markets and financial services to ensure they are fair and transparent. They are essentially a national corporate watchdog, protecting consumers, investors, and creditors. Foreign companies wishing to operate in Australia must be registered with ASIC.

The Australian Taxation Office is the principal revenue collection body for the Australian Government, responsible for administering the Australian federal taxation system, which includes managing and shaping tax, excise and superannuation systems that fund services for Australians. The current taxation system includes taxes payable on personal income (referred to as Pay As You Go or PAYG tax), business income (referred to as Company tax) and goods and services (GST or referred to as a consumption tax).

IP Australia manages intellectual property registration. The entity is regulated under the Public Governance, Performance and Accountability Act 2013, which administers intellectual property rights and legislation relating to patents, trademarks, registered designs, and plant breeder's rights in Australia.

Tariffs for imported goods and services in Australia are generally low, and the country poses limited technical barriers to imports of goods and services, except in the following areas:

5.1 Biosecurity

Biosecurity is a major area of concern for the public and government in Australia. The Department of Agriculture, Water and the Environment is responsible for assessing the biosecurity risks associated with the import of a range of goods from overseas. Animal and plant imports must respect the Biosecurity Act 2015.

5.2 Food Safety

The Department of Agriculture Water and the Environment is also responsible for assessing risks involved with importing food into Australia. All food imported to Australia must undergo a risk assessment, as defined by Food Standards Australia New Zealand under the Imported Food Control Act 1992.

Conclusion

As much as Australia has managed to develop its primary sector to become one of the top 20 global food producers and exporters, its agricultural sector is still relatively small compared to countries like China, India, the United States and Brazil. However, despite the environmental and climate challenges facing Australian agriculture, the sector is resilient, and the prospects for the future are optimistic.

The ambition to increase Australia's farm-gate production from AUD 61 billion in 2020/2021 to AUD 100 billion by 2030 will require increased use of agricultural technologies by farmers. The rapid and significant adoption of national and international AgTech solutions is essential to promote productivity gains and to enable the expansion of the agricultural frontier.

Australia represents an ideal market for AgTech companies due to its favorable business environment, abundance of venture capital, investments and credit lines, and openness to foreign companies to investors. In addition, it is important to highlight that the Australian market is not yet saturated with AgTech companies and solutions and that the country has an important research and development infrastructure (CSIRO, universities, research centers, etc.) as well as a good intellectual property protection system.

The diversified production system, which ranges from arid and temperate agricultural systems to subtropical and tropical agriculture, provides an ideal testing environment for innovative technological solutions. Finally, it should be noted that Australia is also a good launching pad for other markets in the Asia-Pacific region.

The opportunities for the Brazilian company in the AgTech sector in Australia are many and varied. Key areas of interest where strong demand was identified include efficient water use, robotics, food traceability, and waste management and recycling.

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APPENDIX A

Rural Research and Development Corporations

Australia's Rural Research and Development Corporations (RDCs) have helped drive agricultural innovation since 1989. They allow Australian government and primary producers to co-invest in research and development to benefit industry and regional communities. The following table compiles the leading RDCs with a focus on agriculture and food:

Table 1: Rural Research and Development Corporations

Research Development Corporation	Focus areas	Website
Agrifutures	Training, profitability, emerging industries, and innovation All industries	https://www.agrifutures.com.au/
Wine Australia	Wine industry	https://www.wineaustralia.com/
CRDC – Cotton Research and Development Corporation	Cotton industry	https://www.crdc.com.au/
GRDC – Grains Research & Development Corporation (Australian Government)	Grain farming	https://grdc.com.au/

APPENDIX B

Cooperative Research Centres (CRC)

Australia's Cooperative Research Centres (CRC) support Australian industries' ability to compete and produce. This program helps industries to partner with the research sector to solve industry-identified problems through industry grants for collaborative research. The table below compiles the leading CRCs with a focus in agriculture and food:

Table 2: Cooperative Research Centres

CRC	Focus areas	Website
Bushfire & Natural HAZARDS CRC	Hazards, including bushfires, flood, storm, cyclone, heatwave, earthquake, and tsunami	https://www.bnhcrc.com.au
CRCHBP - Honey Bee Products	Honey production, pollination	http://www.crchoneybeeproducts.com
SOIL CRC	Soil management, Sustainability and Productivity	https://soilcrc.com.au/about
Food Agility CRC	Data-driven Digital Solutions for Agrifood	https://www.foodagility.com
Plant Proteins Cooperative Research Centre	Plant Proteins	https://www.plantproteincrc.com.au
CRC NA	Northern Australian industries	https://www.crcna.com.au
Fight Food Waste Cooperative Research Centre	Food waste, recycling, sustainability	https://fightfoodwastecrc.com.au
Future Food Systems	Agrifood innovation, productivity, resilience, and sustainability	https://www.futurefoodsystems.com.au

APPENDIX C

Incubators and Accelerators

Table 3: Incubators and Accelerators

Incubators & Accelerators	Website	E-mail
AgFrontier	https://agfrontier.com.au/	agfrontier@chdc.com.au
Agristart	https://www.agristart.com.au/	info@agristart.com.au
Chobani	https://chobaniincubator.com/	info@chobaniincubator.com
Cicada Growlab	https://growlab.cicadainnovations.com/	melissa@cicadainnovations.com
Gate	https://www.thegate.org.au/	thegate@dpi.nsw.gov.au
Muru-D	https://muru-d.com/	hi@muru-D.com
Rocket Seeder	https://www.rocketseeder.com/	emma.coath@rocketseeder.com
Sparklabs Cultiv8	https://www.sparklabscultiv8.com/	-
Sprout X	https://www.sproutx.com.au/	-
Startmate	https://startmate.com/	-
UNE Smart SRI	https://smartri.com.au/	info@smartri.com.au

APPENDIX D

Venture Capital and Private-Equity

Table 4(a): Venture Capital and Private-Equity

Name	Type	Investments	Website
Artesian	Pre-seed, Seed and Early Stage	Data Farming, FarmLab, Fresh Supply Co, Laconik, Platfarm, Regrow, Swarm Farm, eBottli	https://www.artesianinvest.com/
Muru	Pre-seed	AgriWebb, FarmBot, Farmsave, FloodMapp, Regrow, Zetifi	https://muru-d.com/
Main Sequence Ventures	Seed and Early Stage	Lumachain, Nourish Ingredients, Rapid Aim, RegrowAg, v2Food	https://muru-d.com/
Tenacious Ventures	Early Stage	GoTerra, Rapid Aim, Swarm Farm, Vow Food	https://tenacious.ventures/
SparkLabs Cultiv	Seed	BioScout, Black Box Co, Future Feed, Zetifi	https://www.sparklabscultiv8.com/
Grok Ventures	Seed and Early Stage	Fable Foods Co, GoTerra, Soil Carbon Co, Vow Food	https://grok.ventures/
BlackBird	Seed and Early Stage	Fable Foods Co, Heuros, Vow Food	https://blackbird.vc/
Starmate	Pre-seed	Beyond Ag, Bioscout	https://www.startmate.com/
SquarePeg	Early Stage	AgriDigital, Vow Food	https://www.squarepegcap.com/
Stray Dog Capital	Seed	Deliciou,Grounded Foods Co	https://straydogcapital.com/

Table 4(b): Venture Capital and Private-Equity

Name	Type	Investments	Website
CSIRO	Seed	Digital Agriculture Services, Future Feed	https://www.csiro.au/
Australian Government	Grants	Rubens, Swan Systems	https://www.agriculture.gov.au/ag-farm-food/innovation/grants
BridgeLane Group	Seed & Early Stage	Agerris, Sprout Stack	https://bridgelane.com.au/
KKR Co.	Private Equity	Green Collar, Sundrop Farms	https://www.kkr.com/
Horizon Ventures	Seed & Early Stage	Soil Carbon Co, v2Food	https://horizonsventures.com/
CEFC-CLEAN Energy Finance Corporation	Early Stage	AgriWebb, Soil Carbon Co	https://www.cefc.com.au/
Queensland Government	Grants	Natural Evolution, Swarm Farm	https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/agribusiness/one-stop-service/support/funding-grants

APPENDIX E

Companies and potential clients/partners by segment

Table 5(a): Companies and potential clients/partners by segment

Name	Segment	Website
Agerris	Broadacre Productivity	https://agerris.com/
Data Farming	Broadacre Productivity	https://www.datafarming.com.au/
Laconik	Broadacre Productivity	https://www.laconik.com.au/
PairTree	Broadacre Productivity	https://pairtree.co/
Platfarm	Broadacre Productivity	https://www.platfarm.com/
PrecisionAG	Broadacre Productivity	https://www.precisionag.com/
RapidAIM	Broadacre Productivity	https://rapidaim.io/
Regrow	Broadacre Productivity	https://www.regrow.ag/
Swarm Farm	Broadacre Productivity	https://www.swarmfarm.com/
Australian Plant Proteins	Cellular Agriculture / Plant-based Meats	https://approteins.com.au/
Change Foods	Cellular Agriculture / Plant-based Meats	https://www.changefoods.com/
Fable Food Co.	Cellular Agriculture / Plant-based Meats	https://fablefood.co/
Grounded Foods	Cellular Agriculture / Plant-based Meats	https://groundedfoods.com/
Heuros	Cellular Agriculture / Plant-based Meats	https://www.heuros.com/
Nourish Ingredients	Cellular Agriculture / Plant-based Meats	https://nourishing.io/
v2Food	Cellular Agriculture / Plant-based Meats	https://v2food.com/
Vow	Cellular Agriculture / Plant-based Meats	https://www.vowfood.com/

Table 5(b): Companies and potential clients/partners by segment

Name	Segment	Website
ByteFix	Connectivity / IoT	http://www.bytefix.net
CPU Australia	Connectivity / IoT	http://cpu-australia.com
FarmSimple	Connectivity / IoT	http://www.croppaco.com
Zetifi	Connectivity / IoT	https://zetifi.com
AXG Australia	Crops	https://www.xagaustralia.com.au/jetseed
CroppaCo	Crops	FarmSimple - https://www.croppaco.com/
Seed Terminator	Crops	https://www.seedterminator.com.au/
Drone That	Crops / Horticulture	http://dronethat.com.au
Precision Pastures	Crops / Horticulture	http://precisionpastures.com.au
Sundrop Farms	Crops / Horticulture	https://www.sundropfarms.com/
Telopea Group	Crops / Horticulture	http://telopea.org
Zondii	Crops / Horticulture	http://zondi.com
Foodbomb	Efficiencies in Distribution	https://www.foodbomb.com.au
HiveXchange	Efficiencies in Distribution	https://hivexchange.com.au/
Ordermentum	Efficiencies in Distribution	https://www.ordermentum.com/
eBottli	Food Traceability	https://www.ebottli.com/
Fresh Supply Co	Food Traceability	https://freshsupplyco.com/
Lumachain	Food Traceability	https://lumachain.io/
Beyond Ag	Food Waste and Recycling	https://www.beyondag.com/
GoTerra	Food Waste and Recycling	https://goterra.com.au/
Natural Evolution	Food Waste and Recycling	https://www.naturalevolutionfoods.com.au/
Rubens Technology	Horticulture	https://rubenstech.com/
Sprout Stack	Horticulture	http://sproutstack.co/
Farmlab	Horticulture	https://www.farmlab.com.au/
ManyBusyHands	Job Seeking / Workforce	http://manybusyhands.com

Table 5(c): Companies and potential clients/partners by segment

Name	Segment	Website
Agersens	Livestock	https://agersens.com/
AgMesh	Livestock	https://agmesh.com.au/
Black Box Co.	Livestock	https://www.blackboxco.com.au/
Ceres Tag	Livestock	https://www.cerestag.com/
CSIRO / Ceres Tag	Livestock	https://www.cerestag.com/
CSIRO and Agersens /eShepherd	Livestock	https://www.agersens.com/
DIT AgTech	Livestock	https://ditagtech.com.au/
FeedXL	Livestock	http://feedxl.com
Maia Technology	Livestock	https://www.maiagrazing.com/
NSW DPI and UNE	Livestock	https://invasives.com.au/research/wild-dog-alert/
Optiweigh	Livestock	http://optiweigh.com
ProAgni	Livestock	https://proagni.com/
Red8 Produce	Livestock	http://www.red8produce.com.au
Resurrect Refugia	Livestock	http://www.resurrectrefugia.com
Smart Foal	Livestock	https://smartfoal.com/
SmartShepherd	Livestock	http://www.smartshepherd.com.au
Wynergy	Livestock	http://wynergy.com.au
Ag360	Livestock /Crops / Horticulture	http://askbill.com.au
Paragon	Livestock /Crops / Horticulture	http://www.ablgreen.com
Crawford Boots	Productivity / Robotics	http://crawfordboots.com.au
IRTech	Productivity / Robotics	http://irtechglobal.com
MultiTrakPro	Productivity / Robotics	http://www.multitrakpro.com.au
Bioscout	Productivity / Robotics	https://www.bioscout.com.au/
DAS Digital Agriculture	Resilience, Natural Hazards, and Insurance	https://digitalagricultureservices.com/

Table 5(d): Companies and potential clients/partners by segment

Name	Segment	Website
FloodMap	Resilience, Natural Hazards, and Insurance	https://www.floodmapp.com/
AXIchain	Sales and Trading	https://www.axichain.io/trader.html
Farmgate Auctions	Sales and Trading	https://farmgateauctions.com.au/
LIVEstock Pricing	Sales and Trading	https://livestockpricing.com.au/features-faqs/
Secure Impact	Sales and Trading	https://www.secureimpact.com.au/
Future Feed	Sustainability	https://www.future-feed.com/
Green Collar	Sustainability	https://greencollar.com.au/
Soil Carbon Co.	Sustainability	https://www.soilcarbon.co/
AgriDigital	Trading and Supply Chain Management	https://www.agridigital.io/
Agriwebb	Trading and Supply Chain Management	https://www.agriwebb.com
Agworld	Trading and Supply Chain Management	https://www.agworld.com/au
Geora	Trading and Supply Chain Management	https://www.geora.io/
AquaTerra	Water management	https://aquaterra.cloud/index.html
Farm Monitoring Solutions	Water management	https://farmmonitoringsolutions.com.au/
Farmbot	Water management	https://farmbot.com.au/
Observant	Water management	https://observant.net/
Swan Systems	Water management	https://www.swansystems.com.au/
UbiBot Australia	Water management	https://ubibot.com.au/

About

SCIENCE, TECHNOLOGY AND INNOVATION PROMOTION SECTORS (SECTECS)

Itamaraty has 54 sectors which are specialized in science, technology and innovation (SECTECs) in its posts abroad, in addition to regional representative offices of the Ministry of Foreign Affairs in several Brazilian capitals. The SECTECs act in order to prospect opportunities for cooperation and project the potential of the Brazilian system of science, technology and innovation.

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Innovation Diplomacy Program

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