



Australian Government

Australian Trade and Investment Commission



# AUSTRALIA: SHAPING THE FUTURE OF FOOD AND AGRICULTURE

Opportunities for investment and  
partnership in Agriculture 4.0





Sugar cane farmland, Australia

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Researcher sampling pollen in a field of flowers



# AUSTRALIA: A GLOBAL HUB FOR AGRICULTURE 4.0

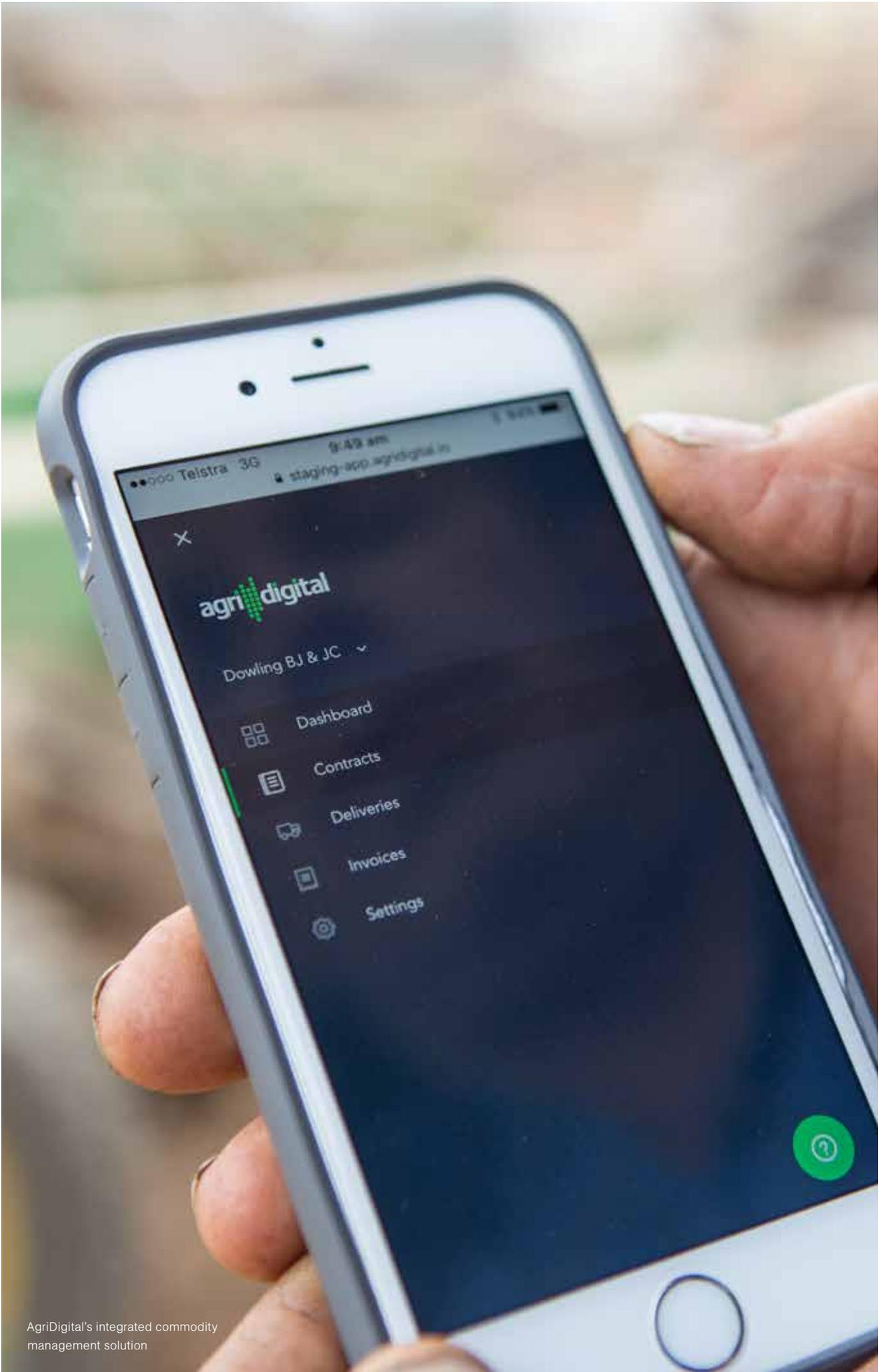
**Australia has captured the world's attention for its pioneering efforts in agriculture and food production, delivering savvy solutions to global challenges.**

The Australian agricultural sector has always been hungry for innovation to drive productivity and value.

Building on this strong record of innovation, the country is emerging as a hub for Agriculture 4.0 – the next generation of technologies set to revolutionise the agriculture and food sector.

Australian developments in robotics, remote sensing and machine learning, as well as bioscience, novel farming techniques, and food innovation and processing, are driving disruption across the global food supply chain.

These technologies are ensuring a more profitable, efficient, safe and environmentally friendly local industry with flow-on benefits to international partners and markets.



AgriDigital's integrated commodity management solution

# ADDRESSING GLOBAL TRENDS AND CHALLENGES

**On a global scale, the food and agriculture sector is seeking sustainable solutions to increase production, combat the effects of climate change and respond to increasingly complex consumer demands.**

Living in one of the world's driest regions, Australian producers are well known for their ability to 'do more with less.' They have successfully created and used innovative solutions to respond to a tough physical environment. Australian innovations include developing crops resilient to salinity and drought, implementing robust irrigation solutions and integrating technology that can predict and optimise farm production.

Australians' ingenuity and appetite to trial and adopt technology have contributed to the agriculture sector's

average productivity growth rate of 2 per cent per annum over the last 10 years.<sup>1</sup> This has also enabled Australia to take its place as a leading exporter, exporting two-thirds of its agricultural production.

Australia is ranked sixth out of 113 countries in the Economist Intelligence Unit's 2018 Global Food Security Index.<sup>2</sup> The country's reputation as a source of clean, green and safe products has helped secure its foothold in Asian markets, home to a rapidly growing middle class seeking healthy, nutritious food. It also provides a strong foundation for developing groundbreaking food products and processing technologies which respond to a variety of consumer tastes and needs.

In addition, Australian supply chain solutions and digital marketplaces are helping meet consumer demand for food traceability and convenience by providing transparent transactions in real time.

## Why Australia?

There are compelling reasons why Australia is a trusted partner in Agriculture 4.0.



## Realising the potential of Agriculture 4.0

While Australia is already the 12th largest exporter of agriculture products in the world,<sup>3</sup> the local industry and government recognises there is room to grow. The National Farmers' Federation aims to increase Australia's agricultural output to A\$100 billion by 2030.<sup>4</sup>

To meet this target, the Australian Farm Institute believes the adoption of digital technologies will be the next key advancement in productivity – realising the potential of Agriculture 4.0 could boost the value of production by A\$20.3 billion.<sup>5</sup>

Understanding this potential, Australian governments are investing to support the local agtech and foodtech ecosystem.



Made by Cow's raw milk is guaranteed to be safe to drink.

### INNOVATING TO MEET MARKET TRENDS

Australian firms are developing new processing technologies to differentiate and produce premium products. Australian dairy producer **Made by Cow** has developed the world's first raw milk that is guaranteed to be safe to drink, using a patented cold-pressing technique approved by the NSW Food Authority. The technique eliminates harmful bacteria while retaining more nutrients and flavour, and results in a longer shelf life than milk from standard heat pasteurisation processes.



Monash Food Innovation Centre provides access to the latest research, technology and innovation development services.

### INVESTING IN AN ELITE FOOD INDUSTRY

**Monash Food Innovation (MFI)** is a university-based Centre of Excellence working with international partners such as China's biggest food company, state-owned COFCO Corporation, and multinational food and beverage organisations. The Centre started as an investment by Mondelez International and the Victorian Government, with the aim of accelerating new innovations to market so Australian food and agribusiness companies can take advantage of local and export opportunities.

Since its establishment, MFI has assisted over 2,500 food and agribusiness organisations in Australia and Asia, from developing their innovation capabilities to accelerating development. MFI works with industry and research partners to provide access to the latest research, technology and innovation development services. Its capabilities include world-class design and visualisation facilities for product and packaging, including 3D printing and virtual reality, and research capabilities in food engineering, nutrition and food chemistry.

MFI is one of a number of innovation centres around Australia catering to the food and agribusiness industry, offering cutting-edge facilities and access to world-class researchers and industry practitioners to provide partners with a competitive edge globally.

# Drivers of Agriculture 4.0

There are several factors driving agtech and foodtech solutions at all stages of the food supply chain.



Scanning wine using the Oziris mobile app to authenticate the product, track delivery and product information, and trace it back to where and when it was produced.



InterGrain researcher inspecting the quality of the company's noodles

# A THRIVING AGTECH AND FOODTECH SECTOR

**The close relationship between farmers, industry and research institutions drives innovation and creates dynamic investment and collaboration opportunities for international enterprises. Australia's estimated 300 agtech and foodtech enterprises<sup>6</sup> are developing globally relevant solutions which are attracting international interest.**

## The startup scene

Australian startups looking to impact global markets are securing funding from global investors, often alongside local players. Recent examples include the following:

- ▶ Australian farm management software provider AgWorld has attracted A\$11.5 million to date from Reed Elsevier Ventures (UK), Syngenta Ventures (US) and Yuuwa Capital (Australia).
- ▶ Irrigation solution specialist Observant was purchased by Jain Irrigation (India).
- ▶ Livestock herd management software AgriWebb secured a A\$14 million Series A raise from UK investment firm Wearsheaf Group.
- ▶ The Yield, which offers Internet of Things (IoT) microclimate decision support for aquaculture and agribusiness, has raised capital from investors such as Europe's the Bosch Group, AgFunder (US) and KPMG (Australia).

The Yield, alongside cloud-based commodity management platform AgriDigital and wearable pedigree tracking system SmartShepherd, also received international recognition at the 2018 AgFunder Innovation Awards.<sup>7</sup>

International accelerators like Asia's SparkLabs are also investing in Australian accelerators and their startups. Australia is home to 15 agtech and foodtech incubators and accelerators spanning urban, regional and rural centres, underpinned by corporate, research

and government sponsors. Accelerators like GrowLab, SproutX and SparkLabsCultiv8 are attracting a mix of local and international startups keen to access the natural advantages and collaborative environment that Australia offers.



SwarmFarm's SwarmBot platform.

## PRODUCER-LED INNOVATION

Enterprising Australian farmers are creating solutions to problems the marketplace does not cater for. Developed by a grain and cattle farmer, **SwarmFarm's** SwarmBot platform enables farmers to deploy technology into their farming systems through the use of 'swarms' of smart, mobile and automated robots. Similarly, the founders of **AgriDigital** drew on their knowledge of the grain industry to develop a cloud-based, multi-participant commodity management platform that helps ensure farmers get paid in real time.

Industry support for producer-led innovation includes the **Fisheries Research and Development Corporation's** Fish-X mentorship program, which provides tools and support to help fishers, researchers and business to test and develop their ideas. Graduates includes **Deckhand**, whose electronic logbook allows fishers to submit their statutory catch and effort data automatically.

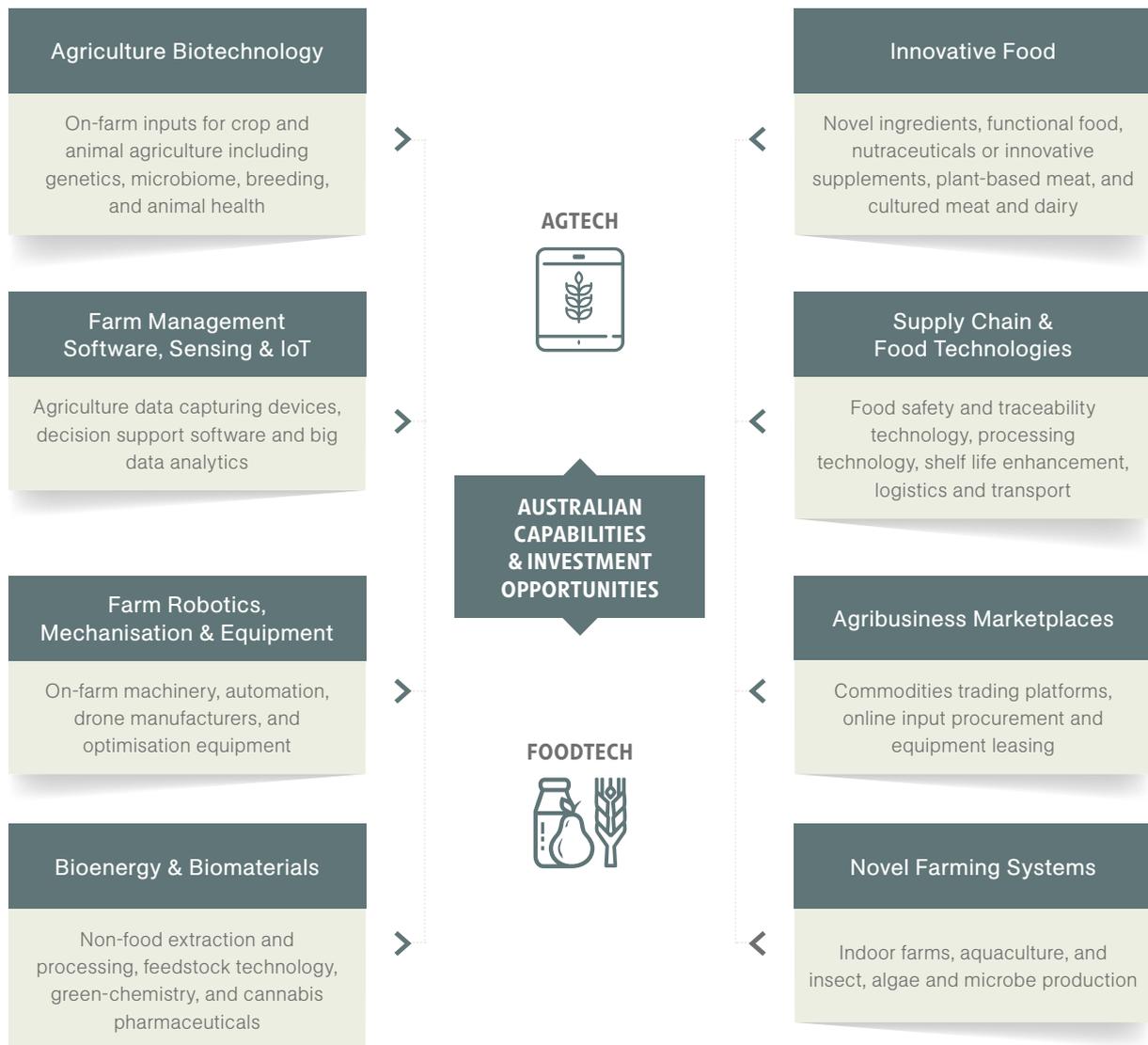
## Opportunities for international firms

While Australia's venture capital market has expanded substantially in recent years – having doubled in total size from 2016 to 2017 alone<sup>8</sup> – there are still plenty of opportunities for international investors in Australia.

In addition to private investors looking for a commercial stake in new technologies, Australia offers solutions and partnership opportunities to uplift the value of existing operations, improve efficiencies and meet changing consumer demand. Examples include:

- › Food manufacturers seeking to source novel ingredients or processing innovation that will help differentiate their products.
- › Multinational corporations looking to leverage Australian expertise and build capacity and presence in global supply chains from Australia.
- › Enterprises and nations seeking education, equipment and technology services in agricultural production and food innovation to build their own capability.
- › Technology businesses seeking opportunities to trial and further develop their solutions in a varied environment.

## Australian capabilities and investment opportunities



Source: Capability categories adopted from AgFunder, AgFunder 2017 Year in Review report



Water tank monitor in Armidale, NSW.

## CONNECTING IN SPACE

A global leader in nanosatellite technology and Internet of Things (IoT) connectivity, Australian business **Myriota** is making life easier for agricultural companies worldwide; automating processes that were once manual and creating connections to assets anywhere on the planet.

In the process of creating its Earth orbit constellation of 50 nanosatellites – each the size of a shoebox and weighing less than 10 kilograms – Myriota’s cost-effective and battery-friendly technology is scalable and suits a vast array of applications. From tracking the health of oceans to monitoring rainwater tank levels and livestock locations, agricultural assets can be tracked and their location, status and condition communicated.

Myriota is levelling the playing field for regional and rural businesses, opening up the possibility of asset monitoring to the 90 per cent of the world without wi-fi coverage.

Myriota raised US\$15 million in 2018 from Australian venture capital firms Main Sequence, Right Click Capital and the South Australian Venture Capital Fund, along with Singtel Innov8 (Singapore) and Boeing HorizonX Ventures (the latter’s first investment outside of the US).<sup>9</sup>



Australian scientists undertake leading-edge food and agricultural R&D

# RESEARCH EXCELLENCE

**International companies have many opportunities to collaborate with Australia's world-renowned universities and research institutions on leading-edge research and development (R&D) projects with strong commercialisation potential.**

R&D in Australia is characterised by:

- › **High levels of investment:** Australia invests around A\$1.8 billion in agricultural R&D and extension each year. Of this, A\$500 million is invested each year in Rural Research and Development Corporations, Australia's dedicated agricultural research bodies. The Australian Government provides an additional A\$430 million for agricultural research. State and territory governments are estimated to invest another A\$250 million per year, particularly in applied R&D, and the private sector an estimated A\$620 million in agribusiness R&D investment.<sup>10</sup>
- › **World-leading academic research:** Australia has the third highest number of universities in the world's top 100.<sup>11</sup> The agricultural research of 24 Australian universities is rated as world-class and above.<sup>12</sup> In terms of IP commercialisation, agricultural research generates the second largest source of income for Australian universities, behind only medical and health sciences.<sup>13</sup>
- › **A national science agency with a strong focus on commercialisation:** The Commonwealth Scientific and Industrial Research Organisation (CSIRO) is the country's largest patent holder, with over 3,600 individual patents, and has a formidable track record of converting research into globally adopted commercial opportunities. It ranks in the top 0.1 per cent for agriculture, plant and animal science citations.
- › **Dedicated food and agriculture innovation hubs:** Australia has agriculture and food innovation hubs in most states and territories. Covering everything from food research to field robotics, they provide a wide array of commercial partnership opportunities.



RDCs work to support Australia's rural industries.

## RURAL RESEARCH AND DEVELOPMENT CORPORATIONS

Australia's **Rural Research and Development Corporations (RDCs)** invest in research and in some cases marketing to support the profitability, sustainability and competitiveness of Australia's rural industries. Funded by industry levies and a government contribution for R&D, these 15 organisations span Australia's diverse agricultural industries, from cotton, grains and red meat to fisheries, horticulture and pork. Collectively, the RDCs have spent A\$3.3 billion over the last decade, and helped double industry productivity over the past 25 years.<sup>14</sup> RDCs have been responsible for creating innovations such as multi-scale monitoring tools used for managing Australian crops that utilise the latest imaging and robotics to predict fruit quality and monitor fruit tree health.



Distinguished Professor James Dale, lead researcher on the 'super bananas' project.

## CREATING 'SUPER BANANAS'

**Queensland University of Technology's Centre for Tropical Crops & Biocommodities** has developed Cavendish bananas resistant to the TR4 disease devastating crops across Asia.

The team has also garnered international support, including from the Bill and Melinda Gates Foundation and the UK Government's Department for International Development, to lead the development of a cooking banana rich in pro-vitamin A. The 'super banana' project aims to improve nutrition and prevent vitamin deficiency in Uganda, where bananas are a staple food. The project is a collaboration with the National Agricultural Research Organisation of Uganda, which is part of the Ugandan Government.



CSIRO's CottASSIST tool can be used by cotton growers and consultants to assist with cotton management decisions.

## CSIRO AND AUSTRALIA'S COTTON INDUSTRY

Australian cotton has the highest yields in the world. Since 1984, Australia's **CSIRO** has developed 113 cotton varieties in Australia which offer high yields, excellent quality fibre and outstanding resistance to disease. CSIRO varieties are now used throughout the industry and have underpinned the success of Australia's cotton industry.

Combined with advanced irrigation techniques and water conservation and management solutions, the Australian cotton industry has increased productivity by more than A\$5 billion, reduced insecticide use by up to 85 per cent, cut herbicide use by around 52 per cent and significantly reduced water use over the last decade.<sup>15</sup>

# AN IDEAL TEST MARKET

## Australia's counter-seasonal environment to the Northern Hemisphere means companies can develop and trial solutions all year round.

Australia's diverse soil types and climates, high-quality raw materials and ingredients, and a multicultural population allow businesses and organisations to research and develop solutions relevant to their markets.

The country's proximity to Asian markets and strong trading ties also create a competitive advantage for international firms looking to meet the food demands of this growing and changing population. Australia's free trade agreements facilitate the smooth flow of agricultural exports to key Asian markets. These ties offer significant opportunities to collaboratively develop, commercialise and scale innovative food and agriculture science and technologies.

### Australia's access to growth markets



# STRONG GOVERNMENT SUPPORT FOR RESEARCH AND DEVELOPMENT

## Australian governments fund a range of incentives and provide robust infrastructure to support food and agriculture innovation.

The Australian Government's R&D Tax Incentive reduces the cost and risk of undertaking R&D activities. Available to companies for eligible expenditure on R&D, the benefit varies depending on the turnover of the business. It ranges from a non-refundable 38.5 per cent tax off-set for large business, to a 43.5 per cent refundable tax off-set for small-to-medium business (aggregate turnover less than A\$20 million).

Australian governments at local, state and national levels offer a range of grants and pilot programs to encourage innovation, entrepreneurship and commercialisation of new opportunities.<sup>16</sup> The Australian Government programs strongly encourage collaboration including with international partners.

These include:

- › The Australian Government's Accelerating Commercialisation<sup>17</sup> grant provides access to expert guidance and financial assistance to help businesses commercialise their novel products, processes and services.
- › The Australian Research Council's Linking Projects scheme<sup>18</sup> promotes national and international collaboration and partnerships between key stakeholders in research and innovation including higher education, government, business, industry and end-users.
- › The Cooperative Research Centre (CRC) program<sup>19</sup> funds industry-driven collaborative research programs for up to 10 years. CRCs frequently involve international partners, and IP from CRC research can be commercialised with industry partners. CRCs focused on the agriculture industry include Food Agility and Fight Food Waste. Proposed centres include Future Food Systems and the CRC for the Blue Economy.

- › The Industry Growth Centre Food Innovation Australia Ltd (FIAL), focused on commercially driven collaboration and innovation, offers matched funding of over A\$100,000 to support collaborative innovation<sup>20</sup> efforts between small and large businesses in the food and agribusiness sectors.



Cow tags utilising SBAS are being trialled for livestock management.

## BUILDING WORLD-LEADING SATELLITE POSITIONING CAPABILITY

The Australian Government is funding the development of an Australian Satellite-Based Augmentation System (SBAS) and upgrading supportive on-the-ground infrastructure, led by **Geoscience Australia**. These changes aim to improve coordination across government and the private sector and capitalise on Australia's geographical advantage as one of the few countries in the world with high visibility to six Global Navigation Satellite Systems (GNSS). Once operational, it is expected that positioning accuracy will be within 10 centimetres across Australia's land and seas, and three to four centimetres where there is mobile phone coverage, greatly enhancing precision agriculture technologies.

# HOW AUSTRADE CAN HELP

The Australian Trade and Investment Commission (Austrade) helps companies around the world to identify and take up investment opportunities in Australia as well as to source Australian goods and services. Our assistance includes:

- › providing insight on Australian capabilities
- › identifying potential investment projects and strategic alliance partners
- › helping you identify and contact Australian suppliers.

Working with an industry and government taskforce under the banner 'Australia for Agriculture 4.0',

Austrade is showcasing Australia's competitive advantages in agtech and foodtech to a global audience and helping to facilitate connections.

Visit [austrade.gov.au/agriculture40](https://austrade.gov.au/agriculture40) for the latest news, case studies, events and resources and discover how we can help you and your business connect with Australia.

## Relevant associations

The Australia for Agriculture 4.0 initiative is supported by Australia's leading government agencies, businesses and universities. For a full list of associated organisations, go to [austrade.gov.au/agriculture40](https://austrade.gov.au/agriculture40)

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