POWERING GROWTH

REALISING THE POTENTIAL OF AGTECH FOR AUSTRALIA
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In agriculture, aided by technology, Australia is moving in the right direction. This report highlights some important initiatives and leading companies and organisations from around the country doing world-class work to build the AgTech sector here.

Australia has its roots in the agriculture, both literally and figuratively. We owe much of our prosperity to the hard work and determination of generations of drovers and planters, shearers and growers. Our nation takes pride in its farmers, regional centres and national produce.

Right now the industry stands at a crossroads. As with most sectors, technology has surged into agriculture, pushing aside well-worn practice, challenging long-held assumptions and upending our understanding of what is normal as well as what is possible.

This is not the first time agriculture has been fundamentally altered by technology. Modern farms would be unrecognisable to those who worked the land just 100 years ago. Whether through machinery, fertiliser, pesticides, genetic modification or even the development of the plough - agriculture has been continuously reinvented for thousands of years.

We are now presented with a series of choices for the future. Automation, artificial intelligence, ubiquitous high-speed communication, drones, big data, interconnected machinery, and cloud analytics offer us the opportunity to further our mastery of agriculture. Technology promises improved productivity, quality and yield, enhanced sustainability, reduced wastage and the ability for farmers to make better decisions. It also offers an important opportunity for the economic benefits of technology to bring prosperity to rural communities.

The economic benefits on offer if we can boost our agricultural output are very real. Australia is a major food exporter, with more than half of what we produce being sold to customers overseas.

As populations in Asia and Africa become wealthier, demand will continue to surge for the kinds of high quality agricultural goods we produce. Australia’s aspiration to be a food bowl for Asia will be helped enormously by technology.

At the same time, agriculture offers a rich opportunity for developing high-growth technology businesses that have the potential to bring Australian AgTech solutions to a global market. As a leader in agriculture, Australia can work to become a leader in the next wave of technology that underpins it too. Global competition from places like Israel, the US and the UK is strong - they too see the benefits AgTech can deliver and have moved fast to become leaders.

This document aims to help guide a productive conversation about AgTech in Australia. It explores the scope of the opportunity, identifying that with global food production needing to increase 70% by the year 2050, agriculture is predicted to become Australia’s next $100bn industry by 2030. It goes on to outline some areas of strength for Australia, drawing on both domestic experience and international context. The report concludes by offering recommendations on how we can work together to best position Australia as a key player in the global AgTech industry.

Agriculture plays a central role both in Australia’s economy and its national identity. It has always been a strength and passion of ours. This document provides important thought leadership on how to nurture the technology that will help Australian agriculture remain world-leading in the years ahead. I commend it to you.

Andrew Robb was Australia’s Federal Minister for Trade and Investment from 2013-2016. Andrew entered Parliament in 2004, having previously served as Executive Director of both the National Farmers’ Federation and Cattle Council of Australia. He is currently the Chair of Melbourne-based tech startup CNSDose.
This report has been commissioned by StartupAUS in collaboration with KPMG, CBA and the Queensland Government. It outlines the current state of play of Australian AgTech and agriculture more broadly, analyses the lessons we can learn from global AgTech leaders and provides recommendations to support a productive and focused conversation about the future of AgTech in Australia. It is not intended to be a comprehensive view of all AgTech activities and players.

**SCOPE OF RESEARCH**

**AGTECH ECOSYSTEM IN AUSTRALIA**

This report outlines:
- The role of technology in agriculture;
- The current AgTech landscape in Australia;
- The necessary conditions to establish a successful AgTech ecosystem;
- The key opportunities and challenges in developing an AgTech sector in Australia; and
- Recommendations for key stakeholders to establish a successful AgTech ecosystem in Australia.

**APPROACH UNDERTAKEN**

The following activities were conducted to obtain research and findings to support this document:
- Discussions with more than 60 stakeholders including AgTech startups, farmers and agribusinesses, research bodies, government and investors. A list of participants and contributors is provided in the Appendix;
- Detailed case studies on a sample of key stakeholders across the industry;
- Desktop research.
EXECUTIVE SUMMARY
AgTech Opportunities and Challenges

**Opportunities**
- Global opportunity for AgTech from the private sector estimated to be approximately US$189 billion between 2013 and 2022.
- Global venture capital in AgTech worth US$1.5 billion and growing rapidly
- Agriculture to become Australia’s next $100 billion industry by 2030

**Challenges**
- Sustainable use of resources
- Adoption and research impact
- New export and commercialisation
- Creating jobs
- Data security & ownership
- Attracting new investment
- Increase revenue
- Attracting private investment
- Improve productivity
- Focus, alignment & leadership
- Collaboration
- Access to talent
- Capitalisation
- Connectivity
- Direction

**Recommendations**
- Improve productivity
- New export
- Increase revenue
- Create jobs
- Attract new investment
- Sustainable use of resources
- Collaboration
- Data security & ownership
- Adoption
- Focus, alignment & leadership
- Connectivity
- Attracting private investment
- Research impact
- Commercialisation
- Access to talent
This report aims to uncover the opportunities for Australia in the emerging market of pre-farm gate digital technology.

AgTech is defined as the collection of digital technologies that provide the agricultural industry with the tools, data and knowledge to make more informed and timely on-farm decisions and improve productivity and sustainability.

Modern AgTech sets itself apart from the ongoing historical technological contribution to agriculture because of the speed with which the technology can scale and reach a global market.

Biotechnology and gene technology are related fields, but are not covered here.
WHY AGTECH?

A value chain exists that encompasses the very first input into production of our food and continues all the way through to the customer. The customer ultimately drives change by providing the demand for various types of food, the source of food, how food is delivered and limitation of wastage. Improved connectedness across each link of this chain will enable farmers to be better able to provide a sufficient and sustainable food supply to meet customers’ needs.

AgTech, biotech, genetech, foodtech, and food ecommerce are all important elements of the integrated value chain. AgTech specifically, though, operates almost exclusively in the initial input and production phases.

WHY FOCUS ON PRE-FARM GATE AGTECH?

- Directly contributes to a more productive, sustainable and customer focused industry
- Potential for AgTech to be a new competitive advantage for Australia as exporters and producers
- Contributes to more effective use of inputs on farm and reduces food wastage
- Relatively immature development and adoption
- Growing global investor community

Growing global investor community
EMERGENCE OF AGTECH

1700
Labour intensive farming techniques.

1794
Thomas Jefferson's plow with moldboard tested.

1862
American agriculture revolution with the change from manual labour to horses.

1868
Steam tractor tried.

1892
First gasoline tractor built.

The tractor and technology continued to evolve over the years, with a major breakthrough in late 2000s with a microchip / GPS capability.

The pace of change in digital technology has rapidly increased. For example, some technologies that have emerged to support AgTech include sky muster, weather support, remote sensors, RFI tags, GPS, remote gate release, remote pump switches, smart phones and wearables.
OPPORTUNITIES FOR AUSTRALIA

ATTRACTION INVESTMENT
Investors are looking to capture value from technological innovation.
In 2015, AgFunder noted that global venture capital investments alone reached $1.5 billion across drones/robotics, decision support technology, irrigation/water, smart equipment/hardware and food safety/traceability. This is up 336% compared with the VC investment in 2014. Beyond this there is increasing public and private sector funding through self-funded startups, large corporates and angel investors. Australian AgTech investment has been much more limited. There is an opportunity to leverage our world-class research and powerful agricultural brand to greatly increase investment into Australian AgTech startups.

GLOBAL MARKET OPPORTUNITY
The global opportunity for AgTech’s impact in the private sector is estimated to be as much as US$189 billion between 2013 and 2022. This figure includes asset at utilisation, employee productivity, supply chain and logistics efficiencies, improved customer experience and increased innovation returns.

AGRICULTURE AS AN OPPORTUNITY FOR STARTUPS
Research suggests that tech startups could add up to $109 billion to GDP along with creating 540,000 jobs by 2033. For startups to achieve that level of contribution, they need industries where innovations can provide significant value. Australian agriculture is just that: a high value core national industry with significant potential for innovative impact.

SUPPORTING AUSTRALIAN AGRICULTURAL AMBITION
By 2050, the earth’s population is projected to reach 9 billion. The Food and Agriculture Organisation of the UN (FAO) predicts food supply will need to increase 60% to meet global demand.
It is expected that 85% of this production increase will be driven by increased yields and cropping intensity, highlighting the critical role of agricultural technologies.
The NFF predicts the value of Australia’s agriculture sector will almost double in the next 15 years, creating Australia’s next $100 billion industry.

EXPORTING AGTECH
Australian high tech exports rose US$1.44 billion from 2009 to 2014, or 44.3%.
In the same period, high tech as a percentage of manufactured exports rose from 11.9% to 13.6%.
AgTech has the potential to be a leading source of technological manufacturing, exporting high tech products to a global agricultural market in need of innovative solutions to meet exploding demand for food.

ELIMINATING WASTAGE
AgTech can play a key role in ensuring sufficient and appropriate food supply helping to reduce Australia’s food wastage which has an estimated cost of $8 billion annually, representing 4 million tonnes of produce.
AgTech can reduce the impact of weeds on farms and in waterways which cost the Australian agricultural industry $1.5 billion in weed control and a further $2.5 billion in lost production.
The following industry themes are driving change and the opportunity for AgTech globally.

**INCREASING POPULATION AND PROSPERITY**
An increase in population, combined with the rapid growth of a vastly increased global middle class, will lead to increased demand for a rich diet with more calories, protein, processed food and customised products.

**CLIMATE CHANGE**
Climate change is likely to have a negative impact on agricultural yield, particularly in drought-prone regions.

**CHANGE IN DEMOGRAPHIC TRENDS**
With rising middle class prosperity comes a shift in food consumption patterns. Wealthy consumers are increasingly choosing diets made up of high-value, low volume, agriculturally intensive foods.

**INCREASING COSTS**
The cost of inputs (fertiliser, seeds and herbicides) and labour are making farming more expensive.

**DEPLETING NATURAL RESOURCES**
As we deplete natural resources we will need to rely more heavily on productivity increases to boost output.

**CHANGE IN CONSUMER TASTES AND DIETARY NEEDS AND WANTS**
Customers are increasingly demanding locally grown, sustainable food.

**SUSTAINABLE USE OF RESOURCES**
Improve the sustainability of land and water through technologies that, for example, reduce chemical use, improve land mapping and enhance water management.

**NEW EXPORT**
Opportunity to develop a new export market, allowing Australia to provide expertise and technology to overseas markets.

**INCREASE REVENUE**
A connected value chain story means confidence in food safety and traceability is increased. Higher confidence in the quality of a product can create value in the marketplace.

**IMPROVE PRODUCTIVITY**
Improve productivity on-farm in yields as well as increased asset efficiency.

**CREATE JOBS**
Create jobs with entrepreneurs and new players joining the agricultural industry. This includes leveraging skills from other industries such as mining and attracting new talent and economic growth to regional Australia.
POSITIVE BRAND
Clean, green and safe reputation. Australia also has unique offerings thanks to endemic species and a strong, positive provenance story.

QUALITY RESEARCH
Research centres and universities are producing quality research and AgTech solutions. The Australian Government provided $306 million of R&D support to agriculture between 2015-2016, of which $252 million was allocated to rural research programs. Australia’s producer support is relatively low (1.3% of gross farm receipts in 2015, compared with the USA at 9.4% and the EU at 18.9%).

PROXIMITY TO ASIAN MARKETS
Significant demand for Australian products is emerging in Southeast Asia which drives a strong export opportunity.

VARYING CLIMATES AND COMMODITIES
Australian agriculture operates in varied climates and produces a wide variety of products across horticulture, aquaculture, livestock, tropical fruits, broadacre, wool, cotton, wine and more.

INDUSTRY WITH STRONG PRODUCTIVITY RATES AND REPUTATION
Australia has strong productivity levels in areas such as cropping and red meat. For example, in 2016 Australia’s crop productivity was 19.2 tonnes per hectare compared with the world’s productivity of 14.6 tonnes per hectare.

DUAL INDUSTRY-LED GROUP
A government-funded and industry-led group working to facilitate collaboration and innovation within the agriculture sector.

ENGAGED INDUSTRY
A positive conversation has started involving AgTech and IoT, in both cities and regions. Results from the Commonwealth Bank Agri Insights survey (a biannual survey of 1,400 Australian farmers) show a growing appetite for investment in the sector with 22% of farmers nationwide expecting to increase technology and innovation investment.

TALENT
Australia is seeing an increase in enrollments for agricultural university degrees, providing the opportunity to upskill the agriculture sector in STEM subjects and technology literacy.

GROWING INVESTMENT COMMUNITY
A very large pool of investible funds, and an investment community with growing interest in AgTech.

STATE GOVERNMENTS DEVELOPING INNOVATION AGENDAS
Focus on innovation through State-based initiatives is bringing industry together with researchers and funding sources.

INNOVATION AGENDA DRIVEN BY FEDERAL GOVERNMENT
A bipartisan national innovation agenda being led by the Federal Government with initiatives across a broad range of policy areas.

ACTIVE INDUSTRY BODIES
15 established RDCs (supported by government) that are starting to focus on specific AgTech research activities.

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OPPORTUNITIES FOR AUSTRALIA
SNAPSHOT OF AUSTRALIAN AGRICULTURE

AGRICULTURAL PRODUCTIVITY GROWTH RATE, BELOW THE WORLD AVERAGE OF 1.7%

GDP CONTRIBUTION (2.4%)
+$57 BILLION

LOST AGRICULTURAL PRODUCTION DUE TO WEEDS
$2.5B

73% OF AUSTRALIAN AGRICULTURE IS AFFECTED BY WEED-RELATED ISSUES

OF FARMERS REPORT WATER ISSUES
38%

OF FARMERS REPORT SOIL AND LAND ISSUES
46%

300,000+ DIRECTLY EMPLOYED

23% FEMALE

MALE 77%

1.4%

15% OF AUSTRALIAN MERCHANDISE EXPORTS

+$43 BILLION EXPORTS

OF OUR FOOD IS EXPORTED
7/12

SUPPLY OF AUSTRALIA’S FOOD
93%

< 1% GOVERNMENT FUNDING AND GRANTS

>123K AGRIBUSINESSES

$1.5B COSTS IN WEED CONTROL

VISION FOR A $100B INDUSTRY BY 2030
CURRENT STATE OF AGTECH IN AUSTRALIA
In addition, several programs and initiatives impacting agriculture and innovation more broadly have been implemented. Some of these initiatives include:

- Productivity Commission Inquiries - Regulation of Agriculture draft report was released on 21 July 2016 and looks at regulatory duplication across federal and state government. The Marine Fisheries and Aquaculture inquiry is due December 2016.
- Farm Co-operatives and Collaboration Pilot – to help farmers improve bargaining power and returns through cooperative business structures.
- Food Innovation Australia Limited (FIAL) – a government funded, industry led group to facilitate collaboration and innovation in agriculture and food.
- Programs providing changes to taxes and incentives - Early Stage Venture Capital Limited Partnerships (ESVCLP), Early Stage Innovation Companies (ESICs), and Entrepreneurs’ Programme.
- Mobile Black Spot Programme – funding to improve rural and regional mobile connectivity.

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<th>2013</th>
<th>2015</th>
<th>2016</th>
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<td><strong>FOOD INNOVATION AUSTRALIA LIMITED (FIAL)</strong></td>
<td><strong>AGRICULTURAL COMPETITIVENESS WHITEPAPER</strong></td>
<td><strong>INQUIRY INTO AGRICULTURAL INNOVATION – SMART FARMING</strong></td>
<td><strong>PRODUCTIVITY COMMISSION INQUIRY</strong></td>
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<td>What: A government funded, industry led group to facilitate collaboration and innovation in agriculture and food. Example outcomes:</td>
<td>What: Practical initiatives and actions to enable a stronger Australian agricultural industry. Example outcomes:</td>
<td>What: While Australian agricultural productivity growth is below world average overall, we have strong productivity levels in areas such as cropping and red meat. For example, in 2016 Australia’s crop productivity was 19.2 tonnes per hectare compared with the world’s productivity of 14.6 tonnes per hectare. Example outcomes:</td>
<td>Inquiry into the benefits and costs of making public and private datasets more available, options for sharing and collecting data, and associated concerns over privacy and control of data use.</td>
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<td>• First strategy document will soon be published including a vision to inform areas of technology and investment.</td>
<td>• $4 billion investment plans for the agricultural sector as a whole</td>
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<td>• ‘Collaborative Circles’ program to brainstorm solutions to technical issues.</td>
<td>• $100m to support the continuation of the ‘Rural R&amp;D for Profit Programme’ out until 2021-2022.</td>
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<td>• ‘Project Fund’ to provide capital for businesses and researchers to work together to solve business/sector challenges and help find commercialisation opportunities.</td>
<td>• Plan to shift focus of research, development and extension funding towards on-farm technologies and programs that improve farm gate returns.</td>
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<td>• ‘Fast and Furious Innovation’ program to provide commercialisation tools and guidance.</td>
<td>Total of 17 recommendations covering:</td>
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<td>Inaugural ‘Celebrating Australian Food and Agribusiness Innovations’ book capturing 50 success stories and lessons learned.</td>
<td>• The use of and regulation linked to unmanned aerial vehicles;</td>
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<td>• Funding to include science, technology, engineering, and maths into agricultural education;</td>
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<td>• Support to farmers’ groups to establish national data sets and benchmarking;</td>
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<td>• Focused innovation working group;</td>
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<td></td>
<td>• Improved network infrastructure; and</td>
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<td>• Regulatory reform related to gene technology.</td>
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STATE AND TERRITORY GOVERNMENTS

State and Territory Governments are directing focus towards AgTech. Select AgTech programs and initiatives around Australia are highlighted below:

NORTHERN TERRITORY

Testing: The Department of Primary Industry and Fisheries operates 10 research farms.
Funding: Business Innovation Support Initiatives (BISI) – program to help fund R&D in the areas of science, engineering, technology and design.

WESTERN AUSTRALIA

Investing: Royalties for Regions program has funded AgTech including electronic flock management technologies, a web portal to share value chain data across the sheep industry, and eConnected Grainbelt project to connect all parties and information to support growers with the aim to improving profitability.
Building: Working with researchers and industry to develop mobile technology, online tools and on-farm technologies.
Showcase technology: Techspo showcased AgTech and aimed to create awareness and give farmers the ability to trial products.

SOUTHERN AUSTRALIA

Investing: Funding into AgTech research including a project looking at the benefit of sensors, web-based and wireless technology in reducing grain crop loss and safeguarding from biosecurity issues.
Driving conversations: eChallenge AgriFood & Wine program to enable innovators to test their ideas, with access to funding and investment.
Sharing and attracting: AgInsight South Australia – data portal available in 6 languages to help domestic and international investors identify business opportunities. Received the 2016 South Australian Premier’s Award for public sector digital innovation and the 2016 Australian Government ICT Award for geospatial excellence.
Funding: Big Data Connect Program provides $10,000 grants aimed at encouraging businesses to explore the value of big data in improving competitiveness and productivity.

VICTORIA

Supporting commercialisation: Agriculture Victoria Services supports commercialisation of government-funded research. Current projects include livestock tag and trace, and pasture reader.
Driving collaboration and regional focus: Regional Development Victoria (RDV) and Food Source Victoria aim to bring the regional voice to government and also to encourage agribusinesses to work together to drive growth in exports and jobs.
Funding: Horticulture Innovation Fund offers R&D grants (up to $50,000) across the horticulture sector to adopt new technologies, improve productivity and increase innovation. The Regional Jobs Fund is a $200m fund that aims to increase job creation and retain existing jobs, specifically targeting high-growth businesses.
**QUEENSLAND**

**New Agricultural Economy:** $3.9m fund over 3 years which includes support for a Technology Commercialisation Fund, aimed at attracting private sector capital into government agriculture- and food-based research and development.

**Driving conversation:** The April 2016 inaugural Advance Queensland Innovation and Investment Summit included a spotlight forum on agricultural technology.

**Business Development Fund:** $40m to help Queensland businesses commercialise ideas. The fund has not been allocated to a specific sector and has the potential to fund AgTech projects.

**Developing the future:** The Queensland Government, in partnership with CSIRO, James Cook University and QUT has developed a Digital Homestead, located near Townsville. It aims to evaluate and demonstrate technologies that enable better decision making on farms, leading to improved productivity and profitability.

**Supporting research:** The Queensland Government is reviewing Mechanisation, Automation, Robotics and Remote Sensing (MARRS) opportunities and challenges for these technologies to benefit a range of horticulture crops.

**NSW**

**Building and sharing:** Department of Primary Industries (DPI) is working with various partners to develop AgTech products including Farm Decision Technologies (FDT), Precision Livestock Management in sheep, unmanned aerial vehicles (UAV), decision support tools via smartphone apps and IrrisAT Irrigation Management.

**Collaborations:** DPI, University of NSW, Cisco, Data 61 and NSW Farmers have collaborated to develop Innovation Central Sydney (ICS), a connected community focused on cloud, analytics, cybersecurity and Internet of Everything platforms.

**Supporting research:** DPI and Charles Sturt University operate the Graham Centre for Agricultural Innovation to support partnership between all groups. The UNE SMART Farm also enables collaborative research and showcasing of technologies.

**TASMANIA**

**Building and sharing:** The Sense-T network was developed in partnership with the University of Tasmania, CSIRO and the Tasmanian Government, and received Federal Government funding. Sense-T applies data from sensor networks to provide shared data analysis and research for better decision making, improved productivity and sustainability. Sense-T has been applied to agriculture and aquaculture.

**Supporting research:** Research institute Tasmanian Institute of Agriculture (TIA) covers AgTech research through its Agricultural Production Systems program.

**Funding:** AgriGrowth Loan Scheme offers lower interest rate loans (up to 5 years, between $30,000 and $1 million) for Tasmanian farm and agri-food businesses.
Australia is in a good position to generate new AgTech solutions, with a reputation for producing high quality research, as well as being home to 9 of the top 100 life science universities in the world. A snapshot of some of the AgTech programs and initiatives within Australian universities and research bodies is provided below.

**UNIVERSITY OF SOUTHERN QUEENSLAND**
University of Southern Queensland has research programs (supported by industry funding) focused on precision agriculture, smart technologies, spatial analysis, remote sensing and monitoring.

**THE UNIVERSITY OF SYDNEY**
The University of Sydney has performed a decade of research into autonomous, remote sensing and developing robotics and intelligent software for horticulture and livestock industries.

**THE UNIVERSITY OF TASMANIA**
The University of Tasmania are involved in ‘Sense-T’ and other AgTech related projects. Sense-T uses data, sensing technology and data analytics to improve decision-making and yields for farmers.

**UNIVERSITY OF WESTERN AUSTRALIA**
The University of Western Australia conducts research on food systems and agribusiness, including adoption of new farming technologies.

**QUEENSLAND UNIVERSITY OF TECHNOLOGY**
QUT is involved in a number of AgTech projects, including AgBot, Harvey, Digital Homestead and the IntelliSensing research program. At the Digital Homestead, QUT has researched the application of machine vision and learning techniques for pasture monitoring.

**QUEENSLAND UNIVERSITY OF FOOD SCIENCE AND TECHNOLOGY**
QUT is involved in a number of AgTech projects, including AgBot, Harvey, Digital Homestead and the IntelliSensing research program. At the Digital Homestead, QUT has researched the application of machine vision and learning techniques for pasture monitoring.

**UNIVERSITY OF NEW ENGLAND**
The Charles Sturt University has a collaborative research centre known as the ‘Graham Centre’. The centre is run in connection with the NSW Department of Primary Industry. A current research project is looking at a remote monitoring system for the beef industry to alert when calves are born. CSU’s course program includes Precision Agriculture subjects.

**JAMES COOK UNIVERSITY**
James Cook University is a collaborating partner for the Digital Homestead located in Townsville, QLD. JCU leads the Digital Homestead project which has included research initiatives such as the ‘Digital Dashboard’ and the ‘Walk over Weighing’ system for animals.
Agriculture is a capital intensive industry segment. It has historically struggled to attract sufficient domestic and foreign investment. Presented below is a snapshot of investment into agriculture as well as venture capital investment.

FOREIGN INVESTMENT
Foreign direct investment in agriculture, forestry and fishing in Australia has continued to grow over the past five years, with $1.6 billion invested in 2015, up 32% from 2014. Australia is likely to continue to see an increase in foreign investment in agriculture as well as AgTech startups as the sector gains momentum. Strategic investment from fast-growing Asian economies (especially China) is likely to continue to grow, and may begin to include investment in AgTech companies.

There is certainly headroom to grow our levels of investment. Australia had venture capital investment of 0.018% of GDP in 2015, compared with the likes of Israel with 0.383%, the United States with 0.284% and Canada with 0.082%. Australia will need to attract more venture capital investment to support a successful AgTech sector.

DOMESTIC INVESTMENT
UniQuest conducted a survey of superannuation funds in 2015 to determine the level of domestic investment into agriculture. The survey revealed on average 0.3% is invested in the agriculture sector by Australian superannuation funds, of which 7.4% is a direct investment. Australian superannuation funds have an opportunity to play a role in the emerging AgTech sector. Overseas, superannuation funds that are increasingly beginning to invest in AgTech. For example, in June 2016, the Canadian superannuation fund PSP Investments acquired a significant investment in Allflex Group, a global leader in animal intelligence and monitoring technologies.
QIC

QIC acquired 80% of North Australian Pastoral Company (NAP) in May 2016. QIC sees AgTech as a natural extension that will create portfolio synergy.

QIC was tasked by the Queensland Government to administer the $40 million Business Development Fund to assist innovation and emerging industries. With no specific allocation of funds, the capital is available for AgTech.

YUUWA CAPITAL

Perth-based $40M early-stage venture capital firm. Yuuwa is an Australian VC that has invested in AgTech, in particular a minority interest in AgWorld.

PRIME SUPER

Partner to the National Farmers’ Federation to provide support developing the new digital initiatives.

FINISTERE VENTURES LLC

A California-based VC firm undergoing an Australian fundraising for a $150m AgTech fund. Melbourne-based Somerset Capital is the appointed placement agent.

WESTPAC

Westpac partnered with Blue Chilli, a Sydney-based startup accelerator to run an AgTech innovation challenge in late 2015. The challenge received 130 submissions with AgDraft (previously AgTasker), an online jobs market that matches seasonal workforce needs with casual farm workers, taking the top prize of $40,000.

NAB

NAB are a supporter of Food Agility, which aims to provide digital solutions for agricultural problems. A case study is provided in the Appendix.

COMMONWEALTH BANK

Commonwealth Bank is currently pursuing a number of agri-specific projects as part of its Regional and Agribusiness Banking division’s focus on the ‘Farmer of the Future’. The ‘Farmer of the Future’ project was run by the Bank’s Innovation Lab, with a focus on what the changing technological landscape means for primary producers and for regional Australia more broadly.

Solutions being developed will target industry needs and leverage the bank’s technological capability. The bank is also exploring opportunities to work with other industry players and providers to deliver AgTech solutions that continue to meet the evolving needs of the connected agri ecosystem.

Commonwealth Bank produces the bi-annual Agri Insights report into farmer investment intentions and is a major sponsor of a range of key industry events and projects.

In 2015, AgFunder reported 526 AgTech (including food e-commerce) deals funded from around the world. Australia had only 6 reported AgTech deals.

However, banks and investment funds are starting to take the AgTech opportunity in Australia more seriously.
Industry corporations and RDCs across Australia are turning their attention to AgTech. Below is a summary of the case studies contained in the appendix of this report.

**BOSCH**

Bosch has invested $2.5m in Tasmanian-based AgTech startup The Yield.

**CISCO**

CISCO’s Innovation Centre was launched in Sydney in February 2016 focused on agriculture, smart cities and transportation. The Centre enables access to business support, investment and rapid prototyping facilities. Partners include CSIRO Data61, National Farmers Federation, NSW Department of Primary Industries, NSW Farmers Association, ATP Innovations, and University of New South Wales.

**ELDERS**

Elders are a sponsor of Queensland based AgTech company SwarmFarms.

**FONterra**

Fonterra has an ‘Open Innovation’ policy to encourage contribution by external parties to develop new products and technologies. It has active research partnerships with universities and research facilities around the world. Fonterra has an innovation centre located in Melbourne.

**GRAINCORP**

GrainCorp received Foodbank Australia’s 2014 Award for Innovation for the establishment of the Grain Program.

**SIMPLET**

Simplot Ignite, a Startup Accelerator, was launched in November 2015, in partnership with Slingshot. The program looks for startups able to address AgTech and food tech themes. Simplot also launched a smart farm in August 2012, which aimed to use advanced technologies and data to help drive improved yields.
Industry associations, corporates and farmers are driving significant innovation in on-farm digital technology in an effort to improve productivity and use of resources. In addition, corporate agribusinesses and stakeholders are working with potential investors to uncover new digital technologies for agriculture.

This is a snapshot of some of the initiatives and activities underway by industry.

**NATIONAL FARMER’S FEDERATION (NFF)**

In December 2015, Prime Minister Malcolm Turnbull announced three agribusiness innovation initiatives to be led by the National Farmers Federation. These initiatives include:

1. SproutX, an AgTech innovation hub aimed at assisting ‘grassroots’ ideas get off the ground to help drive productivity and efficiency for the agricultural sector. Initially starting in Melbourne, the intention is for SproutX hubs to have a national footprint. Prior to launch, SproutX has already received over 1000 applications from startups and will target the commercialisation of 10 AgTech startups per annum.

2. The NFF’s online Platform (www.farmers.org.au) went live in mid June. The platform aims to provide improved industry connectivity through blogs, commentary and live policy developments as well as up-to-date information on weather, news, market information and better management practice.

3. National Farmers’ Digital Agriculture Service which aims to gather and analyse big data to support better decision making for farm management.

**AUSTRALIAN FARM INSTITUTE (AFI)**

AFI recently published a comprehensive research report on ‘The implications of digital agriculture and big data for Australian agriculture’. The report discusses in detail the potential for digital technology to improve productivity and the legal implications associated with the collection and dissemination of information gathered through digital technology. The report also discusses the storage and privacy considerations of big data. There are a number of quality recommendations proposed which form part of developing a successful AgTech ecosystem. The AFI also hosted a Digital Disruption in Agriculture Conference in June 2016 to promote awareness of the opportunities and challenges of digital agriculture.

**RESEARCH AND DEVELOPMENT CORPORATIONS (RDCS)**

There are 15 RDCs in Australia across various agricultural products. RDCs are partnerships between government and industry aimed at funding and determining the focus of research & development and adoption of R&D outputs. RDCs are funded through levies collected from farmers and the Australian Government matches the RDC’s annual planned R&D expenditure, capped at 0.5% of gross value of production. Examples of RDCs include Meat and Livestock Australia, Dairy Australia and Horticulture Innovation Australia.
CURRENT STATE
SNAPSHOT OF AGTECH STARTUPS

**FULL PROFILE**

**FOUNDER**
Emma Weston, Bob McKay and Ben Reid

**DESCRIPTION**
Digital, blockchain, and commodity management software solutions.

**STAGE**
Self-funded by cofounders, with first pilot planned for October 2016.

**CHALLENGE**
Educating growers, buyers and banks on blockchain technology to build trust in the solutions provided by Full Profile.

**ADVICE TO OTHERS**
“Having an agriculture background is an advantage and provides a source of innovation for solutions to ongoing industry issues.”

**THE YIELD**

**FOUNDER**
Ros Harvey

**DESCRIPTION**
Internet of Things (IoT) technology combined with wireless sensor network and localised data to improve yields and profitability.

**STAGE**
Bosch is a key strategic investor. The Yield also received a substantial Accelerating Commercialisation grant from the Federal Government.

**CHALLENGE**
Managing the data in a way that allows the right data to be connected to the right problems.

**ADVICE TO OTHERS**
“It is critical to first consider the needs and wants of the farmer.”

**AgDraft**

**FOUNDER**
Ella Shannon

**DESCRIPTION**
Online marketplace changing the way farmers look to fill seasonal labour shortages.

**STAGE**
Platform is operational and currently seeking the next round of investment.

**CHALLENGE**
Securing support for early stage innovations is a challenge. In the growth phase, securing a path to market and connecting to international investment is a challenge.

**ADVICE TO OTHERS**
“Tap into the wealth of experience and knowledge that exists in our agricultural sector. Learn to thrive in uncertainty and develop good feedback loops for your product/service.”
**Agersens**

**FOUNDER**
Ian Reilly

**DESCRIPTION**
'eShepherd applies technology patented by CSIRO to create 'fenceless farms'.

**STAGE**
Agersens are funded, and have established an international partner and a route to market. Funding is also confirmed to enable application trials.

**CHALLENGE**
Attracting early stage investment.

**ADVICE TO OTHERS**
"You need a diverse set of skills to launch a startup so build social capital with stakeholders, and get an experienced team of committed people around you - advisors who have been on the journey before you."

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**Ovass**

**FOUNDER**
David Newman and Ravi Nichani

**DESCRIPTION**
Software enabled by sensors that managers data assets to provide actionable insights for farmers.

**STAGE**
Ovass are looking for funding partners. Currently in early stages, with the business model still being refined. Pilot sites are being identified.

**CHALLENGE**
Identifying the core problem to be solved and understanding that Ovass cannot be all things to all people.

**ADVICE TO OTHERS**
"Make it real for the farmer, build trust, demonstrate value."

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**agAlytics**

**FOUNDER**
Dr Anthony Brewer, Greg Lauer and Cambell Smyth

**DESCRIPTION**
Hardware solution for nutrient management.

**STAGE**
Self-funded early-stage startup developing proprietary technology.

**CHALLENGE**
Identifying investors and farmers to be involved in the prototyping phase.

**ADVICE TO OTHERS**
"Understand the value proposition to your customer and the key drivers for adoption of new practice or technology. In agAlytics’ experience it is equally important to demonstrate value to both farmers and agronomists. If the farm advisor sees potential in the product there is a greater potential for adoption and continued use by farmers."
NAME:
Emma Weston, Bob McKay and Ben Reid

BACKGROUND:
Emma, Bob, and Ben each have a long history of involvement in the agriculture sector. Emma identified the problem with counterparty and credit risk approximately 20 years ago and had always considered that the solution would require a change in the regulation, as opposed to technology solutions like those now offered by Full Profile.

ABOUT THE TECHNOLOGY:
Agri-blockchain and commodity management software.

ADVICE TO AGTECH STARTUPS:
“Having agriculture expertise on the team is an advantage and provides a source of inspiration, helping us to develop innovative solutions to ongoing industry issues.”

“Full Profile develops solutions to real world problems in the agri-sector that bring transparency, efficiency, and trust to farmers and the post-farmgate ecosystem. In addition to our AgriDigital, agri-blockchain, and commodity management software solutions, Full Profile is exploring opportunities such as novel grower financing, simple on-farm contract management, and solutions for the livestock, wool, rice, cotton, and horticulture industries.”

“Grain growers in Australia can lock in a guaranteed price, but they cannot easily guarantee payment. When growers deliver their grain, they transfer the ownership, or title, to their buyer. Currently, farmers have no choice but to trust that the buyer will eventually honour the price and terms. The risk of the buyer defaulting is a real one: buyer and trader insolvencies occur every year, costing growers, local communities, and the industry hundreds of millions of dollars.”

In 2014, Victorian farmers lost approximately $50m as a result of grain harvests being delivered without payment being received. These insolvencies have a negative effect on local communities and the perception of the industry as a whole. “Removing the risk and bringing transparency and efficiency to the industry is a huge opportunity to inject confidence in the system and to capture lost value.”

Full Profile’s AgriDigital brand of products bring efficiency to transactions along the commodity supply chain. “Our agri-blockchains and smart contracts help growers get paid immediately, save buyers time and money, de-risk financing for banks, and enable paddock to plate transparency for consumers.”

Full Profile started in December 2015. In October of 2016 Full Profile is planning to launch a pilot within the grains industry. According to the company, this will be the first ever in-market application of blockchain within physical agricultural commodities.

The founders of Full Profile are currently investigating opportunities for its AgriDigital products to be deployed internationally, as well as adapted for other commodities such as livestock, wool, and horticulture.

Full Profile won the Westpac BlockHack16 in May 2016 and the Blockchain Summit in June 2016. Full Profile was also selected to present at Finovate Fall in New York in September 2016.

Full Profile is self-funded by the three co-founders, as well as supported by R&D tax incentives provided by the Federal Government. Full Profile is not currently seeking investment. Full Profile is a member of the Stone and Chalk FinTech community and is now located in PWC’s Innovation Hub.
"The Yield is an agricultural technology company. We help growers improve yield by providing on-farm sensors and a customised information service to support rapid decision-making. The Yield’s solutions are powered by reliable, accurate and trusted data. We combine sensing technology and wide area data, then use data analytics to transform raw observations into value-adding information."

The ability to solve problems is affected by the quality of the data being captured and analysed.

"Using both mobile and web applications, we deliver solutions to customers that are tailored to address specific business problems. We take control of the whole process from providing and maintaining the sensors through to delivering stunningly simple-to-use user-interfaces."

"The data is stored in a robust platform, leveraging the Microsoft Azure Cloud and IoT suite using world-leading IoT standards and protocols. We use Robert Bosch’s ProSyst IoT system to manage our on-farming sensing systems. Our technology stack is aligned to Intel’s IoT reference architecture. Local on-farm sensing and intelligence at the edge are integral to our solutions."

"We are rolling out our first patented-technology solution in the oyster industry. It solves business problems such as reducing unnecessary harvest closures that cost the industry millions of dollars a year, labour scheduling based on localised tides, tracking food safety and provenance, and disease management. ‘Our solutions are designed to benefit growers, government food regulators and wholesalers. We make our data available to researchers and entrepreneurs to create new knowledge and products. The Yield protects customers’ privacy. Our customers own their data and we give them control, transparency and incentive to share it.’"

Bosch is The Yield’s development partner for its on-farm sensing system. Bosch is also an investor, with the President of Robert Bosch Australia, Gavin Smith, a member of The Yield’s Board.

NAME:
Ros Harvey

BACKGROUND:
Ros is an entrepreneur and experienced senior executive at both national and international levels.

Ros founded the Better Work and Sense-T programs. Ros recently co-founded the Food Agility consortium with Dr Michael Briers.

Ros is also an Adjunct Professor at Queensland University of Technology’s Institute of Future Environments in Intellisensing.

WHAT NEXT:
The roll out of its agriculture solutions underpinned by its on-farm sensing system.

ADVICE TO AGTECH STARTUPS:
"It is critical to start with the business problem you are solving. Technology should come second."

"Our solutions are designed to benefit growers, government food regulators and wholesalers. We make our data available to researchers and entrepreneurs to create new knowledge and products. The Yield protects customers’ privacy. Our customers own their data and we give them control, transparency and incentive to share it.”
After winning the Westpac Innovation Challenge in late 2015, AgDraft is gaining traction in broadacre farming regions of Australia. The company is close to reaching its next stage of development where it will be seeking investors for further capital raising.

"AgDraft is an online marketplace changing the way farmers look to fill seasonal labour shortages. We are bringing efficiency and reliability to the rural labour market by leveraging ‘farmer referrals’ and by allowing workers to create and build online profiles. The platform extended the barriers of trust between farmer and worker, allowing workers from outside the agricultural industry to secure reliable and safe employment on farms.

AgDraft’s pilot program focusing on broadacre cropping in NSW has been a huge success. In the last four months, we have grown at 62% month on month, matching workers from all over Australia with seasonal work.

AgDraft has also been successful in helping farmers in Western Australia. Kulin farmer Jackie says within 48 hours of signing up to AgDraft, she had found an experienced worker for seeding. She says the key for her was the reliable references that were provided on the AgDraft workers online profile."

The company has received funding through the 2015 Westpac Innovation Challenge and is involved in the Blue Chilli Entrepreneurial Program.
Established in October 2015, OVASS has developed software, enabled by sensors, that manages data assets to provide actionable insights for farmers. The software works to provide farmers with a simplified view of the potential impact of acting or not acting based on the data collected.

OVASS founders David Newman and Ravi Nichani have technology backgrounds and have previously created award-winning technology solutions. The first was an asset management system used to support search and rescue efforts. They also developed a device to help parents locate their children. Newman and Nichani realised that there was a potential application for their asset management code for agriculture.

“We knew that there are limitations when working with remote sites. The aggregated data is then analysed by the software to give farmers actionable tasks.”

OVASS has focused on developing trusted relationships and on understanding the key industry issues. They have also thought carefully about how they attract potential customers. “Over time we learned that dealing farmer by farmer is a slow process. We recognised that we could get faster and better traction by leveraging someone who is already servicing farms (i.e. an agronomist) as part of an extended sales force.”

OVASS is working to collect use cases and get a ‘season under its belt’ to demonstrate value to agribusinesses. The company is looking for pilot sites and funding partners to bring them to the next phase.

ADVICE TO AGTECH STARTUPS:
“Make it real for the farmer. Trust is key and it takes time to build. Make sure you are able to demonstrate value but don’t make promises you can’t keep. Be clear on how you will manage concerns about data ownership and use.”

"Our software helps farmers to structure their data, create profiles, and bring in different data sets including new data from sensors."
Agersens, the ‘virtual shepherd’, combines a smartphone/tablet app, GPS technology, a wireless base station and neck collars, to create ‘fenceless farms’. eShepherd applies CSIRO-patented technology to create a virtual fence system that enables beef and dairy farmers to fence, move, or monitor their livestock using their smartphone, tablet or computer, with 98% success rate.

Farmers draw their desired fencing perimeters by either drawing the outline on an electronic property map or walking the perimeter using their smartphone, tablet or computer, with 98% success rate. Farmers draw their desired fencing perimeters by either drawing the outline on an electronic property map or walking the perimeter using their smartphone, tablet or computer, with 98% success rate. Through a combination of audio and small shocks (less than an electric fence), animals learn to be guided by eShepherd within 1-2 days of training.

CSIRO first developed the animal training software in 2005, but cost of technology meant that the solution was too expensive to attract a commercial market. Improvements in batteries, storage and the introduction of mobile apps means that the technology is now more affordable. eShepherd removes the need for a physical fence (and related labour and material costs) and enables animals to be fenced out of environmentally sensitive areas and towards desired grazing areas. The data collected through eShepherd can also be applied to better manage animal health and welfare.

“I had the idea in 2011 on a farm in Queensland. I met with the CSIRO in 2012, but with a lack of time and funds I couldn’t take the idea further. Our big break came in 2014 with the $75,000 Driving Business Innovation program offered by the Victorian Government. The program no longer exists, but it enabled me to complete the pivotal ground work needed to establish technical and market feasibility. I then committed to work on my own for nearly 12 months to position the company to get funding. We ultimately received a $250,000 contract from a statutory authority which we matched with a $250,000 Accelerating Commercialisation grant to get started. Without these grants and funding, this technology and enterprise would not exist. It’s still very early days, but we are now funded, have appointed a Board, and have an international partner and a route to market. In addition, Dairy Australia were recently awarded $2.6M from the Federal Government to carry out application trials of virtual fencing (using eShepherd) on Australian farms over the next 4 years.

Getting investment at this early stage is really hard work. That early stage funding provided by State and Federal Governments is critical to get new innovation to the stage of being investable. We need more of it, and more mechanisms for delivery of it, if we want to develop innovative technologies and industries in Australia.”

NAME: Ian Reilly
BACKGROUND: Ian grew up on a sheep and cattle farm in North East Victoria. Ian is an experienced engineer, new technology product developer, and program manager. Ian has more than 20 years experience in leading and managing multidiscipline teams through the development of innovative new technology products for global markets.
WHAT NEXT: Prototypes are underway with the focus on getting a commercial product to market.
ADVICE TO AGRICULTURE STARTUPS: “You need a diverse set of skills to launch a startup so build social capital with stakeholders, and get an experienced team of committed people around you – advisors who have been on the journey before you.”
agAlytics is a smartphone-enabled reader that supports nutrient management (soil, water and hydroponics). The hardware solution provides a single use, disposable chemical sensor that attaches to a small hand held reader on a smartphone (via Bluetooth) to provide real time infield soil data. The solution agAlytics provides allows farmers (and the average gardener) to address soil nutrient issues quickly and effectively. The agAlytics team do not have an agricultural background and believe that their lack of agriculture experience was a hindrance initially. Mentors played a key role in bringing this agricultural expertise.

agAlytics have worked closely with farmers from the outset to ensure that the product adds genuine value. Currently, the team is working closely with farmers to articulate the value proposition and determine an appropriate price point that would encourage adoption and use of the hardware. They believe the product provides users with a “Rapid and cost effective infield soil testing solution that empowers the farmer to make informed, data driven, nutrient management decisions to achieve maximum crop yield whilst maintain inputs and maintaining good soil health”.

agAlytics is in its early stages of development, with significant time and money being spent on R&D and prototyping of the hardware solution underway. agAlytics found it difficult to identify groups of farmers would be appropriate to prototype their product. agAlytics is self-funded by the three co-founders and supported by a $20,000 grant the company received from the University of Queensland’s iLab Germinate 8 program. agAlytics have found it difficult to identify investors in the AgTech sector and says it will only seek external investment once the R&D phase is further advanced and the hardware is at an investible stage.
CHALLENGES IN BUILDING THE AUSTRALIAN AGTECH SECTOR
For the purpose of preparing this report we held forums and interviews with over 60 stakeholders. This included two roundtables in Brisbane and Toowoomba in Queensland and interviews across government, industry bodies, farmers, startups, universities, investment bodies, venture capitalists and investors. A list of participants and contributors is provided in the Appendix. The following captures key themes arising from these consultations on what is required in order for Australia to develop a successful AgTech ecosystem.

WHAT WOULD A SUCCESSFUL AGTECH ECOSYSTEM LOOK LIKE?

- An AgTech sector needs to ensure it truly supports Australia’s agricultural industry by improving sustainability and productivity.
- A successful AgTech sector would drive a confident, agile, productive and sustainable agricultural industry with skilled, high-value regional jobs.
- It would be connected and collaborative. Knowledge and data would be collected, analysed and accessible across industry and by farmers, government, researchers/universities, startups and investors to enable each to deliver value.
- AgTech would become a new export market for Australia.
- The ecosystem would be supported by a ‘safe-to-fail’ environment for startups to create and farmers to adopt, with a clear value proposition for all stakeholders.
- AgTech would enable the collection of data that tells a story of the food (where it comes from and the process).

"We would know who’s in the zoo and who’s who in that zoo. We would work together, share information and be focused on productivity. We would be creating AgTech for the right reasons – to support our agricultural industry and drive productivity.”

Brent Finlay, Chairman National Farmers’ Federation

RESEARCH IMPACT

- Issues in research partnerships about ownership of data and Intellectual Property (IP). This can cause the development process to stagnate and restrict the cross-pollination of IP for alternative applications.
- Misalignment of funding structures needed to drive a fast prototyping, safe-to-fail approach. Research periods are too long to drive fast results, and cash is too scarce to enable focus and results over short timeframes.
- Current measures of success are focused on research-based metrics (reports published and cited) rather than commercial impact on productivity.
- RDC levy is based on production, therefore when times are tough, R&D investment declines. But this is the time when productivity improvements are most needed.
- A lack of transparency over previously unsuccessful research projects can lead to duplication of funding and effort linked to replication of this research.
- Lack of understanding by researchers and startups of the core issues facing industry – technology is developed in isolation from the farm and the farmer.
- Disconnect between funding and expectations. “$1 spent on research needs $3 for development and $10 to commercialise. If you only have access to the first dollar, the expectation cannot be for a commercialised product”.

FOCUS, ALIGNMENT AND LEADERSHIP

- No clear vision, strategy or initiatives for AgTech in Australia. Do we want to be a builder, a buyer, or a bystander?
- AgTech, like innovation, is a broad term. This leads to a lack of focus for stakeholders.
- No clear Australian authority or peak body in the area of AgTech across government, industry, investment or research.
## Adoption
- "4 C's for adoption – complexity, commitment, cost and change".
- Inability to clearly articulate the value of the technology to users.
- Lack of awareness of AgTech solutions that exist.
- Decline in government-funded adoption and extension services.
- Long-term planning needed to adopt solutions with typical return on investment periods longer than a single season/year.
- Issues with interoperability between technology and systems.
- Lack of trust in the technology and the party collecting the data, particularly where the party collecting the data is seen to be profiting as a result.
- Limited access to AgTech support services including engineers, technicians, and user support.
- Risk-averse nature of farming. For example, fear that an error in technology could lead to the loss of a harvest and income.
- Disconnect between the market need and the research and AgTech solutions developed (market pull vs tech push).

## Attractions Private Investment
- Investor community lacking confidence and expertise in the emerging sector.
- Lack of proven investment cases - AgTech startups are typically not yet at the revenue generating stage with established market impact and buyers, and scalable business models.
- Australia has a lack of specific AgTech investment funds and too few small to medium sized funds designed to fund and encourage innovation. This leads to an inability to diversify investment.
- For seemingly comparable AgTech solutions, international investors have a preference for AgTech businesses with a physical presence near them.
- Investors will look to invest in areas where they have a deeper understanding of the industry and its needs. Agriculture and AgTech are not areas of expertise for Australian investors.
- Case studies on the investment challenge are provided in the Appendix.
**INVESTORS**
- Investors need to be open to supporting AgTech through capital, strategic connections and partnerships, business growth support and strategies.
- Someone to take the lead as the primary AgTech fund. This will bring confidence and momentum, allowing other investors will start to follow as secondary investors.

**RESEARCH BODIES AND UNIVERSITIES**
- Research bodies and universities need to be able to collaborate effectively with the industry early and regularly, and should seek to better understand its needs.
- Measures of research success should align with driving positive growth and commercial outcomes for industry – for example, the number of jobs created in a region or business, new dollars generated from exports or improvements to profitability of businesses applying the technology.
- Share research and collaborate to refine technologies and solutions.
- Build skill and capability.

**GOVERNMENT**
- Federal Government can help drive clear focus and a vision for the sector enabled by practical support, grants, tax incentives, and infrastructure.
- State governments can enable the strategy and provide visibility.
- All levels and regions of government need to be on the same page in terms of focus for funding, grants, and support for the whole of industry. This needs clear and concise articulation.
- Government should apply minimum effective regulations that are outcome-focused and enable flexibility for an agile industry.
- Government should contribute seed funding for early stage technologies to enable commercialisation as well as ongoing funding for research and innovation grants.
- Facilitate the availability of up-to-date, publicly available agricultural census data.

**STARTUPS**
- Startups need to better demonstrate value of technological solutions to industry.
- Early engagement and collaborative work with farmers and industry bodies is needed to help identify the right market opportunities.
- Need to follow the market pull rather than the technological push.

**RETAILERS**
- Retailers should help bridge the gap between producers/processors and consumers through sharing data relating to buyer habits.
- Supermarkets can tell the provenance story of produce.
- Supermarkets can help drive collaboration and partnerships to address industry challenges.

**INDUSTRY**
- Collaborate between regions, cities and across the value chain.
- Participate in the development and trial of technology, and ultimately invest in technology.
- RDCs and groups should actively share knowledge on the key industry challenges and work in partnerships to find solutions.
- Trial technology and report on performance to help build understanding of the return on investment for technology.
According to the Australian Bureau of Statistics (ABS), the agriculture, forestry and fishing sectors have the lowest proportion of ‘innovative-active’ businesses in Australia. New thinking and new approaches to farming and production are needed to drive our ambitions for growth in the sector.

Australia also ranks as the country with the lowest level of research-industry innovation collaboration in the OECD. Larry Marshall, Chief Executive of CSIRO, explains: “This is for two reasons: we don’t collaborate enough with business and we actively compete against each other in science.”

Australian agribusinesses need to learn and develop together in order for the agricultural sector to reap the rewards of the digital age and foster positive transformative change in the sector.

The data suggests Australia historically hasn’t rated well on collaboration. The issue of collaboration is critical to innovation more generally and was widely raised during stakeholder consultations.

“It is unlikely that a single innovation will transform the global food system, however the sheer number of innovations being pursued will deliver a collection of tools that farmers can use to transform their business.” CAANZ Food, Farming and our Future.
LESSONS FROM THE FINTECH STORY IN AUSTRALIA

STONE & CHALK

WHY A FINTECH HUB?
Stone and Chalk was created as an independent not-for-profit hub to provide financial services startups with a community and collaborative space to help commercialise their ideas. Its objective is to ‘help foster and accelerate the development of world-leading Fintech startups’.

HOW WAS THE FINTECH HUB CREATED?
Following the Fintech report publication a working group was established with government, professional services, financial services, entrepreneurs and venture capitalists coming together as representatives of the ecosystem. The working group was responsible assessing the recommendations raised in the report. The group determined that a Fintech hub could be established in Sydney, led by industry. The next steps were to build a financial model to determine the viability and funding required to support the hub, which required 20 corporate partners and government funding.

Recruiting appropriate hub leaders was extremely important to ensuring the success of Stone and Chalk. The Chair and the CEO both have financial service backgrounds, international exposure as well as a passion for Fintech.

Stone and Chalk initially had 250 seats available, however this has grown to 300 seats, with approximately 75 companies represented. Applicants to Stone and Chalk are assessed on criteria including the quality of the team, stage and viability of the product product, the financial service being addressed and the cultural elements the startup will bring to the hub. The Stone and Chalk model creates a focal point for Fintech venture capital, creating a centre of gravity for both talent and capital which are key ingredients to fostering entrepreneurial enterprises.

An opportunity exists for AgTech to create a hub similar to Stone and Chalk. There are a number of lessons to learn from the success of Stone and Chalk including:
1. Get started (first mover advantage).
2. Ensure the right people are leading the charge.
3. Connect the ideas to the customer.
4. Build connections with potential sources of funding.

The financial services industry is a key driver of national productivity and accounts for approximately 9% of Australia’s GDP. The traditional model of financial services is being disrupted by digital technology, characterised as ‘fintech’. The Committee for Sydney commissioned a report, authored by KPMG, looking at the opportunity for fintech in Sydney. The report detailed a number of recommendations, one of which was the creation of a fintech Hub in Sydney.

The result was the establishment of a Sydney fintech hub known as Stone and Chalk.

Stone and Chalk currently houses Australian AgTech startup, ‘Full Profile’.

A similar hub for AgTech startups could provide an important space for collaboration between stakeholders, supporting research, development, investment and commercialisation of AgTech.

JUNE 2014
- Initial discussion for document

OCTOBER 2014
- Document published

FEBRUARY 2015
- Corporates signed on to the hub

JUNE 2015
- Government funding obtained

AUGUST 2015
- Hub opened

JUNE 2016
- An additional half floor obtained
A YARDSTICK FOR AUSTRALIA

PRODUCT OF NEW ZEALAND
- Connected and engaged community
  - Positive conversation by government, investors and industry
  - Practical government support
    “Selling the story”.

PRODUCT OF INDIA
- Large agriculture sector with productivity gaps
  - The next big customer
    - Active VCs
  - Cross-border engagement
    “Big gaps mean big opportunity”

PRODUCT OF CANADA
- VC community – if you build it they will come.
  - Support for commercialisation
  - Government investment and transparency
    “If you build it, they will come”.

PRODUCT OF ISRAEL
- Mindset - “Necessity is the mother of all invention”
  - Strong VC and incubator environment
  - Government incentive
  - Cross-border approach to research, investment and collaboration
    “Attracting the world and doing it smartly”.

PRODUCT OF THE UK
- Focus and direction with a vision to be a world leader in AgTech
  - Government funded enabling infrastructure including an AgTech Fund, Centres of Innovation and a big data centre
  - Engaging the whole of supply chain
    - Positive conversation led by government
    “Focused leadership from government”.

PRODUCT OF THE USA
- Scale of farms, investment, government funding
  - First mover advantage
  - Active VC and startup community
  - Focus on commercialisation
  - Connectivity infrastructure
    “Connectivity infrastructure Moving fast and with scale”.

PRODUCT OF CHINA
- Focus is on food ecommerce
  - Large government fund for investment in startups
  - Potential big player of the future
    “Sleeping Giant”
A successful AgTech ecosystem requires key elements across innovation, access to capital and access to talent. Australia’s ranking compared to the six international AgTech players we investigated is provided here. While Australia is ranked highly on the ‘Global Entrepreneur Index’ and in terms of number of researchers, it lags by comparison across collaboration and access to capital.

### For detailed case study of each nation, see reference section

# NZ ranking not available  
* India ranking not available
FOCUS

- There must be a clear vision – what role does Australia want in the AgTech sector? Do we want to be a buyer, a builder, or a bystander?
- It is important to work together across the value chain and with key stakeholders to agree priorities and structure incentives and regulation that promote and enable focus.
- Leadership is required from industry and active participation is needed from government, entrepreneurs, researchers and financiers.

WE DON’T NEED TO DO IT ALONE

- Invest in bringing developed AgTech solutions from overseas and adapt them to the local environment - i.e. Canada’s approach.
- Create mutually beneficial alliances with other countries – tap into the brains trust to develop together and attract international attention and investment – i.e. Israel.
- Engage the whole supply chain – we will achieve more together than we will alone.
- It’s the role of government to enable, industry to educate, connect and act, researchers and entrepreneurs to work with industry and understand the problem and value propositions.

TELL A POSITIVE STORY

- It’s important to create momentum. This can be achieved through open and positive dialogue domestically and globally. We must do more to celebrate successes of startups, share lessons, and publicise research project milestones to help drive interest and investment.

PARTNER WITH INDUSTRY TO DRIVE REAL RESULTS

- Industry leadership and consultation is crucial to driving strategy and improving adoption of AgTech.
- Entrepreneurs need facilitated connection to industry and transparency regarding key priorities.
- Investors need key contacts within industry to enable their own focus and understanding of value propositions for AgTech.
- Industry needs guidance in technology and early stage business investment.

GRANTS AND TAX INCENTIVES

- Apply funding to support ideation through to commercialisation and implementation phases.
- Attract and direct investment through tax incentives for investors in rural areas and/or early stage startups.

ATTRACT AND DEVELOP TALENT

- Build the right skills in the upcoming talent pool by combining business and entrepreneurial skills as well as a focus on technology into agricultural courses at university.
- Actively leverage co-operative cross-border research programs within Australia and internationally.
- Promote visa programs to actively attract missing skill sets into Australia.
RECOMMENDATIONS
## Recommendations

<table>
<thead>
<tr>
<th><strong>Recommendations</strong></th>
<th><strong>Rationale</strong></th>
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<tbody>
<tr>
<td>Establish an independently administered fund designed to make AgTech more affordable to industry.</td>
<td>Increasing local adoption of Australian AgTech is critical to both leveraging cutting edge technology to improve agricultural productivity and accelerating the growth and development of AgTech startups in order for them to scale. An independent fund designed to increase the affordability of early adoption of AgTech solutions will remove a significant barrier to entry, accelerating the uptake of AgTech. This will help address market failures identified in this report, while helping the agriculture sector take advantage of productivity delivered through new technology. In renewables, where market failures similarly held back commercial investment, the Federal Government established two independent agencies to stimulate commercial innovation and finance: the Australian Renewable Energy Agency (ARENA) and the Clean Energy Finance Corporation (CEFC). An independent agency built along similar principles (and drawing on lessons learned) would help stimulate AgTech adoption and commercial investment in the agricultural sector.</td>
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<tr>
<td>Increase funding for the Accelerating Commercialisation component of the Entrepreneurs’ Programme.</td>
<td>AgTech by its nature requires more resources to achieve commercialisation. It's often hardware-based, and bootstrapping through the early stages is less viable than in many other tech industries. It takes longer and is more costly to test a product, develop it to a commercialisable state and customise it to its market. Accelerating Commercialisation is designed to support small to medium businesses as they develop novel products, services and processes. There is a natural fit here to leverage our world-class research by supporting its commercialisation into AgTech products that serve a local and global market.</td>
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<tr>
<td>Increase the R&amp;D Tax Incentive and pay it quarterly.</td>
<td>The R&amp;D Tax Incentive is a vital source of funding for startups. However, the refund is payable annually and there can be long and unpredictable delays between making a claim and receiving the funds. This can have serious cash flow implications for startups, since they cannot commit the funds to operational expenses until they have received them. Increasing the quantum of the R&amp;D Tax Incentive for high-growth tech startups would allow AgTech startups to more swiftly develop new products, translating directly into high quality jobs. Paying the incentive quarterly would directly address the widespread issues with cash flow experienced by startups.</td>
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<tr>
<td>Host a summit to broaden the angel pool for AgTech investment.</td>
<td>Australia has a large pool of prospective angel investors with agricultural experience, and conditions for angel investment in startups are more attractive than ever due to the introduction of recent angel investor tax incentives. An opportunity exists to provide the connections, education and guidance to highlight the value of investing in early stage AgTech startups. An AgTech summit highlighting investable startups and linking agricultural stakeholders with technological investors would encourage more smart capital to flow into the growth and development of AgTech solutions while providing an agriculturally-aligned outlet for tax-favourable investment.</td>
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<tr>
<td>RECOMMENDATIONS</td>
<td>RATIONALE</td>
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<tr>
<td>Develop a digital marketplace for AgTech products.</td>
<td>A two-way digital marketplace for AgTech solutions would allow Australian AgTech firms to match their products more closely to on-farm challenges, and would provide farmers with more visibility of technology solutions in the market. The cost of the marketplace can be mitigated by paid placements, advertisements and/or sales commissions. It could take the form either of an enhancement or an alternative to the FIAL e-catalogue.</td>
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<tr>
<td>Establish a network of AgTech hubs.</td>
<td>Research shows that density is a critical part of a startup ecosystem. This is in line with global best-practice. Density is achieved when startup founders and other participants in the ecosystem (investors, advisors, mentors etc) work in close proximity and benefit from frequent “collisions” which enable them to rapidly share learnings and build highly effective networks. A network of agricultural hubs and collaboration spaces that support the entire ecosystem would provide an infrastructure that allows key stakeholders to connect to share experience, problems, solutions and direction. There is scope to leverage the existing CSIRO agrifood hubs into a nation-wide network, expanding their recent efforts to forge an entrepreneurial-minded approach to research and development. The Danish SEGES knowledge centre that bridges the gap between researchers, developers and users to ensure the latest technology is employed on Danish farms could provide a guide for designing this network.</td>
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<tr>
<td>Establish joint R&amp;D funds with leading global AgTech players.</td>
<td>Closer cooperation with the global AgTech industry provides three key advantages. First, there are easy wins - solutions available internationally that can improve agriculture locally if implemented. Second, Australian AgTech will need to reach a global marketplace to maximise its growth potential, so we need avenues to tap into foreign markets. Third, Australian entrepreneurs need to be able to draw on leading international research to help build local AgTech businesses with global reach.</td>
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<tr>
<td>Ensure rural Australia gets connected to state-of-the-art national IT infrastructure.</td>
<td>IT infrastructure is critical in two key areas. First, connectivity is a precursor for the functionality of many AgTech products on offer. Data services, sensor networks, cloud-based software solutions and many other components depend on high speed, reliable connectivity. Second, geographical disadvantages to collaboration can be mitigated using digital tools. Rural access to fast, reliable digital infrastructure remains a vital precursor to building a thriving local Australian AgTech sector.</td>
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<tr>
<td>Develop a nation-wide AgTech strategy.</td>
<td>The Federal Government has an opportunity to set a long-term national strategy in place outlining Australia’s ambitions for AgTech. Australia's role should be defined as some combination of builder, buyer or bystander in the AgTech sector, and clear strategic goals set. These strategic goals can then serve as a lighthouse for decisions on public funding, research direction, collaboration and commercialisation for the AgTech sector.</td>
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<tr>
<td>Provide direction to university and RDC research via commercialisation KPIs and shorter grant periods.</td>
<td>Research is one of Australia’s strengths. Aligning that strength with the goals of the agricultural sector will maximise leverage for the AgTech sector. To achieve that goal, KPIs for research need to include measurable economic goals like productivity growth, business growth and job creation. This should ensure research is focused on areas where there is an identified market need and a potential value proposition exists. Additionally, current funding does not encourage fast prototyping or a safe-to-fail approach, both important practices for tech startups. Shortening the research grant periods to a maximum of three years but maintaining funding levels will encourage focus. Milestone check-ins for the grants can also be amended to have a greater focus on commercial outcomes.</td>
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<tr>
<td>Build technology skills and entrepreneurship into existing agriculture courses.</td>
<td>Agriculture, like many industries, is likely to see a massive increase in the role of digital technology. The sector needs to encourage more experimentation with technological solutions and have enough talent available to turn those successful solutions into commercial products. An injection of entrepreneurial and technological skills at the university stage will improve the flow of Australian talent into AgTech ventures and improve technological and entrepreneurial literacy in the industry at large.</td>
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<tr>
<td>Increase the frequency of the agricultural census to yearly.</td>
<td>The agricultural census provides a bird’s-eye view of the areas where technology can provide maximum impact. Whether it’s increasing production, efficiency or reducing wastage, startups need access to reliable data that identifies the best areas to direct their research and development. By increasing the frequency of the agricultural census, we can ensure we always have up to date information for startups to find opportunities with the greatest chance of making a significant impact.</td>
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APPENDIX

CASE STUDIES
The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has a focus on agriculture as a national challenge and opportunity as part of the CSIRO Strategy 2020. CSIRO hopes to support the productivity, profitability and sustainability of the agricultural industry through its research. CSIRO is combining its knowledge and expertise in data and digital technology with agricultural expertise to support the AgTech sector through research and development. In March 2015, CSIRO appointed Larry Marshall as Chief Executive. Larry was previously Managing Director of Southern Cross Ventures and has a Silicon Valley background. Larry has said his objective is to drive greater connection between research, industry and commercialisation. The goal is for scientists to think more like entrepreneurs - a big part of the reason for creating the ON accelerator program.

Funding for AgTech research by CSIRO is generally obtained from RDCs or the private sector. Research focus is determined based on emerging areas, strength of the market and the ability to generate revenue through the technology. CSIRO is working with Accenture to determine additional opportunities. Farmers are more likely to adopt new technologies if there is clear value in doing so. CSIRO’s experience suggests natural adoption rates are approximately 30%. The next 30% are more reluctant to adopt, while the bottom 30%-40% are highly resistant. CSIRO have entered into three partnerships with AgTech startups as part of an engagement with industry. They include The Yield, the Digital Homestead, and Agersens.

### AGRICULTURE AND FOOD

**Digital agriculture** – Digital technology has the ability to improve decision-making for farmers and redefine the farmers’ role. CSIRO has a number of case studies that feature digital agriculture solutions, including:

1. Sense-T. In partnership with the University of Tasmania, CSIRO is using data obtained through advanced sensors to solve problems for Tasmania and their agriculture ecosystem;
2. Locating cattle with unmanned aerial vehicles;
3. Measuring cattle body condition remotely;
4. Precision agriculture.

### FARMING AND FOOD PRODUCTION

**#CSIROfarms**

1. CSIRO has a partnership with QUT and James Cook University to develop, test and demonstrate technology that can monitor how cattle properties are running. This work is being done through The Digital Homestead in Townsville, Queensland.
2. Transport Network Strategic Investment Tool (TraNSIT) is a tool that identifies potential cost savings through analysis of transport and logistic options across agriculture.

### DATA61

**Improving farming techniques** – Developing solutions for the agriculture industry that are practical through digital technologies.

1. Open Internet of Things – Eight partners, including CSIRO, have created an “open source, mature middleware platform that brings sensor networks, analytics and cloud computing together” and is used for digital agriculture.
2. Phenonet - A digital agriculture solution that provides real time data through the use of sensors to increase efficiency and yield of crops.
3. Agersens virtual fencing.

### ON ACCELERATOR

The ON Accelerator program is designed for CSIRO staff and external collaborators to develop and validate high potential innovation ventures. The program focuses on commercialisation efforts. AgTech startups feature as part of their first two cohorts. ON Accelerator will commence taking applications for the 3rd cohort in November 2016.
DISCUSSION WITH DR CHRISTINE PITT AND THE TEAM FROM MEAT AND LIVESTOCK AUSTRALIA LIMITED

MLA is the marketing, research and development body for Australia’s red meat and livestock industry and has approximately 50,000 members across the industry. MLA has recognised the need for innovation and entrepreneurship and developed a strategy and focus to support the delivery of commercially viable solutions for industry issues. MLA is investing in both on-farm and off-farm research and development projects with a wide range of project partners (producer groups, industry councils, CSIRO, Australian universities and international research centres). R&D is supported through producer levies and matched contributions from the Federal Government.

In 2016-17, MLA plans to invest over $250m in research, development and marketing, including $73.8m in funding through the MLA Donor Company (MDC). The MDC focuses on a broad range of innovation initiatives that deliver benefit across the entire value chain including new digital and automation technologies, high value product and packaging solutions, environmental technologies, on-farm productivity and animal health and well-being. MLA is also helping to drive industry collaboration via the Collaborative Innovation Strategies Partnership program and an increased focus on R&D extension and adoption through programs such its their Profitable Grazing Systems. Currently being piloted, Profitable Grazing Systems offers specialist coaches for more tailored and longer-term support to producers to help build skills and confidence in using data to measure, monitor and manage their operations.

MLA’s Value Chain Digital Strategy has a goal by 2025 to lead the world in the adoption of digital solutions across the red meat value chain, with a focus on attracting digital entrepreneurs and startups to work in the industry. MLA is launching an innovation and entrepreneurship delivery platform with a view to positioning Australia’s red meat industry as an active player in the global AgTech community through connection to technology developers, startups, and investors. The aim of the platform will be to facilitate clarity on industry challenges needing digital solutions and promoting user-centred design whereby producers are engaged throughout the design of AgTech solutions.

ABOUT RDCs:
MLA are one of the 15 eligible RDCs in Australia involved in the Rural R&D for Profit program (a competitive grant program providing approximately $200m to RDCs). MLA are partners on a number of projects that have been successful in receiving funding under the Rural R&D for Profit program.
DISCUSSION WITH ANNE-MARIE BIRKILL FROM ONEVENTURES

OneVentures is a venture capital firm with their head office located in Australia. The firm is focused on opportunities in emerging markets, including the Internet of Things (IoT) and food security. According to OneVentures’ Anne-Marie Birkill, Australia has an excellent R&D record, but investment capital and specialised expertise to commercialise the outcomes of R&D efforts are lacking. OneVentures believes there are a number of factors that make AgTech investment difficult in Australia:

1. **LIMITED DEPTH OR BREADTH OF EXPERIENCED AGTECH SECTOR INVESTORS IN AUSTRALIA**

While Finistere is starting to build a fund and many investors are interested in the space, institutional investors like OneVentures typically only invest in sectors where they have deep expertise, or co-invest with a lead investor that provides this expertise. There are insufficient specialist AgTech investors in Australia with deep commercial and technical expertise, and, very importantly, access to the necessary networks to successfully build a global network.

As AgTech deals and success become more prevalent in Australia, the momentum could build further through AgTech entrepreneurs becoming investors themselves or helping to lead VC funds. In the meantime, attracting such expertise from off-shore is an option.

2. **MANY BUSINESSES AREN’T YET PROVEN**

The companies that are emerging in AgTech are generally in early stage, without a proven business model for global application. Because of the expertise gap, they often have inadequate access to the global networks necessary to support business growth. For later stage investors like OneVentures, there are very few opportunities available to invest in the sector. Their current $100m fund focuses on businesses at the growth phase with proven technology and revenue between $3m - $10m.

3. **SCALABILITY OF BUSINESS**

In order to attract investment, the business needs to demonstrate its readiness to go global. This requires established partnerships, business models and distribution channels.

4. **ME-TOO**

We are competing in a global market and before seeking investment and developing an AgTech solution, it is essential for startups to understand their customers, the problem they are working to solve, their competition, and their value proposition.
With an integrated supply chain, AACo is able to overcome the challenge of competing interests and drive more value from its data.

By analysing and understanding its data, AACo is better able to meet its customers’ needs. For instance, more accurate forecasting and decision-making can be made in processing regarding boning and packaging to meet customer orders. Another example is the integrated databases that enable AACo to trace product back through its supply chain and capture information on individual animals. This allows AACo to adjust its breeding programs to breed animals best suited to specific market preferences in terms of beef characteristics.

In assessing investments in technology, AACo considers the value created through its whole supply chain. The significant scale of AACo’s operations means the company is able to maximise the benefit of even small improvements across the group. With a vertically integrated supply chain, AACo is able to realise the value of the big data decision-making on the sale of its beef.
NEXT: WHERE DO YOU SEE THE FUTURE OF AGTECH?

There is a lot of potential for technology in agriculture.

DATA AND INTERCONNECTIVITY
At a basic level, technology is also playing a vital role at AACO in connecting people across millions of hectares from southern Queensland to Darwin to promote knowledge extension, peer to peer leading and leadership access across vast distances.

INTERNET OF THINGS
Remote machinery such as bore pumps and motors being able to provide maintenance information and watering points providing information on the quantity and quality of water are already being deployed but making them internet connected in the rangelands would provide substantial value.

SENSORS
Remote and on animal/land. Sensors support animal welfare and health providing data that enables changes in animal behaviour to be more quickly identified and treated, helping direct human to livestock intervention to where it is most required.

ROBOTICS
Could be used to roam the vast land conducting soil tests and weed control.

DRONES
While not always the most economic, when applied appropriately drones may have a role to play. For instance, conducting fly-overs of creek beds to identify obstructions and weeds.

ALTERNATIVE ENERGY SOURCES
To reduce the dependence on diesel for energy in remote farming locations.

ADVICE: ANY PARTING WORDS FOR OTHERS IN THE AGTECH SECTOR?

“The agricultural industry could learn a lot from the mining industry, in particular receiving a benefit from its technology and the talent it has developed and deployed. Policy reform is needed to build technology and make it attractive as an investment. The value equation for AgTech startups is different than tech with a consumer focus. There is a smaller market size by both number and available dollars. With the right support, though, Agriculture in Australia is big enough to build a sizable AgTech market.

A key area where government can assist is in ensuring that connectivity exists that enables agricultural businesses to leverage the power of the internet in remote areas. This includes the availability of commercial grade satellite systems, support for roll out of long range wireless technologies, funding support for companies developing such technology and incentives for agricultural businesses willing to be early adopters.”
“Sharing data to build brand, markets, jobs and exports’.

Food Agility has a vision to empower Australia’s food industry to grow its comparative advantage through digital technologies.

Food Agility is committed to creating open standard data platforms and data sharing mechanisms to enable one source of truth and better and faster business decisions. It aims to build an ecosystem that connects all parties along the value chain, bringing food domain expertise and technology. Food Agility recently lodged a submission for the cooperative research centres (CRC) program and is awaiting the outcome of that submission. It has a number of active projects, including a trial with The Yield to reduce unnecessary harvest closures in the oyster industry.

The four strategic themes for Food Agility are:

**DEMAND DRIVERS**

1. PRODUCE THE RIGHT THING
   - real time big data market intelligence and predictive analytics to enable food producers to capture maximum value. Create a link between food producers and consumers.

2. LEVERAGE AUSTRALIA’S BRAND
   - demonstrate provenance of Australian safe and sustainable food.

**SUPPLY DRIVERS**

3. ACCESS TO FINANCE
   - create innovative financial products. Stimulate renewed investment in the food industry by building confidence with data-enabled productivity gains.

4. BUILD FUTURE WORKFORCE
   - decision support systems to scale knowledge across the value chain. Train future workforce in agri-economics and digital technology.

**INVESTMENT:**

The Food Agility CRC submission proposed a budget of $150m over 10 years, with funding from research partners, corporates, industry bodies and governments.
DISCUSSION WITH PHILLIP CUMMINS, MARK LUO, TARYN HOCKING AND JESSICA VO FROM QIC PRIVATE EQUITY.

QIC acquired ~79% of North Australian Pastoral Company (NAP) in July 2016. QIC views AgTech investments to help drive productivity enhancements for its portfolio companies and which may result in portfolio synergy benefits.

WHAT MAKES AGTECH INVESTABLE?

“AgTech will become pressing in the immediate future as productivity uplift and improving institutional returns becomes increasingly important. Part of AgTech’s appeal comes from the risk-return diversification it offers within a basket of agriculture investments.”

WHAT ARE THE CHALLENGES?

QIC believes there are strong investment opportunities in the AgTech sector. It is interested in continuing to evaluate AgTech investment opportunities particularly if they relate to productivity enhancements for its portfolio companies.

QIC identified a number of barriers to overcome and recommendations for the development and adoption of AgTech in Australia.

1. Government funding for agriculture technology deployment – There is a need for government schemes aimed at encouraging adoption of agriculture technology amongst farming enterprises. This will allow the industry to grow rapidly, which would lower the overall deployment cost.

2. Building a startup ecosystem encouraging AgTech commercialisation – Establishment of innovation co-working spaces dedicated towards AgTech to draw talent and resources.

3. Talent retention – The industry needs to embrace the culture of change to fuel the desire for new entrants to participate in AgTech innovation and investment.

4. Connectivity – One of the limiting factors for AgTech effective usability and deployment is having access to a fast and reliable internet connection whilst in remote areas.

ROLE FOR INVESTORS

Investors have a critical role to play in the success of AgTech. QIC believe this role includes early education on the rationale for AgTech investments and active learning. They also have a big role in terms of investing into agriculture. To date, investment by Australian institutions has been limited. AgTech has an important role to play in driving productivity and returns for the food and agriculture sector in general.
USA

BACKGROUND
The US is a dominant player in the global AgTech market. The country benefits from an established investor and startup community, significant investment from multinationals, and heavy government subsidies aimed at de-risking the wider agricultural industry from external factors such as climate.

Agriculture contributes approximately 4.8% to US GDP, US$835 billion (2014). The US accounted for just over 50% of global AgTech investment in 2015, down from over 90% in 2014.

EXAMPLES OF AGTECH
- **Agerpoint** – asset inventory, data and precision agricultural solution for growers of trees and wine.
- **Climate Corporation** – big data and analytics of weather, soil and crop data. Acquired by Monsanto for US$960m in 2013.
- **Edenworks** – a data-driven, sustainable aquaponic farming company that turns vacant spaces into high-quality, low-impact fish and produce farms.
- **Farmers Business Network** – collects member data and uses this to help drive analytics, procurement, and competitive financing options for farmers (launched in 2014). Membership starts at US$500/year and lists investors such as Google Ventures and Kleiner Perkins Caufield & Byers.
- **FarmDog** – US precision agriculture technology for small to medium farms that has attracted investment from Microsoft Ventures, Intel, and Monsanto.
- **Iron Goat** – replacing conventional methods for livestock feed production with automated robotic processes that can produce a product at one-third of the cost.
- **Planet Labs** – next-gen satellite imaging and data analysis.
- **Spensa Technologies** – wireless sensor network, robotics and computer vision to reduce reliance on manual labour, foster eco-friendly farming and enhance crop production efficiency.

COLLABORATION SPACES
Collaboration spaces and accelerators have emerged throughout the US, including in St Louis, Chicago, and various cities in California. Examples include:
- **The Yield Lab** – Accelerator program that offers support, mentorship and funding.
- **Thrive** – Accelerator program established to provide support and access to funding of up to $5 million. Thrive is an initiative of the Steinbeck Innovation Foundation.
- **Radicle** – accelerator fund is dedicated to growing early state AgTech startups into proven businesses (launched 2016).
- **Farm2050** - Launched by Google Chairman Eric Schmidt, Innovation Endeavours and Flextronics Lab IX. Farm2050 brings together entrepreneurs, researchers, and industry to connect technology being developed with industry issues.
- **Terra** – Food and AgTech accelerator launched by Rabobank and RocketSpace.
- **SARTA AgStart** – Focused on accelerating AgTech from the Sacramento region and creating an AgTech startup community.

AVAILABLE GRANTS AND TAX INCENTIVES
- **Agriculture and Food Research Initiative Foundational Program** - $130m of which $10m is specifically for research on agriculture systems and technology.
- **Small Business Innovation Research Program** – program to encourage small business to convert USDA-sponsored research into a commercial product that supports the private sector. Since 1984, 2000 research programs have been funded.
- **American Taxpayer Relief Act (ATRA)** – provides tax breaks including bonus depreciation, deduction on some acquisitions, R&D tax credit etc.
- **Small Business Development Centres (SBDCs)** - provides technical support to small businesses and entrepreneurs.
- **SCOME** – non-profit association dedicated to helping small businesses grow.
GOVERNMENT’S ROLE / INVOLVEMENT

“We’ll need as much innovation and creative thought in agriculture over the next 35 to 40 years as we’ve had in the previous 10,000 years.”
- US Secretary of Agriculture, Tom Vilsack.

Agriculture is a heavily subsidised industry in the US, estimated at US$20 billion p.a. The United States Department of Agriculture (USDA) and its agencies provide research funding to drive focus and support commercialisation activities.

- 2014 Farm Bill - AgTech was highlighted as a priority area.
- Agricultural Research Service (ARS) - authority to administer patents and technology licensing. This is supported by the Office of Technology Transfer which has the role of protecting IP, forming partnerships and translating ARS research into market-based outcome.
- Agricultural Technology Innovation Partnership (ATIP) - program supports the commercialisation of research by the private sector through regional innovation clusters and provides access to mentors, venture funds and entrepreneur education.
- National Institute of Food and Agriculture (NIFA) – US$1.5 billion budget (2016) to support research, education and extension activities including basic R&D, engineering and computer science, development of devices, sensors and systems and helping farmers adopt technologies.
- In 2014, to facilitate private investment and support the creation of rural jobs, the USDA licensed the Rural Business Investment Company with nine farm credit organisations that contributed over US$150m in funding for investment and entrepreneurship in rural AgTech and agribusinesses. The fund is managed by Advantage Capital Partners.

ACCESS TO FUNDING

The US benefits from an extensive AgTech investor group including venture capitalists, accelerators/incubators, corporates, and high-net worth individuals. An example of investors are listed below:

- Sequoia
- Kleiner Perkins Caufield & Byers
- Finistere Ventures
- Cultivian Ventures, LLP
- Khosla Ventures
- AgFunder
- Middeland Capital
- AgTech Innovation Fund
- Monsanto Growth Ventures – US$1bn investment in Climate Corp.
- Bayer – Bayer invested in Planetary Resources in June 2016 which applies hyperspectral sensing useful for detecting soil moisture and temperature readings and is expected to be commercialised in 2018. Bayer is also a founding member of the recently launched Radicle accelerator for AgTech along with Finistere Ventures.
- Google Ventures
- Advantage Capital Agribusiness Fund

High net worth individuals also play a role in providing funding. For example, while not specifically AgTech, The Bill and Melinda Gates Foundation has made a $2 billion commitment to initiatives to increase production through sustainable farming.

ACCESS TO TALENT

- Universities like MIT, Harvard, Yale, Stanford, University of California Berkeley are home to top tier engineering, agricultural science and business schools.
- Salina Valley in California has emerged as an AgTech hub and a key destination for education, mentor programs and work spaces. It is also home to the USDA agricultural research station.
- Student enrolment in agriculture courses including agricultural economics, animal science, natural resource management, and food science and technology showed a 40% increase between 2004-2012 and degrees awarded rose 36%.

WHAT IS DRIVING THE GROWTH IN AGTECH

The US benefits from scale. Scale of agribusinesses and corporates within the supply chain, scale of farm holdings which average 434 hectares while 98% of farms world wide are less than 20 hectares (FAO), scale of government funding, and access to high-net worth individuals.

Thin margins, competition, low commodity prices, climate risk including drought and the expected opportunity that will emerge in feeding a 9 billion strong global population has prompted further focus on driving a productive and sustainable agricultural industry. Technology is seen as the answer.

The AgTech sector is supported by detailed government research (weather, soil, etc.) and an established technology startup community.
**AVAILABLE GRANTS AND TAX INCENTIVES**

- Law for the Encouragement of Capital Investments encourages domestic and foreign investment with reduced tax rates and other benefits.
- The Angel Act provides tax incentives to angel investors that invest in seed companies.
- Tax discounts, such as the municipal tax classification providing up to 66% discount on tax for software startups in Tel Aviv, help incentivise new startups in the region and promote hubs.
- Change to tax rules to treat the startup founders’ gains on sale of the business as a capital gain rather than income. This offers a 15% lower tax rate and applies when the owner continues to be employed by that business.
- Yozma Fund – offers incentives to attract foreign investment (past 20 years).
- The R&D Fund – exists to provide funding and help companies commercialise ideas. Under the R&D Fund, ideas that have been government funded and successfully commercialised are required to repay the funding under a royalty scheme. This helps create a cycle of reinvestment to support the development of the next tech.

**ACCESS TO TALENT**

- Israel benefits from close proximity to other entrepreneurs – ‘drive anywhere in 3 hours’.
- There are about 135 scientists for every 100,000 workers – the highest ratio in the world.
- Israel has the world's highest concentration of high-tech startups per head, with almost 1,000 new firms set up each year.
- Volcani Institute - research centre that has been looking at AgTech (including biotech) since the 1920s.

**BACKGROUND**

Despite a significant portion of Israel being classified as desert, Israel is considered a global leader in agriculture, thanks in large part to its strong technology sector. Tel Aviv is tagged as the 'Startup City' and with a culture focused on problem-solving, combined with a high volume of high-tech startups and scientists. AgTech has emerged as a key sector. Israeli AgTech and irrigation companies generate USD$3 billion of export earnings annually. The ecosystem currently supports over 200 AgTech companies. Israel has achieved record levels of productivity per unit across areas including dairy, cotton, and olives and plays a significant role as a supplier of food to European markets.

**ACCESS TO FUNDING**

- Trendlines - AgTech and foodtech incubator and investor, established in 2007. Unsuccessful in its bid to renew its AgTech licence (expired 30 June 2016) with the Office of the Chief Scientist electing to enable a new licensee to enter the market. Trendlines announced the creation of a $10m Israeli AgTech co-investment fund with Bayer.
- GreenSoil Investments - VC investing in agriculture and food technologies. Raised $30 million and invested approximately $1m. Funds have come from Canada, US, Europe and South Africa.
- Cleantech Ventures – VC initially focused on ‘cleantech’, now shifting focus to AgTech including precision agriculture and data.
- Radicle – $15m fund is a partnership with OurCrowd, Finistere Ventures, Cloud Break Advisors and industry leaders including Bayer and Dupont.
- Monsanto Growth Ventures - 12 investments (40% precision agriculture technologies).
- Harvester Ventures - $40m-$50m fund which started fundraising in September 2015, has a focus on the digital AgTech sector.
- Pontifax AgTech - Investments in digital technology include Conservis & Blue River Technology.
- Copia – privately owned fund designed to invest in university research and technologies to achieve the desired level of maturity for industry application.
GOVERNMENT’S ROLE / INVOLVEMENT

• The Office of the Chief Scientist plays a key role in driving focus and initiatives to support pre-seed, early stage startups to move from idea through to commercialisation.

• Agricultural Research Organisation (“ARO”) - a government research institute supporting AgTech.

• Israel NewTech - pioneering national program led by the Ministry of Economy, and supported by a number of additional government agencies. Israel NewTech helps advance the water and sustainable energy sectors by supporting academic research, encouraging implementation in the local market, and by helping Israeli companies succeed in the international arena.

• The Tnufa National Pre-Seed Fund – early stage business support to technology entrepreneurs and startups including support with business plans and evaluation of commercial potential.

• The Incubator Program – encouraging innovation.

• International Programs – Israeli companies form strategic links with those overseas to help develop competitive capabilities.

• Israel Kenya Agri Challenge - looking for the next disruption in AgTech to provide support to Kenyan entrepreneurs currently working on innovative ventures.

COLLABORATION SPACES

• 45 collaboration spaces including The Junction and Microsoft Ventures Accelerator.

• The Library - a shared working space and access to facilities and networking for technology companies.

• AgriVest Conference - Israel’s premier event for AgTech investment. Launched in 2012 and run by Trendlines, the event aims to build focus on the AgTech sector and connect startups with corporate buyers.

• AlphaStrauss – a community for entrepreneurs and scientists to come together with the support of Strauss Group (one of Israel’s largest food manufacturers) and create technology solutions to agri-food industry challenges including access to water, quality, safety and productivity (launched March 2012).

• MassChallenge – In 2016, Boston based private non-profit organisation opened an accelerator in Jerusalem for startups with an impact on humanity including life science and cleantech. For a small application fee, startups get desk space, mentorship and training, without relinquishing equity.

WHAT IS DRIVING THE GROWTH IN AGTECH

• Israel lacks natural resources, so must be creative and solve problems in order to prosper. Israel has the world’s highest concentration of high-tech startups per capita, with almost 1,000 new firms set up each year.

• A supportive startup ecosystem involving investors, hubs, support services, industry engagement, quality research, and transparency of their activities.

• A collaborative approach between scientists, extension services, farmers and industry bodies.

• Looking cross border - Israel actively engages and cooperates with researchers and investors beyond its borders.

EXAMPLES OF AGTECH

• Agritask – data management system to support decision making.

• Agam – heat exchange technology.

• CropX - smart irrigation company that uses cloud software and wireless sensors.

• Sensilize – multi spectral sensor, providing data for cropping decisions.

• Kaiima – non-GMO crop amplification technology.

• Metabolic Robots – technology that feeds chickens when they are hungry and according to size and age to prevent mortality.

• miRobots – milk “bots” to better automate the dairy industry.
The UK Government has a vision to establish the UK as a world leader in agricultural technology, innovation and sustainability. It is hoped that this focus will enable the AgTech sector to be successful and sustainable and will also attract new talent through developing a refreshed industry reputation as innovative and commercially-focused.

The UK Agricultural Technologies strategy was launched in July 2013 by UK Trade and Investment and the UK Government. This strategy committed £160m over 10 years for three key initiatives:

1. £60m Agri-tech Catalyst Fund - government financially contributes to collaborative industry-led research projects to support commercialisation.
2. £90m over 5 years to establish Centres of Agricultural Innovation to improve the levels of technology adoption through the agri-food supply chain. Research Centres are used as spaces for farmers to experience technology first hand on a demonstration farm.
3. Creation of Agrimetrics (October 2015). Agrimetrics is a secure and independent big data centre for the agri-food industry collecting data and building better and deeper understanding from farmer to customer.

The UK is home to a number of agricultural research centres including Norwich Research Park, The Roslin Institute, The NPPC, John Innes Centre, NIAB and Rothamsted Research.

A focus on driving the future talent pool with universities and research centres being key contributing partners to the development of Centres of Agricultural Innovation. Initiatives for school-aged children such as Farming and Countryside Education (FACE), Brightcrop, and NCUB Leading food 4.0 are also encouraging the next generation into the industry.

The GROW program, a UK AgTech business plan competition supported by Agri-Tech East, helps to identify promising entrepreneurs and aims to support these people to move their ideas through to commercialisation.

Cross-border research partnerships, such as the memorandum of understanding with the Chinese Academy of Agricultural Sciences, enable diverse thinking and facilitates the exchange of researchers and collaborative research projects.

Focused strategy, positive communication and engagement across the value chain from pre-farm gate (researchers) through to the customer.

The AgTech strategy and funding commitment from government has sent a positive message and encouraged conversations and engagement within industry.

UK-based large multinationals such as Nestle, Unilever and Kraft Foods each have a focus on R&D and innovation to help drive an integrated supply chain connecting customer to farmer.

Post-Brexit, the UK’s future success in AgTech and agriculture will depend on the agreements (free-trade or otherwise) it has with European countries.

Significant agricultural research in technology and science is emerging from the UK. The UK Government has set in motion a focus on AgTech innovation. In 2015, the agri-food sector contributed £103 billion to the economy, £19 billion in exports and 3.7 million jobs across close to 200,000 farms.

Through conversations with industry, the Government recognised there was a lack of understanding of the extent of government spend on agricultural research, disconnected funding programs and no clear strategy in place. This, combined with the realisation that AgTech was a large and growing sector, led to the development of an Agri-Tech strategy in 2013.

There is now a focused vision and positive conversation for AgTech in the UK and clear initiatives under way to enable AgTech to be a thriving market.

What is driving the growth in AgTech

- Focused strategy, positive communication and engagement across the value chain from pre-farm gate (researchers) through to the customer.
- The AgTech strategy and funding commitment from government has sent a positive message and encouraged conversations and engagement within industry.
- UK-based large multinationals such as Nestle, Unilever and Kraft Foods each have a focus on R&D and innovation to help drive an integrated supply chain connecting customer to farmer.
- Post-Brexit, the UK’s future success in AgTech and agriculture will depend on the agreements (free-trade or otherwise) it has with European countries.
**COLLABORATION SPACES**

- Rothamsted Centre for Research and Enterprise (RoCRE) – hub and innovation space, housing 12 start up companies.
- Agri Metrics – big data centre of excellence.
- Farm491 – GROW is an initiative to support early-stage business development moving from idea to commercialisation.
- Amius Start Up Program – Accelerator program for AgTech startups across Europe, which offers a 26-week program with access to experts, and the market and the opportunity to access investors and an initial investment.
- In addition to government-led presence at Global AgTech Summits, London hosted the World Startup Competition in 2014 and will again host in 2016.

**EXAMPLES OF AGTECH**

- SoftHarvest – automatic harvester to allow just-in-time picking of lettuce.
- SellMyLivestock and Graindex – both products of Hectare Agritech, these operate as digital marketplaces for grain and livestock. Through crowdfunding platform Seedrs, the startup received over £270,000 in investment.
- HealthyShrimp – salinity sensor to improve aquaculture yields and reduce environmental impact.
- Livestock Industry Data Exchange Hub – data hub for sharing of information from farm to customer providing information on traceability, animal welfare and various other factors at each stage of the supply chain.
- Exosect - technology platform to support the efficient and targeted application of pest management solutions. The company attracted over £15m of private investment from venture capital companies including ClearlySo, WHEB Group and Oxford Capital Partners.

**AVAILABLE GRANTS AND TAX INCENTIVES**

- Agri-tech Catalyst Fund is a government fund that support commercialisation of collaborative industry-led research projects. Funding applies for a maximum of 3 years depending on the stage of the research project and application rounds open 6 monthly. By the end of 2015, 100 projects had been funded through the Catalyst Fund and round 6 of applications is underway. The success stories of Catalyst are shared through government websites, newsletters and social media.
- UK trade and Investment provides advice on tax advantages for AgTech startups, the process for patents and how to commercialise and attract investment.
- UK Trade and Investment promotes the investment case for agri-tech in UK through offering investors reduced taxes, financial incentive packages and simplified planning rules for investments in ‘Enterprise Zones’ in England, Wales and Scotland.

**ACCESS TO FUNDING**

- The UK boasts at least £100m annually in private sector investment towards AgTech. This is in addition to the £60m public sector investment into the Agri-Tech Catalyst Fund.
- Agri-Innovation Venture Capital Fund – created in 2014, the fund invests in early and medium stage AgTech. The co-investment fund is managed by Adapt Group. with Japan’s Tsukuba Technology Seed Co Ltd (TTS) and sources funds from the Low Carbon Innovation Fund and the SMBC Agribusiness fund. There is an £8m fund available for investment into AgTech.
- Crowdfunding platforms such as Seedrs have also emerged with a focus on funding AgTech startups.
CANADA

BACKGROUND
Canada has a strong investor community in place and is now directing its focus to home-grown innovations, including AgTech. There has been a view that by having AgTech funds based in Canada, the agriculture sector will benefit from connection to new technologies and early adoption. The Canadian Government’s recently released Innovation Agenda is driving increased focus on building an entrepreneurial community and supporting commercialisation. Government spending in support of R&D in agriculture and agri-food was over $6.2 billion in 2013-4. Canadian agri-businesses received 25 VC fundings during 2015.

COLLABORATION SPACES
• Agri-Technology Commercialisation Centre – helped more than 500 AgTech entrepreneurs and businesses.
• Bioenterprise Corporation – Canada’s leading AgTech accelerator. In Feb 2016 opened its 5th Canadian office aimed at supporting commercialisation of AgTech innovations.
• Ontario Agri-Food Technologies – focused on helping to ensure Ontario producers have access to and understand the value of technologies, and provides startups with hands-on support with applying for grants.
• The Yield Lab – US AgTech accelerator with the opportunity for Canadian AgTech companies to participate in the program with the support of the Consulate General of Canada in Chicago.

EXAMPLES OF AGTECH
• Farmers Edge - plug and play solution that enables users to optimize crop inputs in order to maximise yields.
• Hortau – monitors irrigation for crops and helps manage water usage and costs. It can mean huge cost savings for drought-stricken regions with California its biggest market.
• Resson - bioinformatics and data analytics company.
• SemiosBio Technologies – manufactures sensors for specialty crop orchards and recently raised $9m in seed funding from a group of private equity investors and the Canadian Government.

ACCESS TO TALENT
• Canada has a strong pool of researchers and entrepreneurs.
• There are 20 research centres in Canada focused on projects to support Canada’s agricultural industry and operate research farms.
• Canada has less than 0.5% of the world’s population, but publishes almost 4% of the world’s scientific papers.
• In 2013, the agriculture and agri-food system accounted for one in eight jobs in Canada, employing over 2.2 million people.
• Canada has experienced a migration of its entrepreneurs and tech startups to the US and must work to keep its talent on home soil.

WHAT IS DRIVING THE GROWTH IN AGTECH
• Agriculture and agri-food systems are a significant industry in Canada, accounting for 6.7% of the GDP and providing one in eight jobs.
• A refreshed focus on Canada’s Innovation Agenda aims to support a home-grown startup community.
• The presence of a strong investor community with the view that feeding a growing population with the same or fewer available resources can only be achieved through technology.
GOVERNMENT’S ROLE / INVOLVEMENT

• The AgriInnovation Program - accelerate the pace of innovation by supporting research and development activities in agri-innovations and facilitating the demonstration, commercialisation and/or adoption of innovative products, technologies, processes, practices and services. The program offers up to CAD$698m to end of March 2018.

• AgriCompetitiveness – $115m program that offers initiatives and funding to help the industry adapt to changing market opportunities and issues and help the sector adapt and respond to rapidly changing and emerging global and domestic opportunities and issues.

• AgPal – program and service finder to help industry stakeholders identify available funding and support from government.

• Agricultural Adaptation Council (AAC) - explore funding for innovative agricultural projects that will help the industry and individual producers adapt and stay competitive.

AVAILABLE GRANTS AND TAX INCENTIVES

• Total business tax costs in Canada are by far the lowest in the G7 and 46% lower than those in the United States.

• The AgriInnovation Program provides two streams of funding. An industry-led R&D stream with up to $5m in non-repayable contributions or the enabling commercialisation and adoption stream with up to $10m as a repayable contribution.

• Crop-specific programs such as Advancing Agriculture - Grape Industry Development Program aimed at supporting productivity through adoption of new technologies, and regional specific programs aimed at driving the commercialisation and adoption of new technologies focused on resource management.

• Enabling Agricultural Research and Innovation Program - supporting and improving farmers’ adoption of new on-farm technology through early funding for early adopters, funding for demonstration trials and funding for developing and adapting technologies for the region.

• R&D vouchers – businesses in Newfoundland and Labrador can apply for 75% of eligible project costs to a maximum of $15,000 per project linked to applied research and development, prototyping, performance testing, field trials and small-scale demonstration projects.

ACCESS TO FUNDING

• Government of Canada – Growing Forward 2, AgriInnovation Program ($698m initiative).

• Seed to Growth Ventures - $125m fund.

• Cultivian Sandbox - $114m fund.

• Avrio Capital – fund 3 with $110m.

• BDC Capital – Perhaps the most active VC investor in Canada. Invested in Hortau.

• Kleiner Perkins Caufield & Byers (US based) participated in a $58m round for Winnipeg-based AgTech firm Farmers Edge.

• AVAC Ltd - Canadian link to Finistere Ventures (US) partnership – Finistere considered an AgTech venture pioneer with investments to date predominantly in North America. Bayer has been a significant investor into the fund.

• Verdex Capital (AgTech investment arm of AVAC) – Launched in 2015, the Fund looks to invest in companies that have the potential to grow to $300m-$500m in the fund’s six-year investment cycle.

• Canadian Pension Fund, PSP Investments – in June 2016, PSP Investments acquired a minority holding in French-owned Allflex Group (originally founded in New Zealand), the world’s largest maker of electronic tags for livestock.
NEW ZEALAND

BACKGROUND

NZ is moving quickly to position itself as a leader in the AgTech market. The combination of practical Government programs and incentives, quality AgTech research groups, domestic investors, and an engaged agricultural industry, is helping to develop the NZ AgTech sector.

In 2013, NZ’s AgTech exports totaled NZ$909m across farm tools and hardware, vehicles, machinery and supplies, water and irrigation, and fencing. Over 30% of this was exports to Australia. Between 2008-2013, the NZ agriculture industry achieved above system growth across labour, capital and multifactor productivity. This has been positively attributed to the impact of technology on the industry.

With recognition that due to the small scale investments in AgTech to date NZ was not being recognised as an AgTech hub (per 2015 AgFunder report), the focus for NZ is shifting to connecting its AgTech sector to global investors and customers and ensuring that the rest of the world knows about the technology coming out of NZ.

GOVERNMENT’S ROLE / INVOLVEMENT

- Through the Primary Growth Partnership, the Ministry for Primary Industries provides funding towards approved PGP programmes at a 40:60 ratio with government to industry.
- New Zealand Trade & Enterprise (NZTE) hosts an annual Agribusiness Investment Showcase in partnership with ASB (Bank) and Sprout (Incubator) – designed to showcase NZ AgTech and help companies (from startup to export) raise money internationally.
- NZTE’s Better by Capital programme – provides tailored investment support for participating companies.
- Callaghan Innovation – government agency supporting NZ’s hi-tech businesses by providing tailored support in roles including engineers, scientists, designers, advisors, researchers and entrepreneurs.

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ACCESS TO TALENT

- New Zealand’s leading AgTech universities and research organisations include Massey University, Lincoln University and the University of Waikato, AgResearch, Landcare and Plant & Food.
- More New Zealanders have a tertiary degree than the OECD average. 41% of 25-64 year-olds and 47% of 25-34 year-olds now hold a tertiary degree, compared with OECD averages of 33% and 40% respectively.

COLLABORATION SPACES

- BCC - BCC is a specialist New Zealand business development organisation focused on agriculture, AgTech and FoodTech startups. It has an accelerator program and manages angel investment group MIG.
- MobileTECH forum brings together industry and technology leaders from all parts of agriculture to hear stories and showcase innovations. In 2016, 320 industry representatives and technology developers attended the MobileTECH forum.
- Sprout - established in June 2015, Sprout is the national AgTech accelerator. Partners include Callaghan Innovation, NZTE, Massey University, KPMG, investors MIG Angels and Enterprise Angels, Fonterra, Tru-Test Group and NZ Young Farmers.
- The 2016 SVForum AgTech Conference was launched to connect NZ AgTech companies to Silicon Valley and share the success stories from NZ in the hopes of attracting larger global investment interest.
- Te Hono Bootcamp - Started in 2012 by the CEO of NZ Merino with the support of Primary Industries and NZ Trade & Enterprise, ANZ and KPMG. The bootcamp gathers together industry executives to go to Stanford University and Silicon Valley. The group goes with a shared vision to make NZ an innovation leader and look at how to shape the agricultural industry and create value for the end user. To date, 178 agriculture execs representing 80% of the sector have been through the program.
**ACCESS TO FUNDING**

- **Enterprise Angels** – a membership-based investment network which looks to connect entrepreneurs and investors and enable members to draw on other members’ expertise to help with individual investment decisions.
- **MIG Investments** – an investment group managed by BCC that has invested more than $20 million in early stage investments.
- **SparkBox Ventures** – an early stage investor.
- **GD1 “Global from Day One”** – an early stage investor.
- **Snowball Effect** – Equity crowd funding platform.
- **“AgriHub”** – The University of Waikato launched this AgTech seed fund with a conglomeration of nine-institutions. Investments will range in size from NZ$5,000 to NZ$30,000 and will focus on projects that are tackling everything from sensing and automation to alternative energy and bio-materials.
- Corporate support and funding is also provided by Fonterra, Gallagher and Tru-Test.
- **WNT Ventures** – a technology incubator with an investment preference for AgTech.

**AVAILABLE GRANTS AND TAX INCENTIVES**

- **R&D Cash Out** - Government has introduced a new research and development (R&D) loss tax credit to give innovative companies access to some of their tax losses sooner. Eligible companies can now ‘cash out’ (claim and be refunded) their R&D tax losses, instead of using them to reduce their income in the next tax year.
- **Primary Growth Partnership (PGP)** – Through Ministry for Primary Industries, PGP is an industry-led, government supported program that invests in long-term innovation (including AgTech) aimed at improving the competitiveness of the agricultural sector. A total of NZ$727m funding has been provided by government and industry to date. The program boasts a 32:1 return on investment and the New Zealand Institute of Economic Research (NZIER) estimates that PGP will deliver NZ$6.4 billion to New Zealand’s GDP per annum from 2025.

**WHAT IS DRIVING THE GROWTH IN AGTECH**

- Agriculture forms a substantial part of NZ’s economic profile, yet with a lack of government subsidies the industry needs to be innovative and value-driven. The level of government support to farmers has been the lowest among OECD countries for more than 25 years.
- NZ AgTech benefits from a close connection to the farm and with the focus of AgTech shifting towards customised approaches and using data to improve productivity, NZ sees an opportunity aligned with their industry strength.
- Universities have launched seed funds, crowdsourcing is emerging as a funding option, and AgTech accelerator Sprout has been established with support from partners including the Massey University, investors, government, and industry including Fonterra and NZ Young Farmers. Industry is engaged and actively driving change.

**EXAMPLES OF AGTECH**

- **SCOTT** - the NZ innovation award winner for 2015. SCOTT provides a meat processing automation technology (robotic).
- **Sensee** – farm monitoring through use of sensors.
- **Logiclals** – orchard management and crop estimation software.
- **Agritrack** – using GPS software to provide information on the location, status and productivity of farm vehicles.
- **DairyMax** – software with specific algorithms to assist with feed budgeting.
- **Beezthingz** – remotely monitor health of beehives and their yield.
- **AgTract** – software in tractors to enable better data collection and analysis.
- **Autogrow** – remote monitoring and control system for indoor agriculture.
BACKGROUND
The AgTech industry in India is relatively young, but has developed substantially over the past year, with 64 confirmed deals being reported by the AgFunder 2015 Investing Report.

The agricultural industry in India accounts for approximately one-sixth of the nation's GDP and supports approximately two-thirds of the population by generating direct and indirect employment. Technology has the potential to reduce input costs, and improve efficiencies and yield in an extremely labour intensive industry.

ACCESS TO TALENT
- India ranks 5th on the global index of the world's most competitive economies.
- Strong startup and entrepreneur community.
- Highly educated.

COLLABORATION SPACES
- Food and agri-business accelerator program – led by the IMAA Centre for Innovation Incubation and Entrepreneurship (CIIE) and a-IDEA, the business incubator at Indian Council of Agriculture Research’s (ICAR) National Academy of Agriculture Research Management (NAAR).
- National Agricultural Market (NAM) - An online platform to connect ‘mandis’ across states, offering farmers more transparency and fair prices for their produce.

EXAMPLES OF AGTECH
- Sohan Lal Commodity Management (SLCM) - agri-logistics company offering comprehensive warehousing services to farmers, processors, traders, commodity exchanges and government.
- Sickle Innovations - farming solutions company focused on improving conventional farming practices through design intervention.
- Ecozen Solutions - solar powered products for irrigation and cold storage.
- Barrix Agro Sciences - offers eco-friendly crop protection methods to increase crop produce and quality with minimal expenditure.
- Anulek Agrotech - increasing soil fertility. BIOSAT (Biochar Based Organic Soil Amendment Technology), a soil additive is developed by the firm which is made of biochar mixed with different organic nutrients.
- CropIn Technology Solutions - technology to create a safer food supply-chain for consumers around the world.
- Eruvaka Technologies - solar-powered equipment to measure different water parameters for aquaculture farmers, enabling them to reduce risk and increase productivity.
- Skymet - India’s first weather forecast company which provides weather solutions to agriculture and crop insurance services through data and information tools.
- Stellapps - first dairy technology solutions company which builds automation tools integrated with cloud, mobility, and data analytics for dairy farms, cooperatives, and private dairies.
- Machines Information Technology Resources Agriculture (MITRA) - proprietary agricultural machines, such as fully automated, vineyard/orchard sprayers and dry chemical dispensing units which automates labor-intensive functions for farmers in the country.
GOVERNMENT’S ROLE / INVOLVEMENT

The government plays a major role in the development and operation of, and investment into, the agriculture economy.

- A substantial proportion of the government’s budget is allocated to the sector to support various policies and schemes for sustainability.
- The government encourages farmers, by providing adequate credits and subsidies, to adopt modern irrigation techniques and technology, including farm mechanisation and the usage of implements.
- The government supports the industry through the marketing and distribution of agri-produce.

AVAILABLE GRANTS AND TAX INCENTIVES

- A sum of INR360 billion (US$5.4 billion) has been earmarked for agriculture in the 2016–17 Budget.
- Urea is highly subsidised: Out of a total fertiliser subsidy of US$10.4 billion, 73% has been allocated for urea and remaining 27% for decontrolled phosphoric and potassic fertilisers in the current budget (2016).
- Farmers are granted loans and credits at a significantly lower interest rate.
- State governments are also compelled to allocate adequate funds to develop the agriculture sector in their respective states and achieve specified growth rates.

WHAT IS DRIVING THE GROWTH IN AGTECH

The factors driving the growth of AgTech in India include:

- Opportunity to improve the productivity, supply chain and farm mechanisation;
- Subsidy and policy support from the government;
- An increase in foreign direct investment into the sector;
- Increased focus on agricultural exports;
- Rising private participation in the agriculture and allied sectors, which is driving a focus on technology and R&D to enhance productivity; and
- Government initiatives like Digital India.

With increasing population and disposable incomes, consumption of high-end food items in both urban and rural India is expected to increase. This would demand an unprecedented output from agriculture leading to faster adoption of technology.

ACCESS TO FUNDING

- Aspada Advisors - invests in agri companies providing different technological solutions to farmers. It is targeting funds close to US$100 million by early 2017.
- Rural Agri Ventures - The company raises capital for operating in agro logistics, agri infrastructure and animal feed. It has raised more than USD5m.
- IDG Ventures - funds valued at US$3.6m.
- Agrostar – An ‘M-commerce platform’ for Indian farmers.
- Infuse Ventures - raised US$18 million since 2007, to be invested in agriculture, healthcare, and clean technology in India.
- ABI-ICRISAT - offers opportunities and support to agri-business startups in India and has raised US$13.2 million since 2004.
- Omnivore Partners - Invests in startups developing breakthrough technologies for food and agriculture, with equity investments up to INR250 million (US$3.7 million).

GOVERNMENT’S ROLE / INVOLVEMENT

The government plays a major role in the development and operation of, and investment into, the agriculture economy.

- A substantial proportion of the government’s budget is allocated to the sector to support various policies and schemes for sustainability.
- The government encourages farmers, by providing adequate credits and subsidies, to adopt modern irrigation techniques and technology, including farm mechanisation and the usage of implements.
- The government supports the industry through the marketing and distribution of agri-produce.
**BACKGROUND**

The Chinese Government is investing heavily in establishing venture funds. The hope is that by providing cash, innovation and startups will emerge, though this approach has been subject to criticism.

E-commerce, rather than digital technology to be applied on farms, is the major agriculture-related technology focus within China. E-commerce is seen as a way to connect the consumer directly to the source of food and goes some way to improving confidence in food safety and traceability. While China doesn’t seem to be focused on digital AgTech yet, its scale could quickly make it an influential player.

**GOVERNMENT’S ROLE / INVOLVEMENT**

In 2015, a government-backed investment fund raised US$231 billion – almost 5 times the amount raised by other ventures globally in the same year. With close to $338b now housed in approximately 780 ‘government guidance funds’ the government is looking to direct cash into traditionally riskier investments (those at seed and early stages). With subsidies and tax breaks banned, provincial and city governments are investing into these ‘government guidance funds’. Agriculture is an area that China is focused on, but the digital AgTech space remains nascent. In addition to the establishment of government-backed venture funds, activity focused on agriculture in China includes:

- No. 1 Central Document on agriculture for 2016 - Released in March 2016, the No. 1 Central Document on agriculture for 2016 includes structural reform focused on rural areas. Reform measures include creating scale in farming operations, training farmers, and improving on-farm mechanisation.

- National High-tech R&D Program 863 - implemented in 1986 and aimed to achieve "leap-frog" developments in key high-tech fields such as bio-technology for agriculture and pharmaceuticals.

- Beijing Australia Agricultural Resource Cooperative Development Fund - This $3 billion fund invests in Australian agriculture. A joint partnership between state-owned Beijing Agricultural Investment Fund and the Shenzen-based Yuhu Group, the fund invests in Australian dairy, beef, lamb and aquaculture assets.

- The government has also committed to increasing financial support for agricultural research.

**EXAMPLE OF AGTECH**

There are a limited number of high profile AgTech companies operating in China. One example is DJI, the world’s largest drone-maker. It is backed by Accel Partners, a leading Silicon Valley VC with past investments in companies such as Facebook, Spotify and Etsy. Nevertheless, this isn’t an area of specific focus for China’s agriculture industry just yet. To date, the focus has predominantly been on improving mechanisation for planting and processing, genetech, breeding tech, animal health, disease prevention, and the role of fertilisers and pesticides.
StartupAUS is Australia’s national startup advocacy group. It is a not-for-profit organisation formed in 2013 by fifty leaders in the national startup community. Our mission is to transform Australia through technology entrepreneurship - by making Australia one of the best places in the world to build and grow a tech company.

StartupAUS commissioned and co-authored this report to highlight one segment of Australia’s traditional economy where technology startups can make a very real, positive impact. Startups are solving real problems across a wide range of traditional industry sectors, adding to the productive capacity of Australia’s economy as a whole.

We’re grateful to our partners on this report, as well as our organisational sponsors - Salesforce and Google - for their forward-thinking approach and commitment to Australia’s economic future.

Commonwealth Bank recognises that enhancing the financial wellbeing of businesses, people and communities means identifying the best practices and benefits associated with a new wave of agricultural technology. To do this, we must understand the key roadblocks, and determine how we can contribute to turning significant opportunity into reality. We hope Powering Growth: Realising the potential of AgTech for Australia will raise awareness of this sector and spark conversation about the best ways to realise the potential in the industry.

KPMG operate across 156 countries and has an active global agribusiness group helping farm enterprises, processors, investors, regulators and global consumer brands across the value chain. In Australia we have identified AgTech as an area of investment to support waste reduction and sustainable productivity gains. We run various industry forums connecting stakeholders across agribusiness and can see significant opportunities and challenges for AgTech, and KPMG wants to play a role in enabling solutions to these.

The development of this report is an example of KPMG’s investment into the agribusiness and AgTech industry. We hope that by helping to start a productive and focused conversation, the industry will benefit. With passion and purpose, we work shoulder-to-shoulder with you, integrating innovative approaches and deep expertise to deliver real results.

Advance Queensland is the Queensland Government’s transformational agenda, designed to spur innovation-led economic growth by translating Queensland’s great ideas into commercial success. It will foster the growth of both newly established knowledge-intensive industries and harness the State’s existing strengths, including in the agricultural and AgTech fields.

Queensland has a significant competitive advantage in the AgTech sector, with well-established research and extension programs, a diverse range of cropping and pastoral activities, and an industry sector that is open to innovation and new technology.

The Queensland Government recognises the potential ongoing contribution of AgTech in improving the productive capacity and sustainability of agriculture, but also the creation of new opportunities for local AgTech companies and exports.

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