



Taking 2030

**Growing agriculture into
a \$100 billion industry**

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Supporting the NFF

TELSTRA

At Telstra, we have been part of the fabric of regional Australia for more than a century. We know that for so many communities, agriculture is a way of life as well as an important driver of jobs and economic prosperity. When agriculture thrives, so do our rural and regional customers.

That is why Telstra is partnering with the National Farmers' Federation. Together, our organisations are committed to growing the agriculture industry to meet the NFF's vision of a \$100 billion farm sector by 2030.

As with every area of the economy, the coming decade will see digital technology further entrenched in the business of farming. The next generation of farm businesses will demand a next generation network. By partnering with the NFF, Telstra aims to better understand and meet the demands of our farm business customers now and into the future.

Realising ambitious goals takes innovative thinking and bold ideas. That is why the first step in our partnership is *Talking 2030*. It is all about uncovering new ideas to accelerate the growth of agriculture that we can then champion together in years to come.

I commend this discussion paper to you as the first step in the *Talking 2030* process. We look forward to the conversation that follows and the ideas and initiatives that emerge.



Andrew Penn
Chief Executive Officer
Telstra

KPMG

The world is changing rapidly on the back of the fourth industrial revolution and food production is changing in line with this new world. KPMG has coordinated the development of this discussion paper with the National Farmers Federation (NFF) and Telstra. The paper is designed to ensure that the key emerging issues and trends in the agriculture and food sector are contemplated by NFF stakeholders when they develop the policy roadmap for 2030. We thank the many industry experts and KPMG Partners and staff that have contributed their thoughts and vision to the report.

This report will be used as a base for discussion for a series of workshops hosted by the NFF over the coming months.

The topics covered in this report are not exhaustive. Some other key matters are already captured in existing NFF policies that can be viewed in full on the NFF website. There are also other issues that may be raised by stakeholders in the forthcoming workshops that are not in this report.

Finally, the NFF will develop their policy roadmap based on the outcomes of the workshops – aimed at supporting a doubling of farm sector output.



Robert Poole
Partner, National Lead
Agribusiness –
Management Consulting

Foreword

The National Farmers' Federation (NFF) has laid down a bold vision for the industry: \$100 billion in farm gate output by 2030.

This financial year that figure will total \$59 billion, meaning we need to grow by almost 70 per cent in the coming 12 years.

That sort of growth doesn't happen by accident. We need a clear strategy to capture opportunities and navigate the challenges that lie ahead.

That's why the National Farmers' Federation is embarking on *Talking 2030*.

Talking 2030 is all about engaging the industry in a conversation about its future and identifying concrete actions which will position us for success.

This discussion paper — developed in partnership with KPMG, Telstra and numerous industry experts — is the first step in that process.

In these pages we've captured fresh thinking on how we:

- respond to changing consumer preferences;
- harness technology and innovation to boost our productivity;
- reach burgeoning new markets across the globe;
- access capital to fund this new phase of growth;
- attract and train the best human talent; and,
- lighten our environmental footprint by producing more with less.

Each of these is a momentous task, requiring a willingness to embrace new ideas and cross-industry collaboration. That's why out of *Talking 2030* we want to establish a clear plan that lights the way to our \$100 billion vision.

Feeding and clothing the world, and ensuring a prosperous future for rural Australia are the dual passions which guide our work at the NFF. Our \$100 billion vision is at the core of this agenda – setting an ambitious target which will benefit our customers and our economy.

This is not a vision the NFF can deliver on its own. We need to partner with like-minded individuals and entities on both the plan and its execution.

I look forward to your feedback on the information and ideas presented in this paper, and look forward to working with you as we progress *Talking 2030* and the resulting ideas.



Fiona Simson
President
National Farmers Federation

Industry drivers



Trade and market access



Trust in agriculture, trust in food



R&D



Costs



Infrastructure



Environmental sustainability



People and future of labour in agriculture



Access to capital

Enablers



Innovation & new technology



Regulation



Coordination of the industry

Key themes

This report is presented through the lens of seven key areas.

Setting the scene



85,681

Estimated total farms in Australia

Understanding our future customer



372 million hectares

Land use in Australia for agricultural production

Supercharging our supply chain



4,331 ha

Average farm size which is up 0.3% since 2014-15

Growing sustainably



Australia - 2nd

Largest agricultural area in the world (after China and before the USA)

309,000

People directly employed in Australian agriculture, forestry and fishing

Unlocking new technology



\$59 billion

Forecasted gross value of Australia's farm production in 2017-18

\$61 billion

Forecast gross value of farm production in 2018-19 (+3%)

Attracting people and capital



Industry leadership and coordination



Understanding our future customer

9.8 billion

By 2050, the earth's population is projected to reach 9.8 billion i.e. +2.2 billion estimation vs today

1st

Africa is expected to represent half of the anticipated growth in global population between now and 2050.

2nd

Asia is expected to be the second largest contributor to this future growth, adding over 750 million people by 2050.

60%

FAO's latest projections indicate that global food production will increase by 60 percent between 2005/07 and 2050.

3rd

Australia – fastest growing vegan market in the world (after Arab Emirates and China)



The expectations of the modern consumer are changing — both at home and abroad.

Consumers expect more information about the provenance of their food and fibre. They are embracing new (increasingly digital) supply chain models which create a more direct connection to a product's point of origin. They are also embracing new food sources — a trend which could force a dramatic reshaping of Australia's production systems.

Reaching our burgeoning global customer base will remain a consistent challenge, as we seek to navigate the complexities of global trade rules. Despite recent advances, shifting public sentiment around the world will continue to act as a headwind for trade liberalisation efforts.

Technology can help us overcome many of these challenges. From advancing product traceability, to automating global trade compliance — new technologies can pave the way for a more seamless and gratifying connection with our customers in every corner of the globe.



Shifting dietary preferences

Australia's consumers are embracing Asian cuisine influences and new health trends, with an increased appetite for exotic greens, grains and new protein sources. This new environment can see niche products move quickly into the mainstream — like kale, quinoa and almond milk — and open up significant new market opportunities for responsive producers.

“The consumer is changing, both in Australia and abroad. They are changing what they buy, when they buy, where they buy, and how they buy.”

Read more by Trent Duvall, KPMG, page 33

Some consumers are also turning away from traditional proteins. The number of Australians who say their diet is ‘all’ or ‘almost all’ vegetarian is up 30 per cent in the past four years. This trend is being compounded by government policies and dietary guidelines encouraging a shift to plant-based proteins in Australia and other countries.

Despite these trends, demand for meat remains strong — with global consumption forecast to increase 46 per cent by 2050. However, new competition is on the way. Venture capital funds around the world are committing vast sums to create ‘alternative meats’, which range from lab-grown meat to plant-based imitations.

Shifting diets represent both a challenge and an opportunity for Australian producers.

Cutting-edge crop varieties which meet these shifting needs are already being developed and deployed by Australian research institutions. However, if rapid changes in demand become the norm it will be costly for farming systems to keep pace.

Greater demands and expectations

Our customers are increasingly focussed on where their food and fibres come from, and how it's produced.

Increasingly, characteristics like taste or price are taking a back seat to animal welfare, sustainability, safety and nutrition.

This means farmers are no longer motivated simply by productivity. They must meet their customer's ethical, environmental and nutritional requirements.

“Twenty first century agriculture is more and more focused on engagement with the community (for social license) and the consumer (for meeting market needs).”

Read more by Andrew Spencer, Australian Pork Limited, page 37

Australia has a competitive advantage in this race. We are a global leader in sustainability, animal welfare and food safety, and ‘Brand Australia’ is known for these qualities — particularly in emerging markets.

Our national brand is a critical piece of the \$100 billion puzzle. The continued alignment of that brand with customer expectations will require a sustained and strategic effort. This can only be achieved through coordination between those entities with an active marketing presence in key export markets.

The perception that Australia is a trusted source of food and fibre is one thing. The next challenge is proving it.

Food fraud is an enormous challenge in some of our largest export markets. In response, consumers are demanding fail-safe systems which can validate a product's whole of supply chain journey.

Australia has world-class traceability systems for agricultural products, but these were designed for biosecurity and food safety — not for the contemporary consumer.

Innovations like blockchain and smart packaging will no doubt play a role in reshaping these systems in coming years to create a seamless digital journey from paddock to plate.

New paths to market

E-commerce for food and fresh produce remains the exception rather than the norm in Australia.

Overseas however, e-commerce has proven a significant disrupter to agricultural supply chains. Amazon Fresh has been well received in Europe, and players like Alibaba and TMall have

sophisticated cold chain networks in Asia which are already processing Australian produce.

These new channels offer Australian producers the chance to move closer to their end customer and capture a larger price premium.

Case study – The Alibaba revolution

A China-based online marketplace and platform, Alibaba is revolutionising the way that retailers and consumers connect. Little heard of when founder Jack Ma (now estimated to be worth US\$41.5 billion¹) established the company from Hangzhou in 1999, Alibaba now hosts over 10 million sellers and averages over 30 million deliveries per day². With recently established offices in Australia, Alibaba — which is part of a group of e-commerce and technology companies ‘Alibaba Group’ — is actively seeking to attract more Australian companies into listing, to service Chinese consumers that have a lust for Australian agricultural produce.

Austrade estimates that over 1400 Australian retailers in the agribusiness, food and beverage space alone are listed on Alibaba³. Providing in-market cold-chain logistics and package tracking through its extensive Cainiao logistics network, Australian exporters are able to access lucrative markets in a way that is often simpler than traditional export.

“Over 1400 Australian retailers in the agribusiness, food and beverage space alone are listed on Alibaba.”

Another development has been the rise of the ‘diagou’ — Chinese Australians who sell Australian products back into China at a premium. The key to the diagou phenomenon is trust: recipients of the goods trust their Australian vendor to send an authentic product.

The common theme is consumers wanting a more direct supply chain, and their willingness to forego a ‘touch and feel’ retail experience to achieve it.

For Australian agriculture the opportunities are profound, but the industry needs to consider ways to maximise the benefits at the farm gate.

Opening up new markets

“By 2030, Australia should have preferential trade deals in place with Asia’s five largest economies.”

Australia has a strong track record (notably in recent times) for pursuing trade liberalisation and brokering preferential trade deals in key export markets.

Recent advances like the China-Australia Free Trade Agreement build on established deals with Japan, the USA and South Korea to provide Australia a footing in a mix of established and growing markets.

As the balance of global wealth shifts east to Asia in the coming century, Australia will need to ensure its trade agenda maximises opportunities in this region.

The recent signing of the Trans-Pacific Partnership (TPP) holds promise in this regard, as does the proposed Regional Co-operation Partnership Agreement which is more closely focused on the Asia-Pacific region.

“The EU and the UK look appealing but the existing level of farm subsidiaries mean that half the agricultural producers would go out of business without them.”

Read more by The Hon. Andrew Robb AO, Chairman, The Robb Group, page 38

Headwinds exist in the form of public scepticism towards trade liberalisation. Stagnant wage growth in developed nations has helped fuel a populist backlash against globalisation in recent years, which in turn has seen the rise of political leaders like President Donald Trump in the United States.

The United States’ current trade policies pose a direct threat to Australian agriculture’s \$100 billion vision. However, the problem is not just global, it’s local. The same sentiment exists in the Australian community — posing a challenge for the farm sector to better articulate the universal benefits of free trade.

In addition to tariffs and quotas, market access is also impeded by so-called ‘non-tariff barriers’ (NTBs). These are a product of each country’s complex (and often bureaucratic) import and export requirements. Sometimes NTBs relate to genuine biosecurity or food safety concerns, in other cases they are imposed for protectionist reasons.

An important opportunity exists to use technology to streamline and overcome NTBs, by codifying and automating the regulation and compliance of trade processes.

Dairy non-tariff barrier statistic

Analysis for Australian red meat and dairy sectors indicates that the industries may be losing out on trade worth \$1.25 billion and \$1.57 billion respectively, as a result of technical barriers to trade⁴. There is however continuous movement on non-tariff barriers, as certification and regulatory challenges are constantly changing with context and being negotiated by governments.

1 <https://www.forbes.com/profile/jack-ma/>

2 <http://fortune.com/2015/09/23/alibaba-says-numbers-real-not-fake/>

3 <https://www.austrade.gov.au/suppliersearch.aspx?smode=AND&ind=Agribusiness%7c%7cFood+%26+Beverage&folderid=1736&pg=1>

4 AFGC, 2015 report http://www.pc.gov.au/_data/assets/pdf_file/0004/195871/sub028-agriculture-attachment.pdf

Citrus exports

The Australian Citrus industry is one of Australia's greatest export success stories in recent years. With trade opened up by ChAFTA and other North Asian FTAs, the industry now exports 26 per cent of all product and is worth \$581 million annually — with most of this value derived from trade growth⁵. Export value grew by 19 per cent and volume by 14 per cent year-on-year in Q2 2017, whilst exports to China grew by a huge 87 per cent in this time⁶. Australian citrus is known as high-quality, safe, and meets the taste profiles of Asian consumers.

Discover insights and read the opinions of experts in the dedicated section 'Understanding our future customer', page 33



Key findings

- By 2030, Australia should have preferential trade deals in place with Asia's five largest economies.
- Consumers are rapidly embracing non-traditional crops, based on new cultural and wellbeing trends.
- While forecasts for meat demand remain strong, wealthy countries are taking steps to reduce per capita consumption. This is coupled with a rise in meat alternatives.
- Ethical, environmental and nutritional factors are increasingly driving consumer behaviour.
- Australia has a trusted global brand, but this must be maintained and validated.
- Our industry traceability systems will need to keep pace with customer expectations.
- Consumers in our export markets are embracing e-commerce for food.
- Chinese consumers are using buyers' agents to source trusted Australian products.
- Australia must continue to improve market access — particularly in Asian growth markets.
- Technology may help overcome non-tariff barriers which impede trade.



⁵ Hort Innovation, Fund Annual Report 2016-2017

⁶ Hort Innovation, Trade Intelligence Q2 2017

Supercharging our supply chain

85%

Of the Australian population currently lives in urban areas

12,000

Jobs – this is the potential that a Fresh Food Precinct close to Western Sydney Airport could create

32 million tonnes

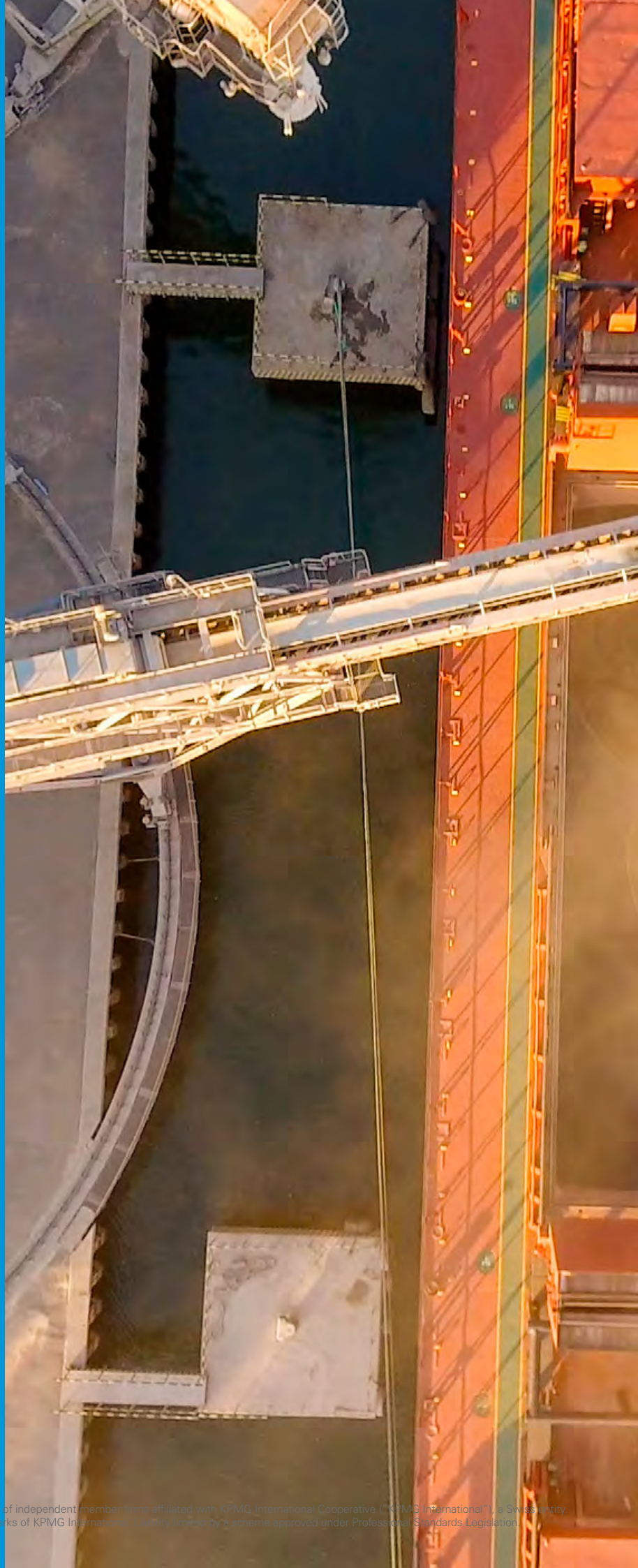
Of freight estimated on the highways and railways by 2030 between Melbourne and Brisbane the equivalent of 1.2 million b-double truckloads of freight per year.

1,700km

The new inland freight rail infrastructure and largest project in Australia with first train operating by 2024

US\$10.6 billion

Estimated revenue of the Ecommerce market in 2017 in Australia (B2C)



A supply chain for 2030 – world-class infrastructure – underpinned by digital technology, real-time data and new contract models

Overview

Infrastructure policy has always been central to the farm sector. The efficient movement of goods from farm to market is a critical factor in Australian agriculture's global competitiveness. To be competitive in 2030 the policy discussion must expand to include new physical infrastructure such as air-freight and also the digital networks that support real-time supply chain management to underpin productivity, food quality and export.

“By 2025 all food and fibre exports from Australia should be fully-digitally enabled, supporting traceability and provenance.”

Connecting our farms to market

In May 2017, the Federal Government announced that it was committing an additional \$8.4 billion through the Australian Rail Track Corporation (ARTC) to facilitate the development of the Inland Rail Project. The project has been positioned as a once-in-a-generation project to connect regional Australia to domestic and international markets. It is Australia's largest-ever freight rail infrastructure project.

“For farming communities to fully realise the potential benefits of Inland Rail it will be important that there be further investment in appropriate ancillary infrastructure such as rail sidings, intermodal freight facilities, supply depots and other industries to complete the supply chain. There will also need to be an associated investment in supporting community infrastructure in regional hubs.”

Graham Matthew, Partner, Head of Infrastructure and Projects Group for Queensland, KPMG Australia

Case study: Modelling the most cost-effective transport options

CSIRO has developed TraNSIT to analyse both small and large-scale investments in the agriculture supply chain, with current applications covering almost all Australian agricultural logistics.

The tool currently accommodates 142 million tonnes of agricultural transport and over five million vehicle movements and 15,000 rail trips per year. This includes the transportation of cattle as well as grains, dairy, poultry, rice, cotton, pigs, sugar, horticulture crops and stock feed. Forestry and sheep will be added in the near future. The tool considers transport from farms to storage, feedlots, processing, export ports, as well as domestic supply chains to distribution centres and retailers.

The tool was used to estimate that an upgrade to the corridor between Roma to Toowoomba to allow triple road train access or Type 2 road train access from Roma to Toowoomba is estimated to save a total of \$4.9 million per year in transport costs or \$1.24 per head of cattle moved.

Maximising access to markets using fresh food precincts and air freight

Investments in the food supply chain will be underpinned by new technologies in plant breeding, indoor farming, energy and water management, food safety and quality, digital and IoT.

New investments will link into distribution models including air freight of fresh food. Fresh seafood, meat and some fruit and vegetables are already air freighted to export markets (e.g. from Wellcamp Airport in Toowoomba to Hong Kong).

Food assurance (quality, safety, environment, people and animal welfare) will be a competitive advantage for Australia compared to many countries. Emerging business models will provide an even better basis for delivering food assurance in real time.

Australia has the potential for highly efficient cross-border zones based on digital platforms (such as blockchain) that will enable fast and efficient trade of food and fibre. For this to be achieved, we must eradicate inconsistencies of food product standards between Australia and destination markets.

For this to occur, Australia must establish the necessary physical infrastructure. Airports capable of accommodating international cargo flights must be established in close proximity to key food growing regions.

By coupling freight facilities with fresh food precincts – where products can be packaged or further processed – Australia can maximise its responsiveness to overseas customers, and its returns back through the supply chain.

“By 2030 all major food producing regions in Australia will have a borderless fresh food precinct – capable of air freighting food directly to key markets.”

“In the next five years Australia must become a leader in digital platforms e.g. blockchain that enable the fast and effective export of food and fibre and provide real-time monitoring of the chain.”

Read more in Think big, think fresh: A Fresh Food Precinct at the heart of Western Sydney



A supply chain underpinned by new contract models to reduce risk for all parties

In this report the CEO of The NZ Merino Company (NZM) John Brakenridge provides an insight into a real example where a sector has changed its supply chain by working directly with customers and providing more certainty across the chain.

“The wool industry must challenge the status quo, blow apart the traditional price-taker mentality and move to a value creation model. The wool industry would never meet the challenges of tomorrow under the price-taker model. Sadly, this model remains prolific in our industry: quality product is produced by passionate people who have no connection with the end-users of their product, no feedback as to how to optimise its value. It’s a commodity disposal model based on an historic auction system where wool producers are in the back seat.”

Australian agriculture is exposed to a combination of global market volatility and climate volatility that has limited the sustainability of returns in most sectors.

If we are to achieve our 2030 growth targets we must work with customers (e.g. retailers) and food processors to develop new supply agreements that improve supply certainty, product quality, sustainability and reduce volatility. We should emulate the work of NZM. We need customers who are prepared to work with Australian growers in sustainable commercial models.

Discover insights and read the opinions of experts in the dedicated section ‘Supercharging our supply chain’, page 40



Key findings

- Reaping the benefits of the Inland Rail will require ancillary investment in rail sidings, intermodal freight facilities and supply depots.
- By 2025, Australia must become a leader in digital platforms (e.g. blockchain) that enable seamless global transacting for food and fibre, and provide real-time supply chain monitoring and validation.
- By 2030, all major food producing regions in Australia should have a borderless fresh food precinct – capable of air-freighting food directly to key markets.
- Australia must explore and embrace contracting models in which farmers are not ‘price takers’ and are better able to manage risk.

Growing sustainably

48%

Agricultural businesses occupy and manage 48% of Australia's landmass

9.2 million mega litres

Total amount of water used on Australian farms

\$251m

Australian agricultural businesses spent \$251m on irrigation related expenditure in 2015-16

94%

Australian farmers actively undertaking natural resource management

63%

Reduction in greenhouse gas emissions between 1996-2016 by Australian primary industries



We must grow food production while we sustain our planet and people.

Overview

The production of food that utilises methods that maintain the health and wellbeing of our natural resources, people and animals is a profound responsibility. Australian farmers love their farms and are ready to take on this challenge.

The planet must produce more food in the next four decades than all farmers in history have harvested over the past 8000 years. That is because by 2050, the Earth will be home to as many as 10 billion people, up from today's 7.5 billion.

The OECD reported that: "For agriculture and aquaculture to respond to future challenges, innovation will not only need to improve the efficiency with which inputs are turned into outputs, but also conserve scarce natural resources and reduce waste".⁷

Most of the population growth is likely to come from developing markets, with Africa expected to double its population by 2050. The demand for food export will put pressure on developed food economies to supply the global market.

In this report we have contributions from industry leaders that provide the farm sector with audacious goals, implementation and communication challenges that will underpin sustainability of agriculture in Australia.

Water is at the heart of the sustainability discussion

As we write this report in March 2018 the management of water in the Murray-Darling Basin (MDB) is again in the spotlight. The MDB is the focal point of water policy in Australia, and the principles of sustainable use for food production and the environment apply to all river systems.

In this report the Murray-Darling Basin Authority CEO Philip Glyde writes that the MDB Plan represents a seismic shift in how we think about the Basin's rivers and how we share their water.

"The MDB Plan puts the environment's needs on a par with those of irrigators and other water users across the Basin's one million square kilometres. Importantly, it also recognises that farmers are stewards not just of the land, but of our nation's water resources too."

"The Basin Plan can deliver its aim — a healthy environment that supports healthy industries and communities. We know that the Basin economy continues to grow, and that there is already tremendous innovation in the irrigated agriculture sector driven by a combination of private and government investment."

Glyde challenges farmers to tell the stories of the importance of certainty that sound water policy delivers.

The use of technology in water management is already prevalent and growing. For example, Victoria's Goulburn-Murray irrigation system is controlled, monitored and measured by a wireless IoT network. However, there are still some elements of the water management system that can be enhanced by the use of technology and this will build confidence in the management of the Basin amongst the community.

Australia should embrace "IoT technology to monitor and measure irrigation water use to ensure community confidence."

"The Murray Darling Basin plan must be implemented in full, and spell an end to water politics."

Case study: Sundrop Farms

The Sundrop horticultural operations at Port Augusta in South Australia, have been established in such a way that they can deliver consistent, high-quality produce year-round through a greenhouse system built around sustainability and intensive farming to achieve a better result for people, the planet and profitability. At full production, the \$200 million project of four greenhouses produces approximately 15,000 tonnes of truss tomatoes a year. Key to their innovation is their self-sourced power – the facility leverages thermal energy through solar panels to make electricity, generate heat and clean water. The solar panels are automated through a series of high tech algorithms to pivot with the sun to maximise exposure to solar energy. The facility also has access to salt water that is purified and reticulated onto the irrigated tomatoes. Seawater is also used in the ventilation system to clean and sterilise the air, minimising the need for crop chemical protection. Finally, while the tomatoes are still harvested weekly by hand, robotic carts are used to take the fruit away and feed it through a state-of-the-art packing facility.⁸

Read more about the intensification of agriculture and the importance of policy settings that are in line with new agricultural production systems, page 49

Emissions neutral Australian agriculture

Can all agri-business sectors adopt the target set by Meat and Livestock Australia — carbon neutral by 2030?

In this report, Michele Allan, Chair of Meat and Livestock Australia (MLA) has outlined MLA's ambition to be carbon neutral by 2030 — referred to as CN30.

Achieving the CN30 goal, says Allan, would put Australia well above our competitors in the high-value markets where consumers have a growing interest in a food's provenance and environmental footprint. It would instil even more confidence in the quality and integrity of our product. And it would neuter the claims of the industry's critics.

7 Agricultural Finance and Opportunities for Investment and Expansion by Augustine Odinakachukwu Ejiogu, ICI Global, Page 98 <https://books.google.com.au/books?id=j95PDwAAQBAJ&printsec=frontcover#v=onepage&q&f=false>

8 <https://www.weeklytimesnow.com.au/agribusiness/decisionag/sundrop-farms-mixture-of-sunlight-andseawater-leading-the-way/news-story/8928aff10d54c5d9a56024e72a6c0377>

“What’s more, there’s an almost perfect correlation that exists between increased productivity and reduced greenhouse gas emissions. That’s been proved in ample research to date, including Commonwealth programs such as Filling the Research Gap,” says Allan.

Lucinda Corrigan, Chair of Farmers for Climate Action, refers to the key role of research and development and the levy-funded agencies in aligning climate research with risk management and productivity gains.

“To be successful IT (R&D) needs to operate more collaboratively both within and across industries.⁹ There are many new players alongside the traditional research and delivery pipeline, universities, State Departments of Primary Industries, and CSIRO. Increasingly, private companies are emerging to deliver downstream development and commercialisation. These arrangements require clear rules around intellectual property and freedom to operate. It is these arrangements that will improve the delivery of commercial outputs to Australian farmers.”

“As a minimum expectation, each RDC needs to set a strategy and goals required to reduce emissions, using robust modelling which shows the mitigation required alongside the projected increase in productivity and total production. Some industries are well advanced, such as the wine grape industry which has been dealing with the loss of one day in growing season over the last 20 years and has made transformational changes to viticulture and its location around Australia,” Corrigan states.

Producing more with less: intensification as a path to sustainability

This report also touches on a clear trend of sustainable intensification of food production in Australia as a clear enabler towards the \$100 billion target, but also sustainability objectives.

Most farm systems are intensifying to some degree. This can deliver improved sustainability and lower footprints.

The Netherlands provides a working case study of how intensification can drive productivity. The Netherlands has a land mass of 41,543 km², and a population of 17 million people. Australia has a population of only six million more than the Netherlands but has more than 150 times more land. The Netherlands however is the world’s number two exporter of food produce by value — Australia sits at 15th on this list. How do they do it? Read more on page 49.

Lucinda Corrigan also sees intensification as a key goal.

“Sustainable intensification will be an important component of the approach in the broadacre industries and particularly in the approach to managing natural resources and responding

to climate change in an increasingly variable climate. The horticulture industries are leading in the adoption of improving water efficiency and nutrients, production and use of energy. The broadacre industries require investment and innovation to achieve sustainable productivity growth (e.g. improving water use efficiency, identification and movement of livestock, monitoring of livestock for sale, reduction of waste through collection and analysis of data). Genomics will play a key role in improving efficiency, combined with big data analysis such as enabling selection for the ‘hard to measure’ traits in beef cattle e.g. feed efficiency on grain and grass.”

Planning laws need to move in line with new business models and technologies. Currently, farm businesses – particularly those on the urban fringe – can face resistance from neighbouring landholders when looking to intensify. State planning laws need to recognise the benefits and necessity of this type of development and more clearly defend landholders’ right to farm.

To support best practice regulation in this area, Australia should develop national best practice planning guidelines for peri-urban agriculture. This could follow models set by national frameworks for community housing, or land use conflict with mining and petroleum.

Energy on the farm

Until recently the price of energy to Australian business was considered a competitive advantage.

There have been multiple drivers of electricity costs over the last decade, writes KPMG’s Cassandra Hogan.

“Network prices have risen due to large capital programs, other increases are due to significant spikes in wholesale costs as the energy mix moves from fossil fuels to renewables. At the same time, gas prices have tripled due to fundamental changes in LNG supply and demand due to exports. Additionally, government green schemes have added further costs to be borne by the consumer.”

According to Hogan, “The government’s role is to provide a stable and robust environment for investment. There needs to be certainty on how climate change policies will apply to the energy sector as well as more measures to better manage and integrate renewable energy supply. The government should also be ensuring that poles and wires businesses have the right incentives to be efficient. To help make prices competitive, in addition to the above measures, better encouragement is required for more supply into the market which will ensure there is a more effective choice for consumers.”

The farm of the future will also consider changes to their energy mix.

⁹ Social Licence to Operate project is a long-term project coordinated by NSW Farmers CEO Matt Brand, to improve the trust that Urban Australians have with the agricultural sector.

“The farm of the future is expected to actively deploy on-site renewable energy and battery storage in its electricity supply mix, achieving significant cost reductions and environmental benefits, without compromising the reliability of supply,” says Dmitry Danilovich of KPMG.

“For grid connected farms, on-site renewable energy sources can also deliver material cost savings, by reducing their electricity consumption from the grid. The farms will benefit from savings on network costs and environmental obligations, where renewable energy assets can be developed behind the meter. Large-scale Generation Certificates (LGCs) provide an additional source of value — these can be used to meet obligations under the Renewable Energy Target in respect of power supply from the grid or sold to energy retailers and other energy users to derive revenue, offsetting electricity supply costs,” says Danilovich.

“These solutions do not compromise the reliability of electricity supply, as the farm remains connected to the grid and continues to draw electricity from the network when on-site power supply sources are not sufficient.”

Biodiversity — national market-based approach rewards farmers

Australian farmers are custodians of approximately 48 per cent of Australia’s land mass. With this comes a deep connection to the nation’s plants and animals and a duty of care in how farm systems interact with them.

Some state-based schemes e.g. BioBanking in NSW, have been put in place to support biodiversity management.

Uptake of these schemes has been patchy and their national implementation piecemeal. The current depth of the market for conservation services on private land falls short of what is required to properly reward landholders for the significant investments they make in landscape management.

While a market-based approach is unlikely to become a comprehensive solution to this issue in the near term, we should nurture new frameworks which provide a consistent mechanism for matching landholders with purchasers of landscape services.

Case Study: BioBanking

BioBanking is a market-based scheme that provides a streamlined biodiversity assessment process for development, a rigorous and credible offsetting scheme as well as an opportunity for rural landowners to generate income by managing land for conservation.

BioBanking enables ‘biodiversity credits’ to be generated by landowners and developers who commit to enhance and protect biodiversity values on their land through a BioBanking agreement. These credits can then be sold, generating funds for the management of the site. Credits can be used to counterbalance (or offset) the impacts on biodiversity values that are likely to occur as a result of development. The credits can also be sold to those seeking to invest in conservation outcomes, including philanthropic organisations and government.

Discover insights and read the opinions of experts in the dedicated section ‘Growing sustainably’, page 44



Key findings

- Industry should consider adopting a target and supporting strategy to be carbon neutral by 2050.
- The Murray Darling Basin plan must be implemented in full, and spell an end to water politics.
- Australia should embrace IoT technology to monitor and measure irrigation water use to ensure community confidence.
- A bipartisan approach to climate and energy policy is required to address climate change while facilitating investment in generation.
- Australia should develop national best practice planning guidelines for peri-urban agriculture which defend the right to farm.
- Government policy should support farmers in developing a mix of energy options on their farms including renewables, battery storage and connectivity to the grid.
- Industry should explore a market-based approach to biodiversity management which rewards farmers for landscape services.

Unlocking new technology

0.015%

Australia's venture capital investment is less than 0.015 per cent of GDP, Israel and the US more than double that investment spend at 0.38 and 0.28 respectively.

\$306 million

The Australian government provided \$306 million of R&D support to agriculture between 2015-2016; \$252 million of this was allocated to rural research programs in particular.

In 2016-2017 they committed \$271.7 million.

\$20 billion

The Government estimates food waste costs the Australian economy \$20 billion each year

US\$5.7 billion

Estimated global market for agriculture robots by 2024

US\$2.9 billion

Estimated global market for drones in agriculture in 2021

1st

The first robotic fruit picking machine is expected to be released to market this year, joining other robotic devices now being used on farm.

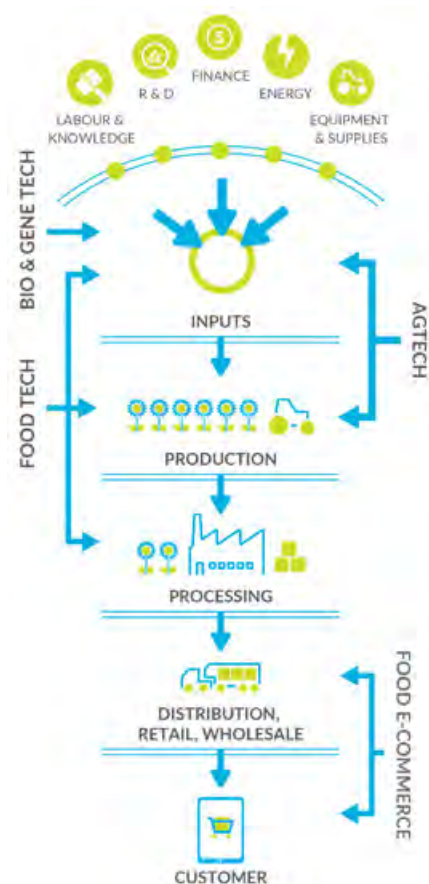


Overview

The appetite of governments, investors, entrepreneurs, researchers, corporates and farmers for new yield enabling technology is very strong, as reported by Ben van Delden, Head of AgTech at KPMG. Australia's AgTech and FoodTech ecosystem is growing day-by-day with increased interest, activity and focus on the role the fourth industrial revolution can play in the least digitised industry in the country.¹⁰ Australia is one the largest food exporters in the world and could benefit from the existing trend and become one of the top three exporters of AgTech and FoodTech.

Australia's agricultural productivity growth rate has been averaging 1.1 per cent¹¹ which is below the global average of 1.7 per cent. Continually investing in technologies and embracing new technologies is essential to closing the productivity gap if Australia is to catch up to other nations and secure its share of the world's growing demand for agriculture produce, and achieve the \$100 billion target by 2030. Economic modelling conducted through the Precision 2 Decision (P2D) project indicates that digital technologies for agriculture could unlock \$20.3 billion in gross value of agricultural production.

How AgTech can improve the connectedness across the value chain, from farmers to customers



Source: *Powering Growth: Realising the potential of AgTech for Australia*, September 2016 <https://home.kpmg.com/content/dam/kpmg/au/pdf/2016/powering-growth-realising-potential-agtech-australia.pdf>

Future-proofing our research apparatus

Research and development (R&D) is a key enabler to underpin innovation and profitable and sustainable sector growth. R&D enables scientific breakthroughs across the value chain from cutting-edged inputs to innovative manufacturing systems and supply chains. In Australia, rural R&D is supported by the levy system co-funded by government contributions and managed by the Rural Research and Development Corporations (RDCs). Despite the various discussions around its merits, the NFF's policy (refer to 'Top policy areas' in Appendix) clearly affirms the value of maintaining the levy system to help Australia to keep the sector ahead of the competitors.

In 2007, CSIRO established a 'Cotton Breeding Australia' partnership with Cotton Seed Distributors (CSD), with supporting technology access arrangements provided by Monsanto. Over 10 years, the joint venture has invested \$101.7 million towards the research and breeding of future cotton varieties for Australian growers.

Read more by John Manners, CSIRO Director, page 50

R&D is usually financed by government-funded institutions but a shift is occurring as alliances and public-private partnerships are increasingly funding agribusiness innovation.

The next challenge is to make the benefits inherent to new R&D technologies available for all. Once they exist, it is critical that innovation be commercialised and adopted by agribusinesses conditionally as research outcomes meet the industry's needs.

The innovation ecosystem still lacks synergies between scientists and agricultural experts to support the development of applications and their effective commercialisation.

"Provide research direction to Australian universities, research development corporations and state departments of agriculture via commercialisation and adoption KPIs, and some shorter grant periods to promote 'sprint' innovation."

Recommends Ben van Delden, Head of AgTech at KPMG. Read more on page 53

Australia needs to create the conditions for AgTech to thrive and deliver the expected outcomes on the sector growth, sustainability and productivity. It is, for instance, about supporting the start-up ecosystem which is prone to failure. In a fast-moving world, it is also about ensuring that the tax system is keeping pace with the AgTech solutions coming into the market.

¹⁰ McKinsey, May 2017, 'Digital Australia: seizing opportunities from the fourth industrial revolution'

¹¹ ABARES, Agricultural commodities: March quarter 2018

http://data.daff.gov.au/data/warehouse/agcomd9abcc004/agcomd9abcc20180306_6R2bY/AgCommodities201803_v1.0.0.pdf

The farm network of the future

The P2D report affirms that “a lack of access to mobile and internet telecommunications infrastructure is a major impediment to the adoption of digital agriculture systems”. The same report recommends that “Federal Government considers policy and investment options to improve telecommunications to farms and rural businesses including the potential for public-private investment models for telecommunications infrastructure”.

Fit-for-purpose network connectivity will enable farmers to fully benefit from digital solutions and Internet of Things. While the NBN is being implemented across parts of the country, the 5G network is also being readied. In addition, new network technologies keep emerging.

None of these new or established networks will be a standalone solution to connectivity issues in regional Australia. The reality is a mesh of network options – fixed and mobile; high and low bandwidth – will work in tandem to service farmers’ various network demands.

“Getting devices to talk to each other and provide real-time information in a central dashboard at the farmer’s home or office will require connectivity on a scale never seen before.”

Read more by Sami Makelainen, Technology Insights Manager, Telstra, page 55

The Internet of Things

The Internet of Things (IoT) is an innovative system allowing the interconnection of the physical world such as animals, people, and mechanical machines with the digital world. IoT offers broad applications, including for the agriculture sector, to provide us with a better understanding of our environment, help us in predicting future events, support decision-making and improve system and automation efficiencies.

“Smart food and fibre IoT [...] enables the agriculture sector from paddock to plate and field to fibre, to not only digitally transform the farm, but to enable the digital supply chain and benefit from the efficiencies, productivity gains and economic opportunities that come with it.”

Read more by Piers Hogarth-Scott, National Lead IoT, KPMG, page 56

According to Sami Makelainen, Technology Insights Manager at Telstra, IoT — while already making an impact in agriculture, IoT will be game changing for Australian farmers (read more on page 55).

Short-term to medium-term use cases driven by a comprehensive instrumentation and connectivity of ‘things’ can deliver up to \$120 billion annually to the Australian economy by 2025¹².

Harnessing the blockchain

Financial services are already being disrupted by blockchain technology. So it will be for agriculture.

In the context of increased awareness for food safety, consumers want to make an informed decision by ensuring product traceability.

As explained in a recent KPMG-NSW Farmers publication¹³, blockchain is a public ledger available to all parties within a supply chain including producers, retailers, logistics providers, and regulators. It provides a comprehensive record of each asset, all transaction history, and its current ownership. It provides a platform for food assurance, serving as a repository for data that demonstrates where, how and when food was produced, processed and distributed, thereby improving traceability and transparency of food.

“Data — not paper — will be the foundation of trade.”

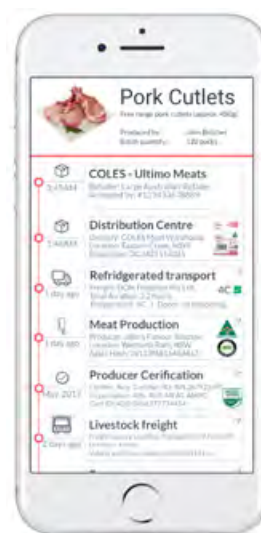
Read more by Laszlo Peter, Head of Digital Ledger Services, KPMG, page 61

The entire value chain will be disrupted by blockchain technology to assemble true provenance.

Some food retailers are already implementing blockchain associated with simple solutions such as scanning QR codes with a smartphone that is linked to a unique code used to demonstrate product provenance.

Industry will have to consider how the demand for blockchain-based traceability systems will interface with existing traceability and quality assurance programs for major commodities.

How blockchain could work in Australian retail



Source: <https://marvelapp.com/6856a77/screen/33960311>

¹² http://www.commsalliance.com.au/_data/assets/pdf_file/0004/58702/Enabling-the-Internet-of-Things-for-Australia.pdf

¹³ KPMG and NSW Farmers, November 2017, *Think big, think fresh: A Fresh Food Precinct at the heart of Western Sydney*



Source: University of Sydney, Australian Centre for Field Robotics

The food retailer Carrefour is implementing blockchain

In March 2018, the French mainstream retailer Carrefour announced Europe's first food blockchain, an innovative system designed to guarantee consumers complete product traceability through a digital ledger¹⁴.

The technology will be rolled out to nine animal and vegetable product lines such as free-range chicken, eggs, cheese, milk, oranges, tomatoes, salmon and ground beef steak. The technology has enabled consumers to have traceability capabilities, whilst also allowing breeders to showcase their produce and expertise. The technology is as simple as scanning a QR code with a smartphone, after which consumers are able to download and access a full suite of information about their scanned product; where and how the animal was reared, the name of the farmer, feeds and treatments used, quality standards met, and where the animal was slaughtered.

Automation and artificial intelligence

During the opening ceremony of the 2018 Winter Olympic Games in South Korea, everyone was able to observe drones' cutting-edge technology. It is of course not only about making

the show. Drones, as well as other robotics and automation solutions, are key enablers to disrupt the sector when it comes to collecting real-time data seven days a week, automating arduous work, reducing costs and supporting the environmental cause.

Electric and autonomous vehicles

The adoption of electric and autonomous vehicles is highly dependent on the investment in, and development of infrastructure, to enable the full benefits of connecting cities with rural Australia.

"Artificial intelligence has the ability to disrupt and digitalise the supply chain of knowledge in the agriculture sector in the next 15 years."

Read more by Salah Sukkarieh, Professor, Australian Centre for Field Robotics, page 63

Further development in machine learning techniques and computation capabilities are still required to cope with the specific challenges of the agriculture sector, including ever-changing environmental factors.

¹⁴ <http://www.carrefour.com/current-news/carrefour-launches-europes-first-food-blockchain-and-plans-to-extend-the-technology-to>

Using and securing our data

The roll out of NBN and arrival of the 5G network wireless communication standard in a few years' time, plus the increased use of technologies including sensors, autonomous vehicles and tractors, drones, connected farming equipment and robots, will create an explosion of data in coming years.

Cyber security

Agriculture will embrace the digital revolution. But as the sector changes, it must also consider the inherent risks. Cyber events can occur at any time and in any place. "[...] it has never been so crucial to apply sound cyber security practices to ensure that benefits can be harvested from technologies in a secure manner," says Khoa Duong, cyber security expert at KPMG. Read more from this expert, page 60

Data delivered by digital technology coupled with advanced analytics are a game changer for Australian farmers to push the boundaries of performance.

However, data must be associated with clear ownership rights and cyber security practices. In our digital world, enhanced computing power together with a generalised internet access creates new marketplaces where data ownership rights become a key challenge. It also increases the risk of cyber events.

"[...] ensuring data does not become a major impediment to competition."

Read more by Mick Keogh, Executive Director, Australian Farm Institute, page 59

Industry must engage closely with providers of new technology solutions to understand how their data will be managed, secured and shared.

Given the imbalance in negotiations between individual business owners and technology companies which service a global customer base – new industry structures will be required to ensure producers' expectations are articulated and met by the technology sector.

The ability to adopt new technologies will be vital to meeting our goals

It is important that farmers have access to new technologies based on good science and sensible regulatory frameworks.

As David Hudson explains in the report, in recent years New Breeding Techniques (NBT's) have emerged that offer novel tools for delivering desirable characteristics in crop plants, such as increased yields, insect and disease resistance and climatic tolerance. Although largely at the research stage, these techniques could revolutionise plant breeding and, by extension, farming.

"NBT's have the potential to reduce the cost and time of bringing new products to the market compared to traditional breeding techniques. They do this largely by improving the accuracy of the plant breeding process so that less time is spent removing unwanted attributes that can be transferred along with the gene of interest during the traditional breeding process."

"The current lack of regulatory uncertainty is the major barrier to transformational advancements in breeding new plant varieties for Australian farmers."

Read more by David Hudson, Managing Director, SGA Solutions Pty Ltd, page 51

Australian agriculture cannot afford to be left behind in this revolution — to do so will reduce Australian farmers' competitiveness in their domestic and global markets.

South Australia's ban on genetically modified crops

The South Australian (SA) government has extended the state's ban on growing genetically modified (GM) crops until 2025, sparking significant concerns for SA farmers. A new report by independent market analysts Mecardo released in March 2018 provides clear and undeniable evidence that the ban does not deliver any benefit to the state's farming sector, but rather is denying farmers the ability to generate profit in a more environmentally sustainable way¹⁵. Not only do SA's farmers now not achieve price premiums, but they don't have the opportunity to experience the benefits of growing safe and approved GM canola — an opportunity the rest of Australia has. Recent independent data by Graham Brookes of UK-based PG Economics has shown that GM crop farmers in Western Australia, Victoria, New South Wales and Queensland have gained \$1.37 billion in additional income and produced 226,000 tonnes more of canola than would otherwise have been produced if conventional seeds had been used. GM traits in cotton and canola have also contributed to a significant reduction in the environmental impact associated with insecticide and herbicide use on the areas devoted to these GM crops in Australia.

15 <https://www.croplife.org.au/wp-content/uploads/2018/03/NEW-REPORT-CONFIRMS-SOUTH-AUSTRALIAN-FARMERS-MISS-OUT-UNDER-STATE-BAN-ON-GM-CROPS.pdf>



Key findings

- Australia's Research & Development Corporation model is an important asset which must be maintained. However, RDCs must continue to embrace new ways of partnering with the private sector on commercialisation.
- Tax and other policy settings must encourage the innovation ecosystem in Australia to facilitate development and adoption of new tools and techniques.
- By 2030, every farm should be connected to the Internet of Things using either traditional or emerging networks.
- Industry should start exploring the impact on supply chain costs, services and stranded assets of a move from internal combustion to electric engines (on and off road).
- Governments and relevant private sector providers must announce clear strategies to co-invest into the array of technologies and physical projects required to facilitate electric and autonomous vehicles.
- Australia should overcome the digital divide by ensuring the digital research and education sector is linked directly to the agriculture and food supply chain sectors.
- The farm sector must develop codes governing the management of industry data.
- Industry must be increasingly educated and aware of the importance of cybersecurity.
- Australia must take a science-based approach to 'New Breeding Techniques', which allows us to keep pace with global competitors.
- Intellectual property rules relating to genetics and breeding need to ensure appropriate access to new varieties.

Discover insights and read the opinions of experts in the dedicated section 'Unlocking new technology, page 50

Attracting people and capital

216,100 male, 88,110 female

216,100 males and 88,100 females were employed in the Australian farm sector at May 2017

99%

Of Australia's farms are estimated to be operated by families

0.3%

The Australian superannuation industry invests only 0.3% of its total capital pool in Australian agriculture.



Making Australian agriculture an employer of choice

People and their skills will continue to be the most important success factor for Australian agriculture. In this report we have raised a number of key issues that are changing and need further consideration.

Demographer Bernard Salt explains that the larger rural towns are sustaining their populations. However, populations are falling in smaller towns and on farms. Salt uses the West Wimmera region to demonstrate this impact.

Ethical labour practices

Australian agriculture must adapt to remain competitive in a changing global landscape according to KPMG's Richard Boele.

"Environmental, social and governance expectations on business are increasing as regulators, investors, customers and communities require greater transparency over non-financial risks. In this context, ethical labour practices have come to the fore as agricultural companies find their approaches to human rights globally benchmarked¹⁶ and subject to media scrutiny," he says.

Boele explains that in Australia, the reputational risk associated with labour rights violations is well known to those in agriculture, and some in the sector fear unfair targeting if growers are subjected to more checks and regulation.¹⁷

"In reality, Australia's brand and the reputation of our farmers can only be protected by strengthening the capacity of our industry as a whole to demonstrate that it can identify and manage human rights risks," writes Boele.

Vibrant rural communities are vital to farm sector growth

West Australian farmer Sue Middleton says that in order to grow farm sector output we need to have competitive regional communities where people want to live, and want to take and grow their businesses. However, she points out four key factors that require significant attention to achieve this: telecommunications, health, education, and childcare.

Rural and regional communities need to get these four factors right, as a minimum, to ensure they can attract people to drive the future of agriculture in Australia.

Accessing global skills

Does Australia need a new ag-specific visa?

Emma Germano, a horticulture grower, explains that agriculturalists are calling for a dedicated visa for the industry to help support an increase in productivity and sustainability for farmers in conjunction with an amnesty on all currently employed labour that does not meet legal regulations.

"The agriculture visa can ensure that workers feel protected in their place of employment and are hired under suitable conditions – particularly for those people who are employed from countries where complaints and communication between employers and employees is culturally discouraged."

"The agricultural visa should be designed to be supportive of the current seasonal workers' program and encourage greater reliability, return workers and efficiencies to drive productivity for the industry."

Commenting on the impact of the recent changes to backpacker tax arrangements, Germano says, "The negative debate and media reporting on the backpacker tax (whereby they are no longer entitled to the tax-free threshold, and instead are taxed at 15 per cent) has resulted in an overall decline in employees and applications for working-holiday visas."

A system to support the hire of a legal, reliable workforce is critical to ensuring that sustainability and growth can be achieved for agriculture as an industry, and facilitates fair costs of labour inputs.¹⁸ This requires a supportive government response that encourages efficient domestic and international labour use, discourages any perverse outcomes and meets employment rules and regulations (including tax obligations).¹⁹

Making our farms investable

Making our farms investable is essential as we seek capital for growth.

Access to capital is perhaps the most important element in achieving the NFF's 2030 goals of \$100 billion of farm output.

"Around \$600 billion in additional capital will be needed on farms and in supply chains between now and 2050 ... a further \$400 billion will be needed to support older farmers exiting the sector, allowing the next generation of farmers to buy them out."

Greener Pastures, 2012

16 Corporate Human Rights Benchmark, 2017, *Agricultural Products* <https://www.corporatebenchmark.org/sites/default/files/styles/thumbnail/public/2017-03/Key%20Findings%20Report/CHRB%20Key%20Findings%20report%20-%20May%202017.pdf>

17 Harley Dennett, 11 December 2017, 'New Agency Needed to Combat Slavery Practices in Australia', *The Mandarin*, <https://www.themandarin.com.au/87075-modern-slavery-practices-new-agency-needed/>

18 Victorian Farmers Federation, 2018, VFF Horticulture Policy Statement – horticulture labour, VFF Policy Council

19 Victorian Farmers Federation, 2018, VFF Horticulture Policy Statement – horticulture labour, VFF Policy Council.

According to KPMG's Sam McClure, Australian agriculture has been challenged by a lack of access to capital and investment.

"There is plenty of capital available, however it often looks for longer investment periods, steady returns and low risk investments — agriculture has traditionally not met these criteria."

Reducing risk is key to increasing capital flow

McClure explains that volatility is the sector's greatest challenge in attracting investment. The regularity of farmer earnings is largely a function of water and climate, which can lead to vast differences in yield year-on-year. The development of innovative financial instruments to reduce this risk are therefore crucial, and both government and industry should work together to create new models to these ends.

"The first way of flattening volatility in the yield curve is through financial products, including insurance. The US has established these types of risk management vehicles for agriculture far more successfully than in Australia, where products are ill-suited to the market and uptake is low. It is estimated that less than one per cent of Australian farmers have crop insurance, contrasted to over 90 per cent in the US."

"Multi-peril insurance is subsidised in markets like the USA but continues to be a gap in the Australian farm business model. The real-time analysis of risk on a farm-by-farm basis (using technologies such as IoT and artificial intelligence) could be the step-change that is needed to make multi-peril insurance a commercial reality in markets like Australia."

Robert Poole, KPMG

This paper also discusses many other business models that will reduce risk and improve the attractiveness of the sector to non-farm capital. These concepts are not new but have also not been widely adopted in the Australian farm sector. These include:

- improved succession planning tools – moving away from primogeniture to collective, transparent and multi-generational farming;
- equity partnerships – where silent investment is sourced to finance expansion and productivity;
- vertically integrated agribusinesses – where most, or all, of the supply chain is owned by the same business, generating greater economies of scale and efficiencies; and
- leasing arrangements – whereby land ownership remains with a single entity and primary production rights are leased to a farmer who can thus leverage their working capital more effectively.



Key findings

- The Australia farm sector must publicly commit to ethical labour practices, coupled with greater oversight.
- A dedicated agricultural visa should be designed to support people coming to Australia for employment in agriculture.
- Industry must explore ways to make farm businesses more 'investment ready' – including through education and extension programs.
- Australia's stance on foreign investment must not place undue barriers on foreign capital.
- New commercial arrangements such as long-term contracts; insurance and leasing or equity models must be explored to make investment in agriculture more attractive – including to superannuation funds.
- Successful succession planning models will play a critical role in encouraging new participants to replace our ageing farming population.
- Rural services must underpin the attractiveness of living in rural communities. All levels of Government should develop master plans that ensure that by 2030 all regions of Australia have access to the best level of communications, health, education and child care services.
- Telecommunications and associated technologies provide an exciting new platforms to deliver services to rural communities, but infrastructure must keep pace with demand.

Discover insights and read the opinions of experts in the dedicated section 'Attracting people and capital', page 65



Expert Viewpoints

Setting the scene



Shifting heartlands — the changing demographics of rural Australia



**By Bernard Salt, Managing Director
of The Demographics Group and
contractor to KPMG Australia**



Australia's rural and regional heartland is on the move. And I don't mean in the geological sense of shifting soils although that too is most likely an issue in some parts of the continent.

No, the Australian heartland that I say is on the move relates to our rural demography: the bigger cities and towns in the regions are still growing albeit at modest rates but the smaller towns and villages and the farmlands are conceding population to other places.

This isn't so much of a seismic shift as it is a slow-burn caused by changed markets, by new technology and perhaps most powerful of all, by the changed expectations of young rural Australians. Indeed, the very model of farming is being reimagined.

The 2016 Census shows for example that over the preceding five years the number of beef cattle farmers dropped by 4000 to 28,000, the number of mixed crop and livestock farmers dropped by 12,000 to

23,000, and the number of dairy farmers dropped by 2000 to 11,000.

We are producing more agricultural output than ever but we are doing so with fewer farmers and with vastly bigger farms. Part of this narrative is being driven by the need for economies of scale, but it is also being driven by generational change.

The accompanying chart shows the age profile of 5000 workers involved in sugar cane growing as compared with 2000 workers involved in internet publishing and broadcasting. The peak age of the former workforce is 58 while for the latter it is 34.

New city-based industries are attracting the next generation of workers away from the farmlands. Australia's rural communities are undergoing profound demographic change as a consequence and all the while the nation continues to deliver agricultural output for local and global consumption.

In the Shire of West Wimmera, located in the Victorian wheatbelt west of Horsham, the census shows that while the number of people living in the village of Goroke (population 218) held steady over the five years to 2016, the number living in Edenhope dropped four per cent to 687 and the number living in Kaniva dropped 19 per cent to 621.

Perhaps the reason why these small wheatbelt towns are losing population is because the demography of the surrounding farmlands is shrinking.

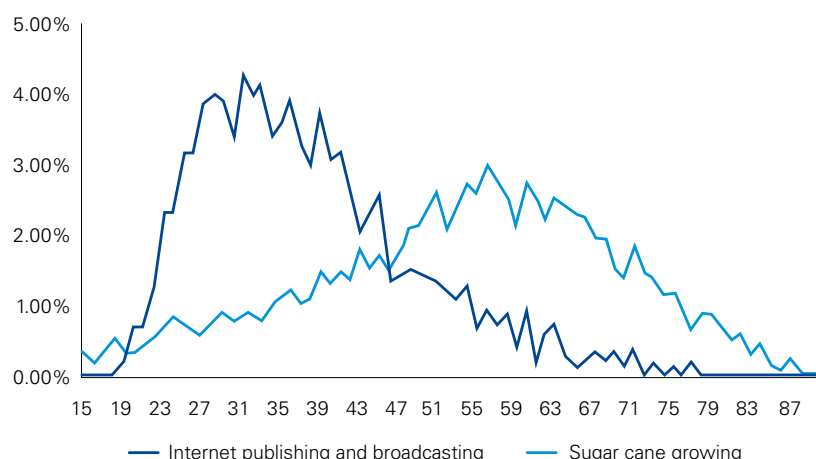
The number of people living in West Wimmera outside the villages and towns subsidised by 10 per cent from 1697 in 2011 to 1526 in 2016. In this part of Victoria, the farmlands are losing residents at a rate of two per cent per year which then impacts the scale of services that can be provided in local towns.

The very model of farming is changing. The family farm isn't big enough or isn't considered to be sufficiently alluring to hold the next generation in the regions. There is no diminution in demand for Australian agricultural product but the way that product is delivered must change and is changing.

Less labour in the regions. Sparser rural populations. Shrinking towns. Bigger farms. More corporate farming. Greater use of technology. And perhaps most controversial of all is the likelihood of even more foreign ownership of farmlands as baby-boomer farmers seek exit strategies that don't encumber their lives, nor limit the lifestyle preferences of their children.

The Australian nation must come to terms with the fact that our rural heartland is on the move.

The farmers versus the techies: age distribution of the workforce in sugar cane growing and in internet publishing and broadcasting at 2016 Census



Source: ABS Census 2016

By increasing the output from the agriculture sector to \$100 billion dollars a year by 2030, what are the implications to the broader domestic economy? From an economics perspective, what broad policies need to be in place to enable this to occur?



By Brendan Rynne, Partner and Chief Economist, KPMG Australia Economics and Tax Policy Centre



Economic overview

Global economic outlook

The global economy has started 2018 positively, achieving growth at 3.5% last year, the highest rate of growth since 2011. This growth is expected to be maintained and even enhanced, with economic growth forecast to be 3.7% in 2018. Importantly, and different to recent years, this growth has been widespread, and again this pattern of widespread growth is forecast to be maintained into the short term.

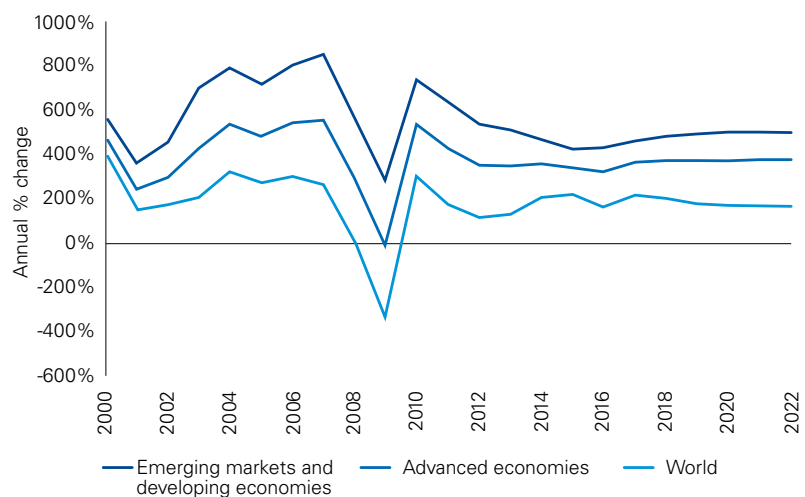
It would seem the global economy has shaken off the effects of the GFC.

Medium term global growth is now forecast to be 3.5% per annum, which is about 0.5% lower than in the 10 years prior to 2007 – but reflects a number of key structural differences in the world today, such as:

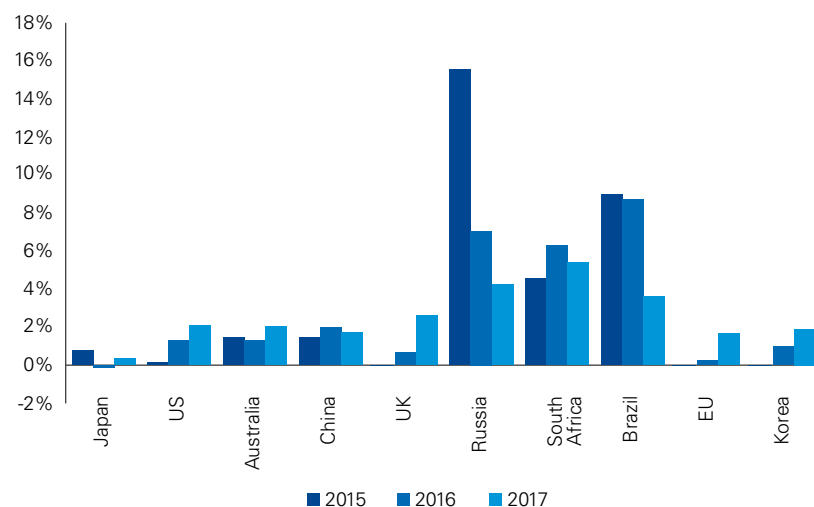
- China will have a slower pace of growth as it transitions from being biased outwards focused economy to one which is more balanced.
- Demographics, productivity and technological change are changing the composition of the labour force in all countries; which will have flow through consequences on consumption, investment and government expenditure patterns the world over.

What's also different with this short to medium term outlook compared to the decade prior to the GFC is a subdued inflationary picture. While economic growth has been picking up, and labour markets have been strengthening, inflation has remained muted. Whether this remains the case is engaging a lot of debate within the business community – at what point will higher economic

World GDP Growth



World inflation



growth and the absorption of the slack in the labour market result in faster earnings growth, and eventually higher inflationary pressures.

While it seems economic growth and inflation have rebounded, other aspects of the global economy, including government debt and borrowings, central banks' balance sheets, and interest rates, are yet to return to long run historical outcomes.

Another key point about the global economy at present is that there is a clear divergence in monetary policy settings in some countries. The US, UK and Canada raised rates during 2017, which the market had been expecting, while the FoMC of the US Federal Reserve has signaled it expects to continue to raise rates during 2018 and 2019; but more importantly it has revised down its expectation of what the long run policy rate should be for the US from 3.5% to 2.75%.

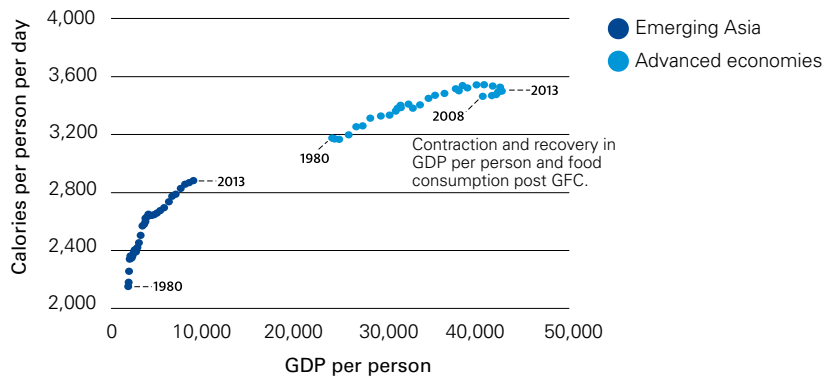
From a key economies perspective,

- The US economy has been in a period of continuous expansion now for over 8 years; and is approaching is historical record of 10 years (March 91 – March 01). US economic growth in the final quarter of 2017 resulted as a consequence of higher consumption spending and improved business fixed investments (both equipment and IP/ R&D), although trade and inventories acted as a drag on growth. Unemployment in the US is now at 4.1% – a 17-year low – and this follows another 2 million plus people employed last year, the 7th consecutive year where this has happened.
- The overall pace of growth in the Euro zone is significant compared to recent history; although the divergence between countries remain marked (eg: Spain = 3.1%; Germany = 2.6%; Italy = 1.5% pa, and it's GDP is smaller today that it was in early 2008). The Euro Area grew by 0.6% in the final quarter of 2017; which followed 0.7% growth in the previous two quarters. Consumer spending was strong; but trade and investment were weak. Inflation also remains subdued in Europe; running at about 1.4% for the 12 months to end December 2017, with food and transport price inflation the main drivers. The subdued inflation has helped the ECB continue with its QE program; albeit a reduced spending rate of €30 billion per month since the beginning of the year, and with a market expectation that it will end later this year; most likely in September.
- China achieved annual GDP growth of 6.9% in 2017, and it's this growth from China that remains the key driving force behind the expansion of the global economy. About one-third of total global GDP growth in 2016 and 2017 can be attributed to China; but forecasts are now anticipating this growth will start to moderate as it transitions away from a production based economy to a more consumer-led one. The December Central Economic Work Conference (CEWC) reaffirmed a desire to see a gradual slowdown in credit, and the economy – rather than an abrupt adjustment. The CEWC's message was China will continue to 'seek progress while maintaining stability'. This expectation is flowing through in forecasts, which are showing expected growth of around 6.5% and 6.25% in 2018 and 2019 respectively.
- Japan has seen its economic fortunes improve dramatically over the past year; higher domestic demand and exports have supported GDP growth by 0.6% in the September quarter 2017, its 7th consecutive quarter of positive growth. While this might not sound like much, this run represents the longest spell of uninterrupted economic growth in Japan for 16 years. While still expecting positive growth this year, it is expected to be a little softer, driven in part by fiscal consolidation reflecting a slowing in government spending associated with the preparation of the 2020 Tokyo Olympic Games.

Implications for Australia's agriculture sector

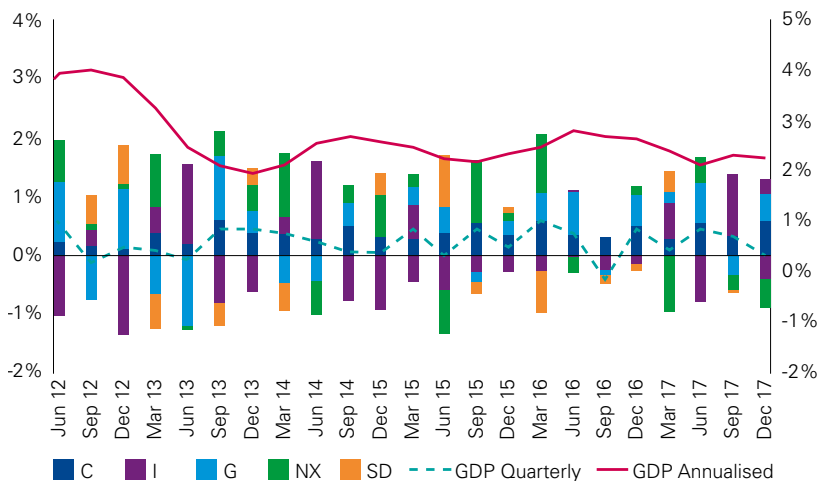
Rising levels of income per person globally are anticipated to translate into increasing demand for food, both in absolute terms and also on a quality-substitution basis. Simply, as the living standards across the world improve, those people in the lower income ranges will be able to purchase more food such their daily calorific intake increases from subsistence levels to levels closer to the world average, while those people in higher income ranges are likely to adjust their buying behaviour such that they purchase better quality food products (either in terms of attributes like taste, substance, use of chemicals, producer provenance, etc).

Changes in calorie consumption and GDP per person, emerging Asia and advanced economies, 1980 to 2013



Note: GDP per person is measured in purchasing power parity (in 2011 international dollars).
Sources: ABARES; Food and Agriculture Organization of the United Nations; International Monetary Fund

GDP growth by component



This phenomenon has already been seen, with the fastest increase in food consumption has been in countries where incomes have grown most rapidly (ABARES, 2018). Australia's food production sector has benefitted from this rise in global incomes – especially income growth in Asian economies – and pull-through demand for basic and value-added agricultural products in Asia. Over the past decade demand for Australia's farm exports has been strongest from our Asian neighbours, including China, India, Indonesia, the Philippines, the Republic of Korea and Vietnam; with this strong rise in demand from emerging Asia economies is expected to be maintained into the short to medium term (ABARES, 2018).

Australian economic outlook

Economic news for Australia has equally had a positive aspect to it over recent months; albeit the latest quarterly GDP results show the Australian economy expanded by 0.4% in the December quarter and annual growth moderated to 2.4% from 2.9%.

The labour market in Australia has been strong; with 400,000 new jobs (and predominately full time jobs) being created last year. This has shown through in the December quarter GDP results as well, with hours worked increasing by 1.1% in the quarter and by 3.5% over the year.

The softer GDP results for the quarter in part reflects a temporary drop in exports, which contracted by 1.8% to be only 0.8% above the level of a year ago. Net exports resultantly had a negative influence on GDP growth for the quarter, reducing economic output by 0.5% in 2017Q4 and 1.3% over the past year. However, exports are expected to improve in 2018, led by LNG as new capacity comes on stream.

The latest national accounts show a range of trends, including:

- strong growth in public demand (1.1% q/q, 4.9% y/y), supported by an investment upswing;

- an upturn in non-mining investment and a reduced drag from mining investment to see an overall turnaround in business investment (-1.0% q/q, +5.8% y/y);
- the start of a slowdown in home building activity driven by falling high density dwelling construction activity (-1.3% q/q, -5.8% y/y); and
- a turnaround in consumer spending (1.0% q/q, 2.9% y/y), which included a significant upward revision to previous estimates.

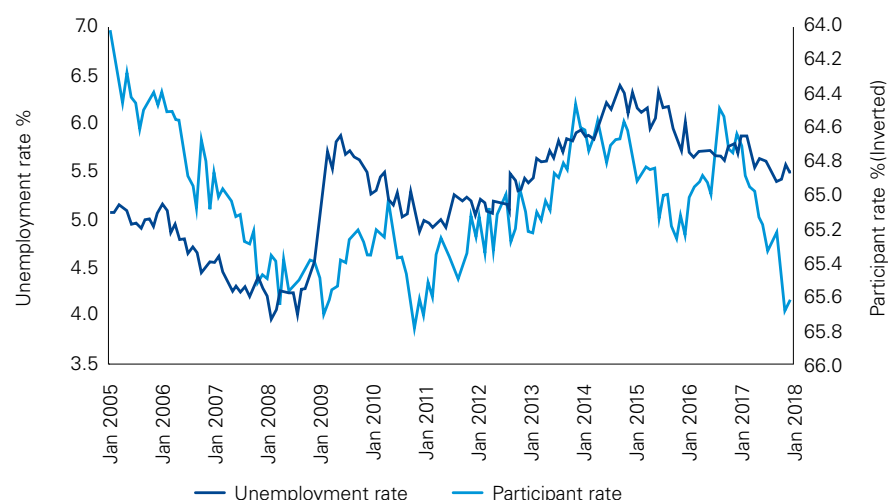
The GDP results also showed total labour income grew by 1.1% q/q, which translates to annual nominal growth of 4.8% over 2017; recognising most of this growth is due to increased aggregate employment and not from higher salaries and wages.

New EBA's, which will last a few years, are being written with wages growth lower than the one's they are replacing. However, there are pockets of higher wages pressure – Sydney, some IT, project management and business services areas – but there are not enough of them for universal higher wages growth to start emerging.

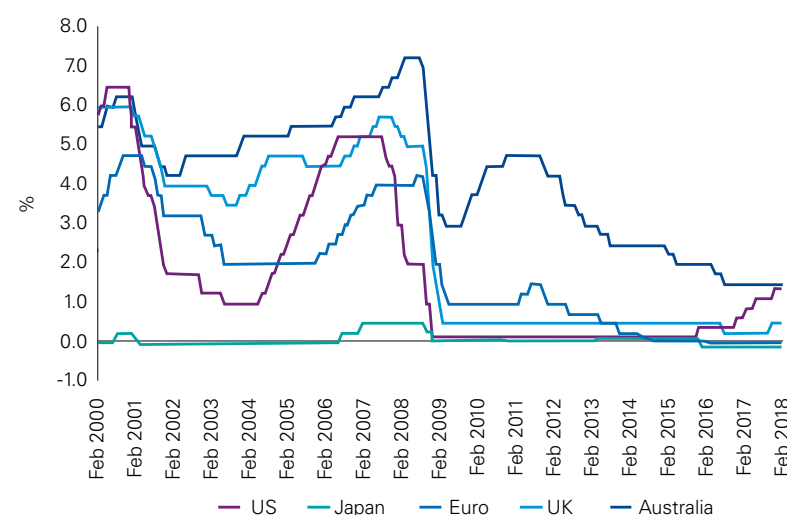
The growth in employment is expected to slow this year; although it is expected to remain robust enough to keep pulling down the unemployment rate to low-5%'s by the end of the year. Until unemployment falls below the notional level of NAIRU (non-accelerating inflation rate of unemployment), which best estimates is about 5%, then wages growth will remain subdued.

The RBA has left the cash rate at 1.5% since August 2016. Governor Lowe has told the House of Representatives Standing Committee on Economics in February 2018 that he expects the case rate to stay at this accommodative setting for some time to come – specifically he said 'the RBA board does not see a strong case for a near-term adjustment of monetary policy'; but ultimately rates will start to rise once unemployment falls and inflation rises.

Unemployment and participation rate



Official interest rate



Core inflation below the band and private sector wages growth still relatively weak. Consumer spending at 2.9% is still a little below the long-run average and is not a pace that would typically lead to a build-up in inflation pressures.

In summary, we're seeing:

- a global economic backdrop that is the best it's been for more than 5 years;
- unemployment levels below of heading towards the levels they were prior

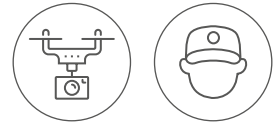
to the GFC; plus wider measures of labour under-utilisation trending down as well;

- investment growing faster than consumption and general economic output;
- but inflation and wages growth remaining low and under control (so far); and
- food demand increasing as a direct result of global income levels rising.

How do we look after our rural communities? What services must be improved to make regional Australia a place to live and do business?



By Sue Middleton,
WA farmer



The agricultural sector and the communities that support this have an enormous capacity to grow in this country. The problem we have is the extent to which we are capturing the true capacity of the value chain. In order to increase this capture, we need to have competitive regional communities where people want to live, and want to take and grow their businesses. However, four key factors require significant attention to achieve this; telecommunications, health, education, and childcare.

Telecommunication is a huge issue in rural regions of Australia, particularly in Western Australia. Anywhere outside Perth is the same as being remote and requires connection to the NBN Skymuster. The regions are data capped, with data speeds below that of rural Africa. There are extraordinary reliability issues, meaning businesses are required to have multiple backup systems with a large cost associated.

Health statistics of people in rural and regional Australia are on every statistic worse than metro Australia. Access to a GP, specialists and preventative health care approaches are key to improving regional health. Access to health care is a key determinant of where people chose to live.

Once outside the major centres, there is an obvious struggle to come up with a model for rural education, where people can stay living with their children. For example, in Western Australia, families are forced to send their children away as young as age 11 to ensure they achieve a good education. As a result of this,



there is an increasing trend of women moving to the city to look after their children during secondary education years, meaning a loss of resources from the community.

Childcare and accessibility to childcare is the untapped, unrecognised gap in services for regional and rural communities. Women produce at least 49 per cent of real farm income in Australia²⁰. Without accessibility to childcare, a woman cannot have an off-farm job, and once again the community loses a resource. The Government

needs to consider childcare policy as an enabling platform for agriculture. With the value of gross contribution by women, if there is no capacity to look after children or to educate children, then the agricultural industry is losing half of its talent and capacity.

Rural and regional communities need to get these four factors right, as a minimum, to ensure they can attract people to drive the future of agriculture in Australia.

20 <https://invisiblefarmer.net.au/significance-of-the-invisible-farmer-project/>

Understanding our future customer

The new consumer preferences and new pathways to market



What key changes in consumer's habits (in Australia and Asia) represent opportunities for the Australian farmers? How can Australian farmers supply these changing consumers through alternative channels?



**By Trent Duvall,
Leader
Consumer and Retail**



**By Ronan Gilhawley,
Partner, Strategy group,
KPMG Australia**



The consumer is changing, both in Australia and abroad. They are changing what they buy, when they buy, where they buy, and how they buy.

In Australia, we are witnessing a change in fusion of cultures, from previous merging with European (Greek, Italian) and Middle Eastern cultures, to increasing contact with Asian lifestyles.

Considering food and agricultural produce, whilst we have adopted the al-fresco dining culture of Europe, we are morphing this with the market cultures of Asia – matched by a changing taste for food varieties, increasingly with a focus on exotic greens, grains and new proteins. This is combined with a move to experiential dining, both in home and out of home, which is driving demand for fresh food, purchased today for an event tonight. This has spawned the farmers market in many suburban town centres, and the resurgence of the high street grocer. Both are staffed by passionate team members that know where the product was sourced from, how it was grown, and how best to prepare it.

We have also witnessed a focus on health and wellbeing that is transforming “niche” products into high demand and high growth mainstream “essentials,” such as almond milk and gluten free products.

Consumers are increasingly health-conscious and ethical in their purchasing decisions, and Australian farmers need to meet this demand in their growing decisions and product branding.

Looking abroad, Asia is being transformed by the urbanisation and westernisation of the middle-class. There is a strong desire for the highest quality product, where provenance and safety are non-negotiable. Food safety scandals across Asian countries are driving this trend – the best known being melamine contamination of milk powder in China in 2011, which has led to such strong demand for Australian-sourced product that consumers can now only buy two cartons per purchase in Australia. They want to buy the food that we consume and that they can prove is made here. ‘Brand Australia’ is strong, but it is essential that any product comes with the appropriate endorsement, and this is the domain of the “daigou” – overseas Chinese people who purchase product in Australia, and ship it back, at a price premium.

To service this demand, Australian agriculturalists must understand “why” they purchase. How do growers, manufacturers and retailers understand what the next big opportunity will be? What are the influencers of buying

trends? Understanding Asian consumers will be crucial to ensure long-term success in Australian agricultural exports.

A major challenge in both domestic and international opportunities is in reaching the consumer. With perishable goods, there is a time premium on agricultural logistics, and supply chains must be appropriately set up to ensure quality is maintained. The rise of e-commerce is a significant disrupter in this space. On-line purchases of fresh produce are still relatively small in Australia, where there remains a “touch and feel” aspect to the buying decision. This will evolve but it will take time – the entry of Amazon into the market may pioneer this domestically, given the success of Amazon Fresh in Europe, whilst Asian e-commerce players such as Alibaba and TMall already host Australian produce and have sophisticated cold-chain supply networks. Australian farmers will need to integrate into these networks, but have an opportunity to reach consumers through innovative emerging channels.

“What opportunities does the digital route to market provide for Australian farmers particularly if they want to link more closely to the customer and move up the value chain?”

Should farmers consider producing new sources of proteins?



By Ben van Delden,
Partner, Head of AgTech
KPMG Australia



Global meat consumption

2016: 321 million tons

2050: forecast to reach 470 million tonnes (+ 46 per cent increase)²¹

Alternative proteins will have a key role in the food of the future. But so will meat. With the number of mouths to feed growing by on average 1.8 times the size of Australia's population per annum for the next 32 years²², there will be an increased need for protein sources. Plant-based proteins are expected to make up 33 per cent of the protein market by 2054²³ up from a current market share of less than five per cent by value (600 per cent increase). Both meat and alternative plant or algae-based proteins will clearly have a critical role to play in filling the dietary needs of two billion extra people, but our farming systems also need to dramatically evolve to produce more food using less land and resources.²⁴

Governments are influencing changes to national dietary recommendations which

will accelerate the demand for new protein solutions. And consumer dietary preferences are evolving:

- More than two million Australians (over 10 per cent)²⁵ now report their diet is 'almost all' or 'all' vegetarian, an increase of 20 per cent in the last four years²⁶
- Australia is actually reported to be the third fastest growing vegan market in the world, after the United Arab Emirates and China²⁷.

Government dietary guidelines are encouraging reduced meat consumption:

- China has committed to halving its meat consumption by 2050 – China announced a \$300m investment to import lab grown meat from three Israel-based companies – SuperMeat, Future Meat Technologies, and Meat the Future:
- The EU *Planting Fresh Ideas* initiative seeks to move 30 per cent of animal-based foods in supermarkets to plant-based food products by 2030

- The Netherlands recommended a diet of not more than 500g of meat per week
- UK guidelines recommend beans and pulses be consumed alongside meat to provide extra protein.

These consumer and government led mega trends present exciting growth opportunities for Australian agrifood producers. The growth of Australia's chickpea crop is a case in point, more than doubling in five years to 2 m tonnes pa.²⁸ The recent announcement of Nufarm, GRDC and CSIRO's collaboration to release the world's first plant-based long-chain omega-3 fatty acid producing canola variety is another dramatic breakthrough enabler for new high value crops that can help the industry close in on the \$100 billion target. One hectare of the Nuseed Omega-3 Canola has the potential to provide the same omega-3 oil yield as 10,000 kilograms of wild-caught fish.²⁹

Innovation in foods are also opportunities for industry that are attracting consumer,

21 FAO, 2009, *Global agriculture towards 2050*, How to feed the world in 2050 Congress, forum notes available at: http://www.fao.org/fileadmin/templates/wsfs/docs/Issues_papers/HLEF2050_Global_Agriculture.pdf

22 Calculation based on FAO population estimates in Australia and around the world.

23 Fisher E, 2015, *Alternative proteins to claim a third of the market by 2054*, Available at: <http://www.luxresearchinc.com/news-and-events/press-releases/read/alternative-proteins-claim-third-market-2054>

24 FAO, (n.d.) *How to feed the world in 2050*, Food and Agriculture Organisation, report available at: http://www.fao.org/fileadmin/templates/wsfs/docs/expert_paper/How_to_Feed_the_World_in_2050.pdf

25 Roy Morgan, 2016, The slow but steady rise of vegetarianism in Australia, available at: <http://www.roymorgan.com/findings/vegetarianisms-slow-but-steady-rise-in-australia-201608151105>

26 Roy Morgan, 2016, The slow but steady rise of vegetarianism in Australia, available at: <http://www.roymorgan.com/findings/vegetarianisms-slow-but-steady-rise-in-australia-201608151105>

27 Euromonitor International, 2016, Plant-based protein: assessing demand for sustainable alternatives, available at: <http://www.euromonitor.com/plant-based-protein-assessing-demand-for-sustainable-alternatives/report>

28 ABARES, 2016, Agricultural Commodity Statistics — Summary of Australian statistics for pulses, Australian Bureau of Agricultural and Resource Economics and Sciences.

29 Chappell T, 2018, Nufarm's omega-3 canola gets green light, The Australian, available at: <https://www.theaustralian.com.au/news/latest-news/nufarms-omega3-canola-gets-green-light/news-story/f915f3ae9b847771777e8071729e1bff>

retailer and investor interest. These include a variety of pea protein based foods, such as Beyond Meat's burger and meat alternative products, and Sunfed Meats (NZ) chicken alternative which contains double the protein of chicken and triple the iron of beef. This industry is attracting significant funding from venture capital funds, entrepreneurs and some of the global red meat giants such as Tyson Meats. Slightly more on the edge are the likes of New Wave Foods who are producing shrimp alternatives using algae. Australia has the coast line and available land mass to meet and exceed the \$100 billion industry target, if we invest in these enabling new agtech and foodtech solutions and think differently about how and where we grow food.

Roger Waters' famous line in hit song 'Another Brick in the Wall' may need to change from "how can you have your pudding if you don't eat your meat" to "peas".

There is an emerging market for new sources of proteins, which doesn't necessarily threaten traditional markets for meat, and the Australian farm sector needs to contemplate how to play a role in that.

Case study – Focus on 3D printing: an alternate source of food?

3D printing technologies offer both businesses and individuals the opportunity to create something, out of what is seemingly nothing. Joining 'ink' to form objects designed on computer software, innovations are particularly occurring in printing of metals, plastics, and increasingly, consumables. The ability to print food, notwithstanding the ethical and nutritional questions that arise, offers challenges to agricultural growers who face competition from new 'producers' in the form of printers.

The technology is gathering pace. Dutch firm byFlow is a market leader in 3D food printing, whilst ETH Zurich printed an entire house in 2017, and a number of companies are creating prosthetics for those in regions where usual production and treatment costs would be prohibitive³⁰. In the Australian agricultural sector, MLA has focused on 3D printing at its major conference, discussing value adds through high-protein additives, reuse of secondary cuts and new product innovation.³¹ As the diversity of applications becomes apparent – Elon Musk's SpaceX firm has recently sent a 3D printer into space, enabling on-site repairs and continuous restocking – governments are beginning to consider infrastructures fuelled by fast, cheap and efficient 3D printing systems. No industry will be left untouched.

30 <https://www.theguardian.com/technology/2017/feb/19/3d-printed-prosthetic-limbs-revolution-in-medicine>

31 <https://www.mla.com.au/news-and-events/industry-news/3d-printing-technology-for-value-added-red-meat/>



What does the Australian food sector need to do to maintain and enhance its reputation for food provenance?



**By Robert Poole, Partner,
National Lead Agribusiness
– Management Consulting
KPMG Australia**



Traceability, provenance and managing food fraud are all key issues for both food producers and consumers; to achieve this suppliers are now required to provide accurate information about the origin of products, ingredients and processing for all retailed food.

Current federal legislation states that food products sold in Australia must have updated country of origin labelling (CoOL) under Consumer Law. Businesses selling food in Australia were given two years to phase in CoOL; however, with this period due to end on 30 June 2018 this transition period is nearly complete. Labelling will also be mandatory (except for food products already in trade, which are allowed to see out their shelf life outside of this period). It should be noted, the CoOL is

not required for products bound for the export market.

CoOL labelling requires that the Australian kangaroo logo, proportional bar charts and/or 'Made in Australia' statements are used on packaging to indicate the proportion of Australian ingredients and processing that went into a product. Additionally, food sold in Australia that is imported, or processed overseas, needs to provide appropriate reference to its relevant country of origin.

While the CoOL labelling is achieving a greater awareness of food products in Australia, it has not managed to specifically reduce food fraud (where claims of origin, contents and quality are made). The ability to digitise and electronically monitor country of origin and processing that has occurred

through technology, such as blockchain and smart packaging, could be catalysed in the future to improve food provenance assurance alongside CoOL.

Additionally, while CoOL has helped improve the value of Australian food products locally; there are no legislative requirements on exports. Extending CoOL to include 'Australian made' or 'Grown in Australia' on food or products for export may assist as a marketing tool to increase consumer demand for Australian produce by highlighting the quality and provenance of Australian food to the overseas market.

"The sector needs to monitor the effectiveness of the new labelling laws to ensure they genuinely do provide more consumer choice."



32 Australian Government, *Country of Origin food labelling — factsheet*, published by the Department of Industry, Innovation and Science, available through: <https://industry.gov.au/industry/IndustrySectors/FoodManufacturingIndustry/Pages/Country-of-Origin-Labeling.aspx>

33 Fisher C, 2015, *Country of Origin food labelling research*, prepared by Colmar Brunton for the Department of Industry and Science

Will agriculture self-regulate in regards to animal welfare? What are the positions taken by the industry in a voluntary sense?



**By Andrew Spencer,
Chief Executive Officer,
Australian Pork**



Agriculture operates within the community and for the benefit of consumers, and when it comes to animal welfare, both of these stakeholders are important.

For most agricultural produce, gone are the days when farmers produced 'as much as they could' and then went in search of a buyer. Twenty first century agriculture is more and more focused on engagement with the community (for freedom to operate/social license) and the consumer (for meeting market needs). The closer the industry practices and products can line up against expectations of these two stakeholders, the greater the potential value to be generated through the business.

When it comes to looking after animals, there is a latent expectation from all involved that livestock industries act in a responsible and ethical manner. It's not enough just to claim this; today it needs to be able to be demonstrated for those who choose to investigate further. This is where quality assurance programs and private standards play a role in verifying that the rules are in place and they are being complied with.

The dilemma comes when well-intentioned but unqualified citizens or consumers demand production practices that they believe are 'more ethical' but in fact are potentially detrimental to the wellbeing of the animals. Consumers for example tend to get confused between what constitutes 'natural' and 'good animal welfare', considering the two to be inseparably equivalent. Since nature is a cruel beast, nothing could be further

from the truth. So much of what we do in Australia's livestock industries is actually fighting against the forces of nature to give our stock a better chance of biological success – for example, managing parasites, vaccinating against disease, protection from predators and shelter against the elements. Ethics in this case dictates that the animal comes first, but our obligation as food and fibre producers is to engage with our citizens and customers to explain what we do and thereby build the trust in our industries.

So, in reality, 'doing the right thing' is doing what the science tells us is best for the animals and our responsibility is to make that work as best we can for the consumer and the community. That can be through a combination of mandatory and voluntary standards; typically, the legislated rules are the base welfare platform to which higher standards can be added and aspired.

So will industry self-regulate on animal welfare? Where necessary, I think they will, and their positions will be based on the science first and the needs of their customers and consumers. The community however requires a base level of animal welfare legislation to provide an independent assurance of good practice and this will also continue. It's not a question of either one or the other – both can co-exist together.

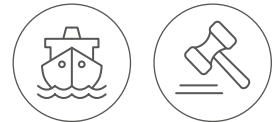
"Animal welfare will remain a key policy priority for Australian agriculture across the supply chain for both Australian and international consumers."

Maximising market access

Where are the next big wins for Australia in terms of trade reforms? Where should Australia be looking next?



By The Hon. Andrew Robb AO,
Chairman, The Robb Group



It is human nature to prefer the status quo; to keep things just as they are, to oppose change particularly when it means you have to change too.

History is littered with political populists who have played to this sentiment, often at great cost to communities.

President Trump is one such modern day populist looking to take the trade world backwards with the potential to incite a trade war, and much more. Trump's removal of the USA from the TPP (Trans Pacific Partnership agreement) means that this 21st century, high-quality agreement has been bludgeoned. The USA was 70 per cent of the GDP included in the original 12 country agreement.

Going ahead with the TPP without the USA is the right thing to do (it will put pressure on the US as they lose concessions available to others), but their absence denies the region massive growth opportunities in the meantime

that would have been delivered, including to the USA.

So, priority number one is to keep major pressure on the USA to re-join the TPP.

Priority number two in terms of trade reforms is easy to determine by following where the growth will be in the decades ahead; namely the Asia Pacific region. Our backyard.

While we have bi-lateral agreements now with many of the countries in our region, the next priority must be to improve those agreements, and to lock in one set of trading rules across the region, using the 12 country TPP as an example.

The awkwardly named RCEP (Regional Co-operation Partnership agreement) represents an immediate opportunity. RCEP includes all ten ASEAN countries plus China, India, Japan, South Korea, New Zealand and Australia. It has been under negotiation for some time, and includes six countries that are also in the TPP. The important point is that it

includes the reluctant India. As well, China is involved.

Over time, if you put the TPP (with the USA back in) and the RCEP together you achieve one set of trading rules for the whole Asia Pacific region — an Asia Pacific Free Trade region. Harmonising trading rules would have a hugely beneficial impact on the cost of moving goods and services between countries within the region, as well as promoting investment levels. It can be done. Look at the TPP. Many said it could never be negotiated.

While we have negotiations progressing on other fronts, and all liberalisation takes us forward, it is important to weigh up the benefits for the effort expended.

The EU and the UK look appealing, but the existing level of farm subsidies mean that half the agricultural producers would go out of business without them. It will be a hard row to hoe, with politics getting very much in the way.



How can Australian farmers maximise the utilisation of Free Trade Agreements? What are the keys to success across the supply chain, in particular for trade with China and India?



**By Peter Liddell,
Asia Pacific Leader
for Strategy
and Operations
Advisory Services**



**By Leonie Ferretter,
Director, Trade & Customs,
KPMG Australia**



Australian agribusinesses face a range of challenges across supply chains in order to reach the lucrative Asian markets – particularly China and India. Understanding the entire supply chain and analysing the drivers of supply chain complexity, as well as determining effective solutions, takes time and on-the-ground knowledge. Businesses frequently miss the opportunity to get to the bottom of such operational complexities³⁴.

When exporting to China and India, there are a number of keys to success. The first realisation for new entrants is that China and India are actually comprised of numerous markets, each having vastly different characteristics. Defining your ‘market playground’ – where to play, how to play and whom to play with – is the first critical step for any Australian business³⁵.

Secondly, understanding local regulations and policies, and how they impact business models and trading opportunities, is important. Detecting, interpreting and applying both the written and unwritten local rules requires adaptive strategies and operations³⁶.

Thirdly, businesses need to plan with a measured approach and solid strategy. Multi-National Corporations (MNCs) that have taken time to analyse the market

have reaped significant returns, with sharpened focus and profitable growth. When collaborating with partners, it is important to understand the background of that entity, aligning key messages with the objectives of stakeholder sponsors.

A further driver of Australian agribusiness success is in utilising Free Trade Agreements (FTAs). Whilst not overcoming some of our trading partners’ non-tariff barriers, FTAs offer reduced tariffs on a large number of agricultural goods with many tariffs to be phased out entirely. 80 percent of eligible exports to China and Korea are utilising FTAs³⁷, and those businesses not using FTAs miss the considerable duty benefits and competitive edge provided in the agricultural sector by Australia’s FTAs. Consideration of FTA benefits, in conjunction with non-tariff barriers, is a must for Australian businesses considering expansion into Asian markets.

Australian agribusiness must develop the internal resources, processes and systems to interpret FTA-specific legislation, understand global supply chains, and accurately classify goods. Often, specialist advice is required to get the technical details right, however accurately assessing the numerous FTA rules is the key to unlocking FTA value.

“Australian exporters should be encouraged to seek professional services that ensure they fully access the opportunities that FTAs provide.”

34 KPMG Australia, *Succeeding in China – Five critical components for Australian companies*, April 2016

35 Ibid

36 Ibid

37 The Hon. Steven Ciobo, MP, Minister of Trade, Tourism and Investment, *The Australian*, 1 March 2018

Supercharging our supply chain

Connecting our farms to markets



What are the keys to ensuring Inland Rail is a success to enable agriculture to grow towards \$100 billion?



**By Graham Matthew, Partner,
Head of Infrastructure and
Projects Group for Queensland
KPMG Australia**



In May 2017, the Federal Government announced that it was committing an additional \$8.4 billion through the Australian Rail Track Corporation (ARTC) to facilitate the development of the Inland Rail project.

Inland Rail has been positioned as a once-in-a-generation project to connect regional Australia to domestic and international markets. It is Australia's largest ever freight rail infrastructure project.

The new 1700km rail line will stretch from Melbourne to Brisbane via regional Victoria, New South Wales and Queensland. The aim is to transform the way goods are moved between Melbourne and Brisbane, connecting farms, mines, cities and ports to domestic and global markets. Construction has already commenced, and the first train operations are intended to take place in 2024-25.

From the perspective of farmers, Inland Rail represents a series of challenges and opportunities.

It has been well reported that there remain some concerns regarding the proposed route, especially in the affected areas where ARTC will need to acquire property to develop new rail corridors. Although the project utilises 1200km of existing rail corridors, new corridors will need to be created for some 500km of the proposed route. Even allowing for the best of goodwill in community consultation processes it is inevitable that there will be a degree of disruption.

Over the longer term, Inland Rail affords an opportunity to create an infrastructure spine for freight haulage for agricultural producers and suppliers. However, it is only one element of what will be needed for a fully integrated logistics chain.

If Inland Rail is the spine, it will be important not to overlook the need for ongoing investment in the 'supporting limbs', to bring the vision to life and realise the wider benefits in regional Australia.

"For farming communities to fully realise the potential benefits of Inland Rail it will be important that there be further investment in appropriate ancillary infrastructure such as rail sidings, intermodal freight facilities, supply depots and other industries to complete the supply chain. There will also need to be an associated investment in supporting community infrastructure in regional hubs."

What does Northern Australia need to grow its agribusiness industry?



**By Luke Bowen,
General Manager, Northern
Australia Development Office**



The accelerated development of Northern Australia is critical to a more prosperous and secure Australia.

Agricultural development will be an important part of Northern Australia's future. Increasingly affluent Asian populations will demand more quality produce. To take full advantage of the opportunities presented by this growing Asian middle class, Northern Australia agribusiness must maintain its focus on biosecurity and overcome its infrastructural and geographic challenges.

Northern Australian agricultural products are considered premium, which is closely tied to Australia's strict quality assurance and biosecurity standards. Maintaining these standards is critical to the environmental health of our agriculture, as well as our ability to continue to position Northern Australia as a high quality agricultural and livestock producer for Asian markets to our north.

Better transport infrastructure must also be built to improve the ability

for farmers to get their product to market. Much of Northern Australia's agricultural production occurs in remote areas. Investing in better road and rail infrastructure is critical to ensure reliable and efficient supply chains. The Northern Territory agriculture and livestock industries are world leaders in using technology to efficiently and sustainably manage its resources across vast areas of remote land. Improving telecommunications infrastructure is necessary so Northern Australian farmers and pastoralists can continue to improve their operations through technology such as remote sensing and earth observations.

Water infrastructure must be enhanced to take advantage of the fact that 60 per cent of Australia rain falls in the land north of the Tropic of Capricorn³⁸. Only about two per cent of that rain is used. Harnessing this rainfall will rely on infrastructure investment based on an understanding of the intersection of arable soils and potable aquifers, as well as sustainable extraction rates.

"A strong and prosperous Northern Australia contributes to the economic wealth of Australia, as well as strengthening relationships and alliances with the countries to our north. All levels of government and the private sector have a role to play in delivering the infrastructure that will help drive growth in agriculture and accelerate Northern Australian development."

38 Schrieber, C., 2017, Asian growth encourages Aussie focus on north's infrastructure, Northern Australian Infrastructure Facility, available online: <https://naif-gov-au.industry.slicedtech.com.au/wp-content/uploads/2017/07/Asian-Growth-Encourages-Aussie-Focus-20-July-17.pdf>

Maximising our returns using Fresh Food Precincts

What are the opportunities offered by Fresh Food Precincts and food tourism for air freight?



**By Robert Poole, Partner,
National Lead Agribusiness
– Management Consulting
KPMG Australia**



Co-locating Fresh Food Precincts (FFPs) with existing or new transport and airport hubs has the capability to grow agricultural output, deliver new local jobs and increase access to fresh produce for domestic and international markets. For example, it is feasible that a FFP will facilitate the ability of an overseas customer to purchase fresh produce or meals via their mobile device and have it delivered within 24 to 36 hours.

FFPs will be underpinned by new technologies, such as the Internet of Things (IoT), blockchain and robotics. Food safety and quality can also be further enhanced as a result of integrating these technologies into the supply chain at FFPs. FFPs must be supported by inter-governmental

protocol agreements to assist in the fast, efficient and borderless delivery of products, within preapproved standards set by the destination market, and with a confidence that Australian producers will meet these expectations across the supply chain.

FFPs build on the concept of intensification of Australian food production. They also link to the forecast growth in tourism and air traffic; take for example China, where there is currently already more than 100 flights a week through nine commercial airlines with tourism numbers set to triple from one million to 3.3 million by 2026³⁹ With so many flights operating between Australia and key international markets, agriculture can make use of excess cargo capacity

to transport fresh products more regularly and on greater scale.

Despite the potential of these projects, FFPs need requisite support through effective planning, innovation and capitalising on available growth opportunities. This includes the necessity of having digitally enabled legislative and regulatory operations and requirements pre-approved by government; including planning, biosecurity, border security, food assurance, 24-hour operations, zoning, environmental compliance, transport and utilities. Real-time systems will support improved supply chain functionality, management of data, security of information and oversight of processes to ultimately deliver food from paddock to plate effortlessly.

39 Australian China Business Network, 2017, *The China Tourism Economy: Reaching Australia's Potential*, on behalf of the ACBN and Trade Victoria

Giving confidence to the supply chain

How can contract models employed by The New Zealand Merino Company help to reduce the risk of price volatility and build confidence in the supply chain?



By John Brakenridge,
CEO, The New Zealand
Merino Company



Merino wool is having a moment. Commodity prices are high. Innovation and heightened global awareness around sustainability have created new fervor for natural fibres.

We can reassure ourselves that price 'can only go up, it can't go down', as is the sentiment from some, however history tells us that as long as we operate in the realms of commodities, prices will be cyclical. What goes up must come down. Shouldn't we use this moment for wool as a catalyst for a more important consideration: what will it take to sustain this moment?

The wool industry must challenge the status quo, blow apart the traditional price-taker mentality and move to a value creation model.

That's been our strategic anchor at The New Zealand Merino Company (NZM) since its inception 20 years ago — the wool industry would never meet the challenges of tomorrow under the price-taker model. Sadly, this model remains prolific in our industry: quality product is produced by passionate people who have no connection with the end-users of their product, no feedback as to how to optimise its value. It's a commodity disposal model based on an historic auction system where wool producers are in the back seat.

The true cost, diversity of skills and tenacity required to make the transformation from production to market value is often underestimated. In my opinion, business models need to fundamentally change and once you embark on this strategy you have to keep going. You can't stand still.

In the case of Merino, phase one of that transformation meant breaking down age-old supply chain secesses and firing up a collaborative spirit that would replace the boom and bust of commodity auctions with the solid ground of contracts with retail brands such as Icebreaker. Contracts connect growers with their market partners introducing stability and certainty; certainty of price and demand year-on-year, certainty of quality, transparency (certainty of ethics), and alignment on what it takes for a brand to prosper in the market to the benefit of everyone in the value chain.

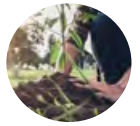
This connectivity will only become more relevant. With NGOs breathing down the necks of corporates which are viewed as exploiting the land, people or animals, there has been no more critical time than now to bridge the gap between brand and land. In our digital age one false move can have catastrophic effects in a matter of hours. Shared knowledge and experiences will help us ensure our wool brands and producers maintain their social license to operate.

If we fail to align with consumer needs, we will fail our brand partners, and we'll fail growers.

"The farm sector must challenge the status quo, blow apart the traditional price-taker mentality and move to a value creation model."

Growing sustainably

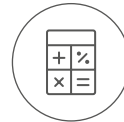
Water



What needs to change to build confidence in the Murray-Darling Basin Plan?



**By Phillip Glyde, Chief Executive,
Murray-Darling Basin Authority (MDBA)**



The Murray-Darling Basin Plan represents a seismic shift in how we think about the Basin's rivers and how we share their water.

It puts the environment's needs on a par with those of irrigators and other water users across the Basin's one million square kilometres. Importantly, it also recognises that farmers are stewards not just of the land, but of our nation's water resources too.

The Basin Plan can deliver its aim – a healthy environment that supports healthy industries and communities. We know that the Basin economy continues to grow, and that there is already tremendous innovation in the irrigated agriculture sector driven by a combination of private and government investment.

For farmers, increased certainty about their rights to a share of the water resources, an open, efficient and transparent water market and increased confidence in long-term management of the Basin, are three critical features that

will underpin business confidence and drive future investment.

There are also opportunities in the coming years to take further advantage of Australian government programs that aim to improve irrigation efficiency in return for some of the water savings. These opportunities can help to improve business profitability as well as the Basin's sustainability.

In order to succeed, the Plan needs a sustained commitment from all parties, including governments and farming communities, to transparency, collaboration and adaptive management. This commitment, combined with a strong compliance framework, will ensure water users understand their rights and responsibilities and can make the most of the opportunities this scale of water reform presents.

I challenge farmers to talk publicly about the work they do to make the most of their water resources and the contribution they make to the environment every day.

“Farmers should also talk about the ways that Australia's water reforms, most recently the Basin Plan, have provided the conditions they need to get on with the business of turning a sustainable profit. Those with good stories to tell have the biggest role in increasing confidence in the potential of the Murray-Darling Basin.”

Case study – Rubicon Water: How is IoT driving regulation of water?

Water management is one of Australian agriculture's greatest challenges – a natural inhibitor of yield and farm development. Rubicon Water, based in Victoria, offer merged hardware-software technology solutions to provide farmers with more information and capability than ever before, in managing irrigation of their land. Rubicon's water-saving technology is currently used by most of Australia's rural water authorities to automate the supply of irrigation water to farms. Now the company has developed technology that integrates farm operations with these supply systems and promises farmers water savings and improved yields.

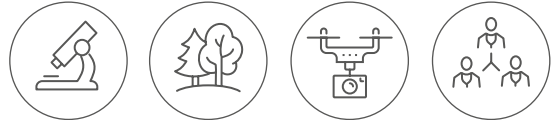
The solution utilises existing water authority infrastructure to enable each farm to have an IoT network, opening up a world of on-farm automation technology. This is coupled with an app that is integrated with the water authority's software and gives farms access to local weather and satellite information and analysis tools, so they can schedule their irrigations accurately and apply water precisely, leading to water efficiencies and improved productivity. Data and connectivity is at the core of this solution, with tangible efficiency gains for both farmer and local community.

Climate

How does agriculture balance productivity and sustainability as Australia moves to the \$100 billion target?



**By Lucinda Corrigan, Chair,
Farmers for Climate Action**



The NFF will need to work through the Research and Development Corporations (RDC) and the Federal Department of Agriculture and Water to coordinate investments in research and development for mitigation, sequestration and adaptation to climate change. The boom in AgTech and private investment will see new public-private partnerships that reduce the adoption time frame. The key piece for the NFF will be advocating for a long-term policy approach to reducing emissions for the agricultural sector.

The two key drivers for improving productivity and balancing natural resource outcomes are a renewed focus on innovation and human capability. The definition of innovation used in these paragraphs is 'an idea, practice or object that is perceived as being new by the end user and perceived as adding value'.

1 The research and development ecosystem sits at the centre of the advances in sustainable productivity. To be successful it needs to operate more collaboratively both within and across industries⁴⁰ There are many new players alongside the traditional research and delivery pipeline, universities, State Departments of Primary Industries, and CSIRO. Increasingly, private companies are emerging to deliver downstream development and commercialisation. These arrangements require clear rules around intellectual property and freedom to operate. It is these arrangements that will improve the

delivery of commercial outputs to Australian farmers. The Australian Farm Institute has recently published a study which demonstrates in countries that have maintained a strong public system it nurtures a strong and growing private R&D sector.

- 2 As a minimum expectation, each RDC needs to set a strategy and goals required to reduce emissions, use robust modelling which shows the mitigation required alongside the projected increase in productivity and total production. Some industries are well advanced such as the wine grape industry which has been dealing with the loss of one day in growing season over the last 20 years and has made transformational changes to viticulture and its location around Australia.
- 3 As a starting point, each industry needs a sustainability framework which sets out the goals in natural resource management and climate change, and in the animal industries, animal health and welfare. These frameworks already exist in the dairy and red meat industries. The other commodity industries need to embrace this approach.
- 4 Sustainable intensification will be an important component of the approach in the broadacre industries and particularly in the approach to managing natural resources and responding to climate change in an increasingly variable climate. The horticulture industries are leading

in the adoption of improving water efficiency and nutrients, production and use of energy, the broadacre industries require investment and innovation to achieve sustainable productivity growth (e.g. improving water use efficiency, identification and movement of livestock, monitoring of livestock for sale, reduction of waste through collection and analysis of data). Genomics will play a key role in improving efficiency, combined with big data analysis e.g. enable selection for the hard to measure traits in beef cattle e.g. feed efficiency on grain and grass.

- 5 Digital technology to improve productivity and reduce loss. Research by the Australian Farm Institute shows that precision agriculture in the international grains industry has delivered improvements in productivity of around 10 to 15 per cent. Australia has a challenge to invest in the data platforms to use the large amounts of data being generated to improve productivity. This is the focus of the 'precision to decision' investments in the Rural Research for Profit project.

⁴⁰ Social Licence to Operate project is a long-term project coordinated by NSW Farmers CEO Matt Brand, to improve the trust that urban Australians have with the agricultural sector

Should the MLA initiative on carbon neutrality be adopted across the industry?



**By Michele Allan,
Chair, Meat and
Livestock Australia**



For the Australian red meat industry, a 2030 carbon neutral goal makes good economic sense.

Achieving the 'CN30' goal would put Australia well above our competitors in the high value markets where consumers have a growing interest in a food's provenance and environmental footprint. It would instil even more confidence in the quality and integrity of our product. And it would neuter the claims of industry's critics.

What's more, there's an almost perfect correlation that exists between increased productivity and reduced greenhouse gas emissions. That's been proved in ample research to date, including Commonwealth programs such as Filling the Research Gap⁴¹.

So how do we do it?

In 2017, MLA commissioned CSIRO to explore if, and how, the red meat industry (defined as the farm and processor sectors) could become carbon neutral by 2030. The study found it is possible and presented a range of pathways to consider.

MLA is now reviewing those options and forming a research, development and adoption plan to implement those most favourable.

Some pathways are well known and can be acted on now; such as improving animal genetics and husbandry to reduce emissions per unit of meat production, and sequestering carbon into soils using pastures and legumes.

Others require further work to verify environmental and economic benefits to industry and the community. These include new feed supplements and vaccines which reduce methane emissions from animals, and the role of dung beetles in sequestering carbon into soils.

However, the red meat industry cannot do it alone.

Achieving CN30 will require unprecedented collaboration between industry, government, research organisations and technology partners. Existing investment in RD&A activities to deliver carbon reductions and continuing productivity gains will need to be increased.

Both sides of federal parliament have targets to reduce carbon emissions by 2030, as do most states, but CN30 also needs clear and stable government policy to enable large-scale investment in productivity improvement and carbon abatement.

It is a big challenge, but by working together, a carbon neutral red meat industry by 2030 can be achieved.

"Other sectors need to consider the strong stance taken by MLA when it comes to a self-regulated carbon neutral target."

⁴¹ The Filling the Research Gap saw 88 projects funded through \$74 million in committed Commonwealth Funding. A number of these projects centered on livestock methane research. Australian Government Department of Agriculture, 2017, Filling the Research Gap, Department of Agriculture and Water Resources, available online: <http://www.agriculture.gov.au/ag-farm-food/climatechange/carbonfarmingfutures/ftgr>

Energy

What does the sustainable farm of the future look like?



By Dmitry Danilovich,
Head of Clean Energy
KPMG Australia



Energy users, including in agricultural sectors, have experienced significant increases in their electricity supply costs in recent years, and are actively exploring opportunities to reduce these costs. Some of the options being considered include:

- **Lowering consumption**, through energy efficiency measures; and
- **Using alternative sources**, such as development of renewable energy solutions, often coupled with battery storage.

The economics of renewable energy, particularly wind and solar PV, versus fossil fuel fired generation has improved significantly. Declining costs of renewable energy sources and battery storage open opportunities for farming enterprises to source electricity at a lower cost, as well as achieve their environmental sustainability objectives.

For off-grid farms relying on diesel-fired generation, the choice of renewable energy is obvious. The long-run marginal cost of wind and solar PV is already significantly lower than the short-run marginal cost of diesel-fired generation, i.e. the cost of diesel and variable operating costs. This means that off-grid farms can achieve material cost savings on fuel and operating costs by adding renewable energy into their power supply mix and reducing operating time of diesel sources. With a significant decline in costs, driven by scale economies in battery manufacturing, battery storage has also become economical against diesel-fired generation.

For grid connected farms, on-site renewable energy sources can also deliver material cost savings, by reducing their electricity consumption from the grid. The farms will benefit from savings on network costs and environmental obligations, where renewable energy assets can be developed behind the meter. Large-scale Generation Certificates (LGCs) provide an additional source of value – these can be used to meet obligations under the Renewable Energy Target in respect of power supply from the grid, or sold to energy retailers and other energy users to derive revenue, offsetting electricity supply costs. These solutions do not compromise the reliability of electricity supply, as the farm remains connected to the grid and continues to draw electricity from the network when on-site power supply sources are not sufficient.

“The farm of the future is expected to actively deploy on-site renewable energy and battery storage in its electricity supply mix, achieving significant cost reductions and environmental benefits, without compromising the reliability of supply.”

How have electricity prices changed, and what policy settings are emerging?



**By Cassandra Hogan, Partner,
National Sector Leader – Power
& Utilities, KPMG Australia**



There have been multiple drivers of electricity costs over the last decade. Network prices have risen due to large capital programs, other increases are due to significant spikes in wholesale costs as the energy mix moves from fossil fuels to renewables. At the same time, gas prices have tripled due to fundamental changes in LNG supply and demand due to exports. Additionally, government green schemes have added further costs to be borne by the consumer.

The states vary in their residential price trends across all jurisdictions. AEMC price data suggests while some states prices have peaked and commenced a decline, others will continue their rise over the next financial year before falling, and the remaining will continue to rise throughout the forecast period to FY19-20. The energy sector is asset-intensive which needs to be financed exposing energy prices to future movements in interest rates. Prices will also depend on the effectiveness of government policy changes to remove volatility in the wholesale electricity and gas market.

There has been a lot of sector reform and debate in recent years. The government's role is to provide a stable and robust environment for investment. There needs to be certainty on how climate change policies will apply to the energy sector as well as more measures to better manage and integrate renewable energy supply. The government should also be ensuring that poles and wires businesses have the right incentives to be efficient.

To help make prices competitive, in addition to the above measures, better encouragement is required for more supply into the market which will ensure there is a more effective choice for consumers.

Pricing policy varies between regional areas. Some regions or states have uniform pricing policies, for example, QLD and SA, between users in both urban and rural locations. In other states, price depends on the costs of the local network business and demand patterns in the local distribution network. The lack of scale economies in these areas

can lead to higher prices plus less reliable services. Further, it could lead to less access to services that help the consumer manage their costs, such as batteries, PV and solar.

There is a lack of monitoring and reporting on these issues. Policy makers will benefit from having greater transparency of impacts to rural consumers due to price increases.

“Governments’ role is to provide a stable and robust environment for investment and provide certainty around climate change policies and how they apply to the energy sector. We need to better understand and monitor how energy impacts rural views. To help make prices competitive, in addition to the above measures, better encouragement is required for more supply into the market which will ensure there is a more effective choice for consumers.”



Producing more with less: intensification as a path to sustainability

Is land use regulation appropriate, especially in the context of intensification of agriculture?



**By Robert Poole, Partner,
National Lead Agribusiness
– Management Consulting
KPMG Australia**



As new farm planning regulations are being brought in for Victoria, it is clear that a holistic national stance needs to be taken in regards to the 'right to farm'. The need to increase food production and the ability of farming operations to expand and intensify must be balanced with increasing urban development, community preferences and in some cases sustainability and environmental concerns.

Ultimately, national and state planning regulations need to include strong definitions on land classification (including protecting farming zones to ensure that Australia can continue to produce food and fibre for the domestic and global market); this allows farmers to explore future growth opportunities and technologies — without additional red tape and supports councils to instil efficient permit application processing where required.⁴²

Many farm systems are intensifying. This can sometimes mean improved sustainability and lower footprints. Whatever the case, planning laws need to move in line with new business models and technologies.

“Many farm systems are intensifying. This can sometimes mean improved sustainability and lower footprints. Whatever the case, planning laws need to move in line with new business models and technologies.”

Case study – The Dutch way to sustainability

The statistics:

- The **Netherlands** has a land mass of 41,543 km², and a population of 17 million people.
- **Australia** has a population of only 6 million more than the Netherlands but has more than 150 times more land.
- The **Netherlands** however is the world's number two exporter of food produce by value
- **Australia** sits at fifteenth on this list.

Considering the constraints the Netherlands has in relation to land, labour, urban environments and a consciousness towards environmental concerns – they produce and process enormous quantities of food, the majority of which is exported.

How do they do it?

Innovation and a key commitment to sustainability — 'twice as much food, half as many resources'. A national initiative to increase productivity has allowed the country's agriculture sector to thrive in a relatively short period of time with farmers reducing their dependence of resources by up to 90 per cent.

Feeding the world:

Supporting their productivity, the Netherlands have instigated an efficient and effective food hub in Rotterdam to ship produce and processed goods direct to consumers around the world via air, rail and sea (and import food they can't grow themselves).

When agriculture works alongside business, government, science and the community – safe, health and high-quality food can be produced sustainably for the global food ecosystem.

Source: KPMG Australia, Western Sydney Fresh Food Precinct, 2017

⁴² Agriculture Victoria, 2017, *Planning for sustainable animal industries — its origins and progress*, Victorian Department of Economic Development, Jobs, Transport and Resources, available through: <http://agriculture.vic.gov.au/agriculture/livestock/planning-for-sustainable-animal-industries/planning-for-sustainable-animal-industries-its-origins-and-progress>

Unlocking new technology

Future proofing our research apparatus



What are the ideal settings for a successful R&D environment in Australian agriculture?



By John Manners, Director,
CSIRO Agriculture and Food



R&D investment is critical for driving value addition, productivity and growth in the face of emerging markets, cost efficiency and scale opportunities. We need to create an innovation ecosystem in Australia that can take the excellent science that our public institutions do and take it further down the commercialisation track, making it more accessible to further commercialisation by both new and established players. Australia consistently scores highly in international rankings for quality of scientific research. However, when it comes to translating discoveries into real-world outcomes, Australia is currently ranked a lowly 76th in the world for innovation efficiency and bottom in the OECD for industry-research collaboration⁴³.

Traditionally, scientific advances in agriculture have come from government-funded institutions. However, as governments around the world look to make scientific research deliver industry outcomes and be financially self-sustaining, a shift is occurring. Agribusiness innovation is increasingly found in partnerships and alliances

between research organisations and industry – the first crucial pillar of a successful R&D environment.

The second pillar for success is creating a vibrant innovation ecosystem. This system needs to cut through the need for publicly funded research to meet the requirements of multiple stakeholders, often including political imperatives. These requirements are frequently driving agricultural research outputs to less effective, socialised delivery models. R&D outcomes must engage more readily with the private sector, to result in focused, market-ready outputs, and research providers should share in the value created to stimulate self-sustaining delivery systems.

A prime example following these two factors is Cotton Breeding Australia – the research partnership between CSIRO and CSD Ltd., with supporting technology access arrangements with Monsanto. The program is self-sustaining, and Australian cotton growers can exploit the world's highest yielding varieties and best crop protection traits. The three organisations share returns,

which sustains the technology pipeline to drive further industry competitiveness.

Australian agribusiness could further learn from the Netherlands in this space, who similarly implement three-way public-private 'golden triangle' partnerships across research. Proximity to European markets means the approach is collaborative and investors share in value created, and we may foresee that our Asian proximity offers similar opportunities for the future of investment into Australian-derived agrifood innovation⁴⁴. There is significant investment capital in Australia and overseas, and the buoyant future prospects for agribusiness ventures to make this happen.

"We need to create an innovation ecosystem in Australia that can take the excellent science that our public institutions do and take it further down the commercialisation track, making it more accessible to further commercialisation by both new and established players."

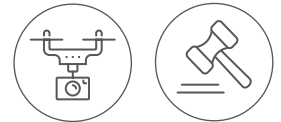
43 <https://www.globalinnovationindex.org/analysis-indicator>

44 John Manners, 2017 presentation, 'Get small and grow big! — innovation and consolidation'

What is the power of new genetic technologies for agribusiness?



By David Hudson,
Managing Director,
SGA Solutions Pty Ltd



It is widely accepted that by 2050 agriculture will need to feed a global population exceeding nine billion people. This is the challenge Australian farmers are facing whilst dealing with ever more volatility created by climate change, price fluctuations, regulatory change, socio-economic, demographic and geopolitical shifts. Pests, weeds and diseases continue to threaten both quality and quantity of food produced. Access to new and innovative plant varieties will be a vital tool in managing these challenges.

In recent years New Breeding Techniques (NBT's) have emerged that offer novel tools for delivering desirable characteristics in crop plants, such as increased yields, insect and disease resistance and climatic tolerance. Although largely at the research stage, these techniques could revolutionise plant breeding and, by extension, farming.

NBT's have the potential to reduce the cost and time of bringing new products to the market compared to traditional breeding techniques. They do this largely by improving the accuracy of the plant breeding process so that less time is spent removing unwanted attributes that can be transferred along with the gene of interest during the traditional breeding process.

There are many techniques that fall under the banner of NBT's, including those that sequence or edit genes, and so-called speed breeding and diversity breeding

techniques. Some of the NBT's are relatively easy, quick and cheap to use by comparison with traditional methods. They therefore allow breeders to focus more on 'niche' crops or localised growing conditions and to react more quickly to the changing needs and wants of growers and consumers.

These techniques can be used in very specific ways, for example they can be applied to enhance nutrient content, increase shelf life through the reduction of oxidation and bruising and improved colour, odour, flavour and texture. These benefits are already being explored and realised by our competitors around the world. For example, in the US, a browning-resistant mushroom and a potato with better storage properties have been produced using gene editing. Disease resistance is a huge focus for the plant breeding community and already powdery mildew-resistant wheat and blight-resistant rice have been bred in China and the US respectively.

The challenge for Australia's regulators, the Office of the Gene Technology Regulator (OGTR) and Food Standards Australia and New Zealand (FSANZ), as well as regulators representing the majority of Australia's trading partners is that although the mutations generated through gene editing may not have occurred naturally, the end product is indistinguishable from those arising naturally or through conventional mutation breeding. Currently both

the OGTR and FSANZ are addressing the challenge of identifying to what extent NBT's should be regulated by undertaking a reviewing of their respective regulations. There is a general scientific consensus that most of these techniques are not GM.

This uncertainty has been brewing for several years, leaving Australian agriculture together with many of its trading partners without clear legal guidance. The current lack of regulatory uncertainty is the major barrier to transformational advancements in breeding new plant varieties for Australian farmers.

Meanwhile other countries around the world have already begun to realise the benefits plant varieties bred using these techniques can bring, and Australian agriculture cannot afford to be left behind in this revolution – to do so will reduce Australian farmers' competitiveness in their domestic and global markets.

"Whilst there is huge opportunity for these new techniques to benefit Australian agriculture, realising this potential largely depends on how they are regulated. There is uncertainty about the extent to which some of these techniques involve GM and therefore whether they should be regulated as such or whether they should remain unregulated."

Patent law in agriculture: is there any potential risk that needs to be considered?



**By David Hudson,
Managing Director,
SGA Solutions Pty Ltd**



Part of the sustainable response to the challenges facing Australian agriculture will be to have access to a continuous pipeline of innovative technologies and management strategies. For farmers this commences with the selection of 'elite' plant varieties and/or livestock lines and then applying leading edge technologies and management strategies. Underpinning this approach will be the need for farmers to access and adopt transformational technologies which

will require high levels of investment, invention, design and creativity and, consequently, high levels of intellectual property content. One of the challenges for Australia's agricultural future based on the adoption of innovative technologies and management strategies will be to optimise intellectual property from the perspective of both consumers and sellers of intellectual property protected products and services domestically and to/from the rest of the world.



Creating the conditions for AgTech to thrive

Does Australia have an effective environment for rural innovation and start-ups?



By Ben van Delden,
Partner, Head of AgTech
KPMG Australia



By Amanda Goddard,
AgTech Specialist
KPMG Australia



Over the past two years, momentum has quickly developed within the Australian AgTech and FoodTech ecosystem. At last count, there are close to 300 AgTech and FoodTech companies operating in Australia, and the sector is seeing an increase in both capital invested and the players in the supporting innovation ecosystem.

This support ecosystem is important as the failure rate for start-ups runs close to 92 per cent over their first three years in business⁴⁶.

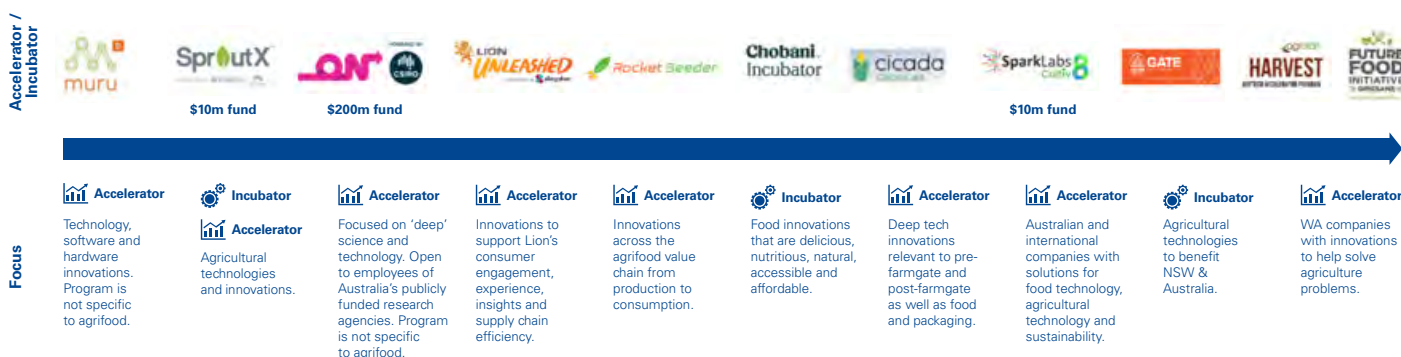
Since late 2016 at least ten incubators or accelerators with a focus on agriculture and food innovation have been established in Australia. These organisations assist with the development and then commercialisation of agriculture technologies — assisting entrepreneurs with going to market and ensuring product-market fit.

Cooperative Research Centres such as Food Agility have also emerged with a focus on digital innovation for Australia's agrifood industry. Food Agility's ambition is to see Australia become the agrifood innovation nation. Launched in 2017, Food Agility will operate for 10 years, with \$200m in committed funding from over 50 industry, research and government partners. It is focused on fast-tracking the growth of Australia's food industry through digital technologies. Precision 2 Decision, a project involving Australia's rural research and development corporations (RDCs), led by Cottons RDC, has been investigating the barriers to digital technology adoption in agriculture and is moving focus onto solutions to these barriers. Initiatives such as the *Australian Agrifood Digital Directions* index and enabling platform that Food Agility and KPMG are championing will help agrifood businesses identify

opportunities to digitally enable their operations, supply chains and sector.

There is no shortage of avenues for entrepreneurs, farmers, investors and industry stakeholders to get engaged in discussions around emerging technologies. Significant effort has been directed towards driving awareness of the agrifood technology opportunity. The focus now must be on driving action and promoting and enabling adoption on farm and through the value chain.

“Economic modelling conducted through the Precision 2 Decision project indicates that digital technologies for agriculture could unlock \$20.3 billion in gross value of agricultural production”

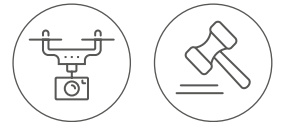


45 Jamie Pride, 2017, "Unicorn tears — why startups fail and how to avoid it"

Is the tax system ready for AgTech?



**By Tony Morganti, Partner,
Corporate Tax
KPMG Australia**



From accelerated depreciation to income averaging, the agricultural industry is widely known to have access to some of Australia's most targeted tax concessions. However, with the evolving technology space it has become evident that a number of areas of tax policy are not keeping pace with the AgTech solutions coming in to market.

Technology can have its primary uses but given its versatility it can also provide ancillary benefits. These ancillary benefits may disqualify the technology from meeting the often strict wording requirements of a particular section in the tax legislation. For example, electronic collars on a cow for virtual fencing may also provide information on the health and weight of the beast, calling into question whether the

technology is really a fencing asset. Similarly, a device that allows you to best allocate water and thus is a water facility, may also provide data on soil to enable a farmer to determine whether a paddock requires fertiliser.

In this respect, many contemporary solutions that are technology based are not presented with a consistent tax treatment as traditional agricultural assets that address the same problem. The primary example lies in electronic 'virtual' fencing technology. Under the current tax concessions, an upfront tax deduction may be taken for fencing assets, however the strict and narrow interpretation of the law looks only at physical fencing assets, not the temporary nature of a virtual fence.

Encouragement of the uptake of technology in the agricultural industry is vital to the continuing maximisation of efficiency and yield. However, the tax system is currently falling behind the advancements in technology, leaving contemporary farmers without access to traditional concessions.

"Encouragement of the uptake of technology in the agricultural industry is vital to the continuing maximisation of efficiency and yield. However, the tax system is currently falling behind the advancements in technology, leaving contemporary farmers without access to traditional concessions."



The farm network of the future and the Internet of Things (IoT)

What is the farm network of the future?



By Sami Makelainen,
Technology Insights Manager,
CTO Strategic Planning and
Foresight, Telstra



For generations, advances in technology have helped Australian farmers become more efficient and productive. However, the increasing use of connectivity and equipment autonomy is transforming the way farms operate today. Farming practices of the future will soon be unrecognisable to farmers just one or two generations before.

Increasing connectivity will make farming life simpler and more efficient. Existing mobile networks have started our journey and new technologies such as low-power-optimisation LTE Cat-M1 and NB-IoT, the upcoming 5G mobile network and satellite technologies will continue this evolution.⁴⁷

However, to make things simpler, things may become more complex for a while. Getting these devices to talk to each other and provide real-time information in a central dashboard at the farmer's home or office will require connectivity on a scale never seen before, and will undoubtedly involve different interfaces, methods and systems that are not always seamlessly compatible. The benefits though, once successfully done, will be game changing for Australian farmers.

One of the technologies already making an impact is IoT. This technology gives a major impression even at the simplest end of the scale, such as water tank

sensors for water level monitoring and leak detection, which can save significant quantities of water – a precious resource in Australia.

By 2030, IoT solutions will be moving more towards what the Institute for the Future calls the Internet of Actions, in which the systems move beyond sensors doing measurements to become more autonomous actors that are goal-setting, and self-optimising.

In addition to improved connectivity, IoT deployments will be driven by long or indefinite (through energy-harvesting) battery lives, miniaturisation and low-cost devices.

Short to medium term use cases enabled by ubiquitous connectivity will include⁴⁸:

- Sensors embedded in soil which can track moisture and soil health, making it easier for farmers to efficiently distribute water and fertilisers. At the other end of the logistics chain, sensors that can sniff the ripeness of food will be integrated into packaging and storage units, optimising not just the delivery chain for freshness and reduced wastage but also enabling the consumers to use ingredients optimally.

- Ingestible sensors monitoring livestock health, rumination across an entire herd of cattle, health of prized breeding stock and fertility across a range of breeds can be monitored and tracked in real time.⁴⁹
- Connected farming equipment will increasingly become autonomous for precision planting and other cropping activities; performance data being aggregated at the homestead or office via a farm-wide dashboard that provides an integrated view of not only livestock and crop health but tracking and forecasting business health and profitability as well.
- Widespread use of drones for various activities. For example, drones can diagnose many crop-related diseases early, and drones equipped with hyperspectral sensors allow measurement of water and nitrogen levels – a much more efficient method than labor-intensive ground surveys. Drones can even be used for livestock mustering instead of expensive helicopters⁵⁰.

All of these technologies and more serve to help reduce the cost of crop inputs as well as improve yields, sustainability, resilience and quality, while reducing the environmental impact through the reduced used of inputs and wastage.⁵¹

⁴⁷ Weldon M, *The Future X Network: A Bell Labs Perspective*

⁴⁸ Food Futures Lab at the Institute for the Future

⁴⁹ Telstra, March 2017, White paper "Regional Australia's technology future"

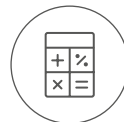
⁵⁰ Adão T et al., 20 Sep 2017, Hyperspectral Imaging: A Review on UAV-Based Sensors, Data Processing and Applications for Agriculture and Forestry, Remote Sensing

⁵¹ Ericsson Networked Society Lab: ICT & The Future of Food and Agriculture, <https://www.ericsson.com/assets/local/networked-society/trends-insights/networked-society-insights/industry-transformation/reports/ict-and-the-future-of-food-and-agriculture.pdf>

What impacts will IoT have on agribusiness?



By Piers Hogarth-Scott,
National Lead Internet of Things
KPMG Australia



The agriculture sector is one of the last billion-dollar industries to be truly digitised. The Internet of Things (IoT) is a key enabler to unlocking this opportunity, and at the same time the challenge of on-farm connectivity is rapidly being solved. Society has embarked on an era that can be termed the 'fourth industrial revolution' due to the rapid development of technologies and digital ubiquity⁵².

Whilst AgTech can loosely be defined as technology that is used in the agriculture sector such as livestock, horticulture and cropping to help drive efficiencies and profitability, the IoT in agriculture – also known as smart food and fibre – is the broader application of connecting the physical world with the digital world through the instrumentation of every thing such as crops, soil, water sources, livestock and more. The real power of IoT exists because it enables operations to be connected and optimised in ways previously not possible through the use of sensors, connectivity, data analytics, artificial intelligence, machine learning and cognitive abilities. Smart food and fibre IoT enables the whole ecosystem to deliver economic capital, social capital and natural capital. It enables the agriculture sector from paddock to plate and field to fibre, to not only digitally transform the farm, but to enable the digital supply chain and the efficiencies, productivity gains and economic opportunities that come with it.

Smart food and fibre enables consumers, producers, processors, logistics operators, biosecurity, trade validation, government regulators and policy makers to work smarter in our cities, regional and remote landscapes. Through unprecedented opportunities IoT enables the enhancement of our most fundamental human emotional and intellectual response to each other and the world around us. What we eat, wear and create through growing food and fibre, and how we impact one another and the planet we share to do these things, is intimately related to how we live, our wellbeing, and our success in an inter-related global society.

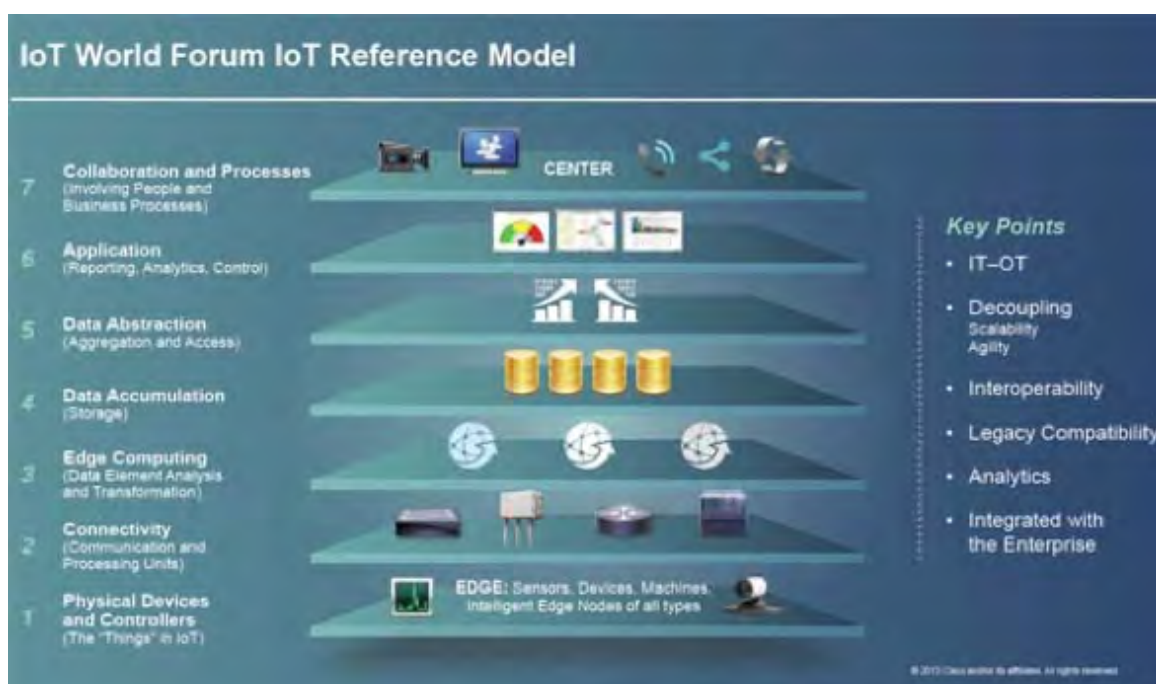
In a world that is increasingly digitally connected by the IoT, data becomes a critical asset. IoT provides the entire agribusiness supply chain with faster and better insights from real-time data that enables the sector to make smarter and more agile decisions in response to market demand, automated processes, predicting future events, becoming more efficient in how we produce food and fibre to ensure less wastage, delivering product to market in a more timely fashion, and providing confidence to our customers of provenance, safe, sustainable and high quality product.

But the mass instrumentation and connectivity of every thing also introduces cyber security risk. Ros Harvey, Managing Director of leading

Australian AgTech company The Yield, said in a recent KPMG report *Security and the IoT Ecosystem*: "The potential for IoT to drive benefit in the Australian agriculture sector is significant, but we need to have the right security measures in place. In agriculture, trust relationships run deep. Growers need to have confidence that their data and their on-farm systems are secure. If that trust is compromised, adoption of IoT will suffer."

Peak industry body IoT Alliance Australia (IoTAA) recently released their IoT security guidelines providing top-level guidance to CEOs and CIOs, with a focus on key sectors including agriculture. "Managing security risks and protecting user privacy are vital to realising the benefits of digital transformation," said IoTAA CEO, Frank Zeichner. "We see a security agenda as vital to build trust in an IoT-connected world for consumers and business users, as well as an opportunity for the Australian cyber security industry," says Mr Zeichner.

"IoT has the capacity to significantly change the digital connectivity landscape for Australian farms and policy makers need to continue to support its introduction to the farm sector. This needs to be balanced with the appropriate security measures."



Source: Cisco IoT World Forum

Case study – Cisco & NSW DPI: Practical example of how a farm can be digitised

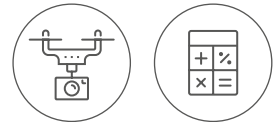
Cisco, the NSW Department of Primary Industries and Bralca Pty Ltd are collaborating to develop the Farm Decision Platform (FDP). FDP has been deployed across a number of farms in Orange, NSW, and is in the process of being commercialised for scale. FDP has been designed with a vision to 'digitise the farm' to help farmers make better decisions and increase profits. The platform solves both the challenge of on-farm connectivity, whilst also enabling a variety of sensors measuring weather, crops, soil conditions, livestock health and other attributes, married with third party apps that bring artificial intelligence and machine learning, to help farmers optimise operations, predict future events and reduce operating costs.

Utilising and securing our data

How can big data be utilised to improve agriculture outputs? What are some of the policies and risk management strategies required to support big data?



**By Anthony Coops, Partner,
Innovation & Digital Solutions,
KPMG Australia**



Agribusinesses are among the slowest organisations to adopt new digital technology, despite the fact the entire agricultural industry revolves around data⁵³. From rainfall and a range of weather patterns, to the clockwork timing and precision of harvesting and distribution, the success of any modern agribusiness can be enhanced through effectively using an array of data sources. As technology becomes increasingly more prevalent, so do the types and number of data sources. Adding to this, the roll-out of the NBN and the other connecting solutions to rural areas means farmers will increasingly have access to the infrastructure to connect to sensors and devices spread across their property.

Early adopters in agriculture are already reaping the benefits of their investments in digital technology and advanced analytics, including:

- Oyster farmers making critical harvesting decisions by better understanding the real effects of rainfall run-off, through combining remote water sensors with predictive models⁵⁴

- Farmers replacing manual measurements and calculations with state-of-the-art sensors to measure and analyse evaporation, so that the optimal amount of water is supplied to crops
- Lettuce growers optimising supply chain processes to maximise shelf life — a win for both retailers and consumers.

Digital technology and advanced analytics offers farmers new and exciting ways to achieve higher yields at a better quality, and with less waste and effort. Ultimately this translates to higher profits, happier customers, and a healthier environment. In today's increasingly competitive global market, there has never been a better time for agribusinesses to take advantage of what digital technology coupled with advanced analytics has to offer.

“The roll-out of NBN and other connectivity solutions means farmers will increasingly have access to infrastructure to connect to sensors and devices spread across their property.”

53 Digital Australia: Seizing the opportunity for the Fourth Industrial Revolution, McKinsey

54 The Yield + Microsoft: Transforming the Australian agricultural industry, video available on YouTube <https://www.youtube.com/watch?v=0EK15i7CU5Y>

What is the next challenge in terms of competition policy to drive a more vibrant agricultural and food sector in Australia?



**By Mick Keogh, Executive Director,
Australian Farm Institute and
part-time Commissioner, ACCC**



Getting competition policy right is a bit like getting the rules of a game of football right. The aim is to make sure all get a fair chance to compete, and the rules need to be modified as knowledge and technology changes.

Australian competition and consumer laws were significantly modified in 2017, with the introduction of the 'effects test', and legislation banning concerted practices and unfair contracts. The effects test should make it simpler for courts to prevent anti-competitive behaviour by dominant companies, and the unfair contracts laws will prevent manifestly unfair terms being inserted in standard contracts between major companies and suppliers or customers.

These reforms are relevant to the agricultural sector, where markets are on occasion dominated by several large companies, and many transactions occur based on standard-form contracts.

The very rapid development of digital technologies and marketplaces is the next major challenge for competition regulators and laws. The exponential growth of computing power and almost universal internet access has enabled major companies to expand rapidly and disrupt markets in ways that reduce competition. This issue was examined by the Productivity Commission in 2017, which made recommendations aimed at ensuring that data does not become a major impediment to competition. As an example, a farmer can currently utilise a cloud-based software platform to accumulate farm data. However, if the system restricts the farmer from exporting that data to another competing software system, then the more data the farmer accumulates, the greater the unfair advantage one system has over another.

The Productivity Commission recommended that strong data

ownership rights should be implemented, to ensure that data retention does not become a major block on competition. It recommended that the government implement legislated universal data rights, and that industry sectors be required to develop codes governing the management of data within the industry.

It is becoming more and more apparent that the use and analysis of data has the potential to provide a major boost to agricultural productivity, and the challenge facing the sector is to find ways to encourage these developments, but at the same time to ensure they don't begin to damage competition in the sector.

"It is recommended that the farm sector engages in the development of codes governing the management of data within the industry."



Is cyber security a threat for agriculture?



**By Khoa Duong, Associate Director,
Technology and Cyber Security,
KPMG Australia**



Cyber security is commonly featured as the number one business risk, with many threats, such as malware, that could affect an organisation. This can result in loss of services, leakage or compromise of data, reputational damage or compliance breaches. As observed recently with the Cadbury chocolate factory in Tasmania (who were affected by malware and had to close operations for a period of time), cybersecurity events can occur at any time and in any place.

As farmers and companies become more and more digitally connected, it

has never been so crucial to apply sound cyber security practices to ensure that benefits can be harvested from new technologies in a secure manner. It is an opportune time for the agriculture sector to leverage the insights and lessons from other sectors, and to re-evaluate its information and technology landscape and ensure key risks are being managed.

There are opportunities to promote an active dialogue within the industry, confirm the understanding of digital information and technology landscape, understand the opportunities and risks,

and support the industry to maintain cyber security with fit-for-purpose processes, resources and technology.

“Raising broader awareness and providing relevant guidance will support the sector to ensure that with the increasing pace of AgTech, cybersecurity is also being factored in at the same time, making cyber security a part of the ‘smart farming’ revolution.”

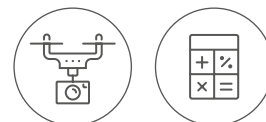


Harnessing blockchain

How can blockchain support the agribusiness industry?



By Laszlo Peter, Partner,
Head of Digital Ledger Services
KPMG Australia



Distributed ledger technology, more commonly referred to as 'blockchain' has had significant media coverage in the last 12 months. While the agricultural sector has seen a few blockchain experiments and prototypes, industry leaders have suggested that the entire food assurance value chain is ripe for automation and the sector provides one of the most promising use cases for deploying emerging technologies like blockchain.

Agricultural companies are reliant on legacy infrastructure that is either complicated or cost prohibitive to replace or change. Blockchain technologies offer a new, complementary environment that can co-exist with existing systems and infrastructure that has the ability to

deliver significant benefits in automation, productivity and access to new markets and customers.

In the value chain of the future, where data – not paper – will be the foundation of trade, information will flow between nations, but privacy and commercially sensitive information will be secured. Technology will help to remove inefficiencies caused by inconsistent standards that goods encounter as they cross multiple countries and will reduce working capital built up in the value chain (especially at customs, ports, etc.) due to manual documents and processing.

Cross border collaboration will help to reduce waste as goods transfer

faster through ports to end consumer/user. New and innovative products and services will emerge around tracking, financing and insuring goods in the most efficient and real time manner as actors in the trade process will have greater transparency allowing for more timely planning and faster fulfilment. Such transparency and certainty of trade-related activities would help to reduce fraud, improve welfare, simplify the value chain and help identify (and remove) compromised participants.

The first countries to link international trade platforms will generate major competitive advantages. Not only would their country's exporters face significantly reduced trade costs, but



supply would be faster, smoother and more dependable. The opportunities go beyond one particular organisation and can drive a wider and national transformational agenda.

While blockchain technologies hold significant potential, we do not believe that the key to successful application of this technology is its technological sophistication. We believe that the true measure of success will be the ability of industry participants to foster buy-in supported by commercial constructs driven by the following factors:

- 1 The **trust** built by all stakeholders through management of the initial phases of an industry collaboration;
- 2 Transparent and effective **governance** to ensure that solutions that are built are done so for the industry and by the industry;
- 3 Management of **risk** for all parties given the different stages of maturity regarding emerging technology adoption and capability at which various stakeholders might be; and finally

- 4 The practical, day-to-day **operation** of a collaboration environment (also known as the 'platform'), where a carefully appointed and independent 'operating entity' can codify, distribute and manage the rules, standards and functions of the platform.

Such an approach would enable collaboration of (sometimes competing) stakeholders to develop new products and services that currently are not possible or are cost prohibitive. These opportunities will shorten process cycles and settlement times, will reduce costs and operational risks, provide better transparency for contracting parties (risk) and improve cash management practices.

Developing a fully inclusive blockchain platform is a complex initiative. Starting with a well-defined (but end to end) initial scope is ideal to discover early limitations, scalability options and the most ideal ways to on-board a broad set of participants.

"The entire food assurance value chain is ripe for automation and the sector provides one of the most promising use cases for deploying emerging technologies like blockchain."

Automation and artificial intelligence

How can artificial intelligence disrupt the agriculture sector?



By Salah Sukkarieh, Professor,
Australian Centre for Field Robotics



Artificial intelligence (AI) is a very general term to describe different levels of machine learning techniques and algorithms that help us either understand the world better (through data crunching and pattern analysis) and/or to provide machines with capabilities to quickly know the world and make decisions or take actions based on that knowledge.

AI has the ability to disrupt and digitise the supply chain of knowledge in the agricultural sector in the next 15 years. Where a farmer currently relies on an agronomist at points in time within the production cycle to relay farm management processes and long-term outcomes to drive actions, machine learning approaches can provide information 24 hours a day, 7 days a week, giving a farmer more flexibility and opportunity for experimentation with real-time results. This shortens the time between knowledge and practice, and can begin to collapse the time that knowledge is transferred as it's gained in the university, to R&D, to the agronomist and farmer.

Various challenges still exist for the successful implementation of machine learning techniques in the agricultural sector. The largest challenge is in the variable spatiotemporal nature of food production. This means that many techniques currently available in the machine learning R&D spectrum may not be suited and significant developments in R&D are required. Unlike industries such as mining and aviation, the algorithms developed for the agricultural sector are required to keep up with the

ever-changing environmental factors. To do this, machine learning techniques not only need lots of data but also the computation capabilities to analyse that data either offline or in real time. Furthermore, technologies such as drones, ground robots, tractor-based and hand-held sensors are going to create an explosion of data in the coming years across the broad spectral band. With this, we are likely to see start-ups developing AI solutions on an isolated scale, while the larger companies will focus on the architecture that allows all these platforms, sensors and algorithms to plug and play.

The most immediate barrier is a digital divide, a lack of synergy between computer scientists and agricultural experts. While a computer scientist is an expert in the field of algorithms, they lack practical knowledge in the agriculture space. Similarly, an agricultural expert generally has no or little understanding of the complexities in the algorithm and software space. In the short-term, we should look to activate the innovation pipeline and allow start-ups to provide single solutions by combining knowledge of both sectors. In the long-term, the government should look to break down the rural/digital divide by looking at changing education elements in the rural and science sectors.

“The government should look to break down the rural/digital divide by looking at changing education elements in the rural and science sectors.”

Case studies on automation in agriculture

Tackling the challenge of weeds, which costs Australian farmers annually around \$1.5 billion in weed management and \$2.5 billion in lost production, is one area that is attracting automation/robotic solutions. US-based see and spray weeding robotics company, Blue River Technology, recently made headlines when it was acquired by John Deere for US\$305 million.

Australian-based agriculture robotics companies such as Swarm Farm are working to help tackle the nation's weed problem. Lightweight, sensor-guided, autonomous 'swarmbots' have applications for weed spot spraying and mowing for the broadacre and horticulture sectors, with more applications anticipated. The Australian Centre for Field Robotics at the University of Sydney is also actively working to design on-farm robotic solutions to weed management through RIPPA, as well as herding cattle through Swagbot.

By performing routine on-farm activities such as weed management, automation and robots can help close agriculture's labour shortage gap and enable farm managers' time back in their day to focus on managing the farm business. When combined with sensors, robots are also able to support the environmental stewardship of the industry applying inputs such as water and chemicals when, where and in the quantities they are needed. We have access to leading-edge robotics solutions, we need to accelerate access to these for our growers to unlock the productivity and safety dividends they offer.

What impact will electric and autonomous vehicles have on rural Australia?



**By Praveen Thakur, Director,
Management Consulting,
KPMG Australia**



It is predicted that by 2040, 35 per cent of all new car sales will be electric⁵⁵ — this is a conservative estimate. Furthermore, it is estimated that by 2025, 65 per cent of all vehicles on the road could contain at least one autonomous technology⁵⁶. Battery prices are falling, and notable corporates are investing heavily into the electric and autonomous space, Google and Apple being some of the most notable ‘technology’ firms moving into the sector. Lives and businesses will be heavily impacted by this transformation, but none more so than in regional areas, where distance and mobility are acute issues in day-to-day business operations.

The first major impact will be enhanced rural-urban connectivity — achieved through productivity and cost efficiencies. The reduced cost of fuel and potential to optimise congestion, which is estimated to cost Australia \$30 billion per year by 2030⁵⁷, will enable cheaper, more convenient access between the regions and traditional business hubs. This is much like the impact of long-haul, large aircraft which made the price of

international travel affordable to many consumers. The economics of rural to urban transportation will improve, and the opportunity cost of living and working regionally, to enjoy rural lifestyles but also having an ability to travel to urban areas to access other opportunities, will reduce.

The second important implication will be seen in the optimisation of the supply chains as a result of big data analytical capabilities, especially in delivery, efficiency and assurance. An Internet of Things network centered on interacting smart vehicles will enable fluidity in moving goods from rural areas to transport hubs, based upon the data gathered by vehicle usage. This network will also add to provenance-enabling technologies such as blockchain, to reduce liability and increase quality assurance during transportation. Shipments will be more easily tracked and monitored to ensure that regions producing fresh products are no longer constrained by concerns of produce arriving to consumers in premium shape.

However, impact will be dependent upon investment into related infrastructures.

A bold statement must be made by government and corporates alike, to co-invest into the array of technologies and physical projects that must be put into place to facilitate electric and autonomous vehicle operations. This includes challenging questions such as setting legal precedents — determining who is at fault in an accident involving an autonomous vehicle, for example. A suitable number of charging stations must be present for electric vehicles to overcome consumers’ ‘range anxiety’, whilst autonomous vehicles must be guided by smart technologies that track movement and ensure continuous safety on the road. This process and the vision of our public and business leaders will determine the benefits accessed by regional communities as a result of electric and autonomous vehicles.

“The vision of our public and business leaders will determine the benefits accessed by regional communities as a result of electric and autonomous vehicles.”

55 <https://www.bloomberg.com/features/2016-ev-oil-crisis/>

56 <https://home.kpmg.com/content/dam/kpmg/us/pdf/2017/11/us-jnet-2017-issue4-article1-en.pdf>

57 https://bitre.gov.au/publications/2015/is_074.aspx

Attracting people and capital

Making Australian agriculture an employer of choice



What are governments, companies and NGOs doing to ensure ethical labour practices are adopted around the world?



**By Richard Boele,
Partner, Global Head,
KPMG Business
and Human Rights
Network**



**By Meg Brodie, Associate
Director, Lead Human
Rights and Social Impact
Services, KPMG Banarra**



Australian agriculture must adapt to remain competitive in a changing global landscape. Environmental, social and governance expectations on business are increasing as regulators, investors, customers and communities require greater transparency over non-financial risks. In this context, ethical labour practices have come to the fore as agricultural companies find their approaches to human rights globally benchmarked⁵⁸ and subject to media scrutiny.⁵⁹

In Australia, the reputational risk associated with labour rights violations is well known to those in agriculture, and some in the sector fear unfair targeting if growers are subjected to more checks and regulation.⁶⁰ In reality, Australia's brand and the reputation of our farmers can only be protected by strengthening the capacity of our industry as a whole to demonstrate that it can identify and manage human rights risks.

This is particularly important as Australia follows other jurisdictions around the world which have introduced legislation requiring transparent corporate reporting of modern slavery and other rights

risks.⁶¹ In 2018, Australian entities with annual revenue of AUD \$100 million will need to get ready to publicly report on their efforts to address modern slavery in their operations and supply chains.⁶² Agriculture will be in the spotlight: the ILO has identified that 11 per cent of modern slavery victims worldwide are within the agricultural and fishing sector, and seasonal work, often involving vulnerable populations such as migrant workers, is regarded as a high risk.

Leading companies are exploring innovative approaches bringing together technological solutions that offer assurance over production with robust human rights due diligence, and introducing these into the suite of supply chain management options. Conducting a gap analysis which examines the maturity of your current approach is an important first step in assessing your capacity to respond.

“Public commitments to ethical practices, coupled with greater oversight and awareness will be essential for Australian agriculture’s capacity to secure global markets for our products.”

58 Corporate Human Rights Benchmark, 2017, *Agricultural Products*, <<https://www.corporatebenchmark.org/sites/default/files/styles/thumbnail/public/2017-03/Key%20Findings%20Report/CHRB%20Key%20Findings%20report%20-%20May%202017.pdf>>.

59 Caro Meldrum-Hanna and Ali Russell, 6 May 2015, ‘Slaving Away’ ABC Four Corners, <<http://www.abc.net.au/4corners/stories/2015/05/04/4227055.htm>>.

60 Harley Dennett, 11 December 2017, ‘New Agency Needed to Combat Slavery Practices in Australia’ *The Mandarin*, <<https://www.themandarin.com.au/87075-modern-slavery-practices-new-agency-needed/>>.

61 KPMG, October 2017, Submission to the Commonwealth Attorney General’s Department: Modern Slavery in Supply Chains Reporting Requirement, <http://newsroom.kpmg.com.au/wp-content/uploads/2017/10/AG-Submission-Modern-Slavery-in-Supply-Chains-Reporting-Requirement-FINAL-20.10.2017.pdf>

62 Richard Boele and Meg Brodie, 31 October 2017, ‘Are You Ready to Go Public About Modern Slavery? Time to Get Prepared’ KPMG Newsroom, <http://newsroom.kpmg.com.au/modern-slavery-hidden-supply-chain-proposed-legislation-lead-transparency/>

Accessing skills

What needs to be done to increase productivity of land and diversify land use owed by the Indigenous communities?



By Glen Kelly, Director,
Arrilla Indigenous Services
KPMG Australia



Indigenous groups have emerged as significant land holders and players within the pastoral industry and are growing their interests in agricultural regions. This is the result of the strong match that pastoralism and agriculture have with Indigenous cultural values, in addition to the business and employment opportunities that the sector provides.

In recent times, greater emphasis has been placed on supporting Indigenous participation in these sectors, with focus driven through native title and land rights regimes as well as the advent of land purchasing programs such as the Indigenous Land Corporation. Mainstream institutions now also play a growing role in supporting the growth of the Indigenous agricultural and pastoral sectors.

The Commonwealth White Paper on Developing Northern Australia has brought sharper focus on the uses and productivity of Indigenous held lands, particularly in pastoral areas, and discussions on how to unlock the potential of these lands have gathered pace.

These discussions have centered around topics such as:

- Increasing the productivity of land holdings;
- Reform to assist the economic activation of existing land and water rights;
- Diversifying land use and the development of new and non-traditional (to the sector) business on existing lands;
- High value over high volume produce;
- Access to domestic and increasingly international markets;
- Access to capital and developing investment ready business proposals;
- Research and development support; and
- Infrastructure investment to support these ends.

What's good for Indigenous landholders then, is potentially very good for the industry as a whole.

"As there are significant and increasing areas of land held by Indigenous peoples across Australia, unlocking the potential of lands and improving productivity will have an enormous and positive impact on the overall economic, social and cultural status of Indigenous communities. It will also have a large and positive impact on reaching the \$100 billion industry wide target."

Does Australia need an agriculture visa?



**By Emma Germano,
Managing Director of
I Love Farms and President
of VFF Horticulture Group**



Agriculturalists are calling for a dedicated visa for the industry to help support an increase in productivity and sustainability for farmers in conjunction with an amnesty on all currently employed labour that does not meet legal regulations. An amnesty would provide those presently hired without legal rights, a permit to continue working. This would ensure the current labour deficit is not compounded, and the value of the agricultural industry as a whole is not threatened.

The agriculture visa can ensure that workers feel protected in their place of employment and are hired under suitable conditions — particularly for those people who are employed from countries where complaints and communication between employers and employees is culturally discouraged.

The agricultural visa should be designed to be supportive of the current seasonal workers program and encourage greater reliability, return workers and efficiencies to drive productivity for the industry.

“The agricultural visa could be designed to support people coming to Australia for employment in agriculture specifically, providing a legitimate incentive for international labour hire where domestic shortages exist.”



What is the impact of change in the policy of backpackers tax?



**By Emma Germano,
Managing Director of
I Love Farms and President
of VFF Horticulture Group**



Australia is running short of suitable employees to assist the agricultural industry – farmers are increasingly having to rely on labour-hire companies and backpackers (working holiday makers).

The negative debate and media reporting on the backpacker tax (whereby they are no longer entitled to the tax-free threshold, and instead are taxed at 15 per cent) has resulted in an overall decline in employees and applications for working holiday visas.

A system to support the hire of a legal, reliable workforce is critical to ensuring that sustainability and growth can be achieved for agriculture as an industry, and facilitates fair costs of labour inputs.⁶³ This requires a supportive government response that encourages efficient domestic and international labour use, discourages any perverse outcomes and meets employment rules and regulations (including tax obligations).⁶⁴

A labour data gap exists across agriculture too, better capture of data in relation to the number of people hired in the industry, including the allocation of working holiday visas, the use of seasonal workers, and the number of labour-hire placed employees, will allow the industry better oversight of supports required to ensure industry sustainability.



⁶³ Victorian Farmers Federation, 2018, VFF Horticulture Policy Statement — horticulture labour, VFF Policy Council.

⁶⁴ Victorian Farmers Federation, 2018, VFF Horticulture Policy Statement — horticulture labour, VFF Policy Council.

Making our farms investable

How do you make agribusiness more investable?



By Sam McClure, Partner,
Deals Tax Legal
KPMG Australia



Australian agriculture has been challenged by access to capital and investment. There is plenty of capital available, however it often looks for longer investment periods, steady returns and low risk investments – agriculture has traditionally not met these criteria. Volatility is the sector's greatest challenge in attracting investment. The regularity of farmer earnings is largely a function of water and climate, which can lead to vast differences in yield year-on-year. The development of innovative financial instruments to reduce this risk are therefore crucial, and both government and industry should work together to create new models to these ends.

The first way of flattening volatility in the yield curve is through financial products, including insurance. The US has established these types of risk management vehicles for agriculture far more successfully than in Australia, where products are ill-suited to the market and uptake is low. It is estimated that less than one per cent of Australian farmers have crop insurance, contrasted to over 90 per cent in the US⁶⁵. Regular insurance products include crop peril, property coverage and operational insurance – all of which provide an investor with security in the knowledge that should yields or operations decline, the businesses invested in remain secure.

Furthermore, leasing arrangements can be organised in alternative ways to limit volatility. Sharing risk with variable lease

agreements, where the lease prices fluctuate alongside yield and productivity, mean that land owners and growers share in productivity variation. Generally, leases are set around rigid terms, with set annual fees and three to five-year periods. They do not typically account for seasonal variance, thus creating an imbalance between the contracting parties – one often wins at expense of the other. Restructuring leases to vary depending upon productivity of the land creates a situation where farmers and land owners are equally invested and risk is spread.

Secondly, diversification of production segments can also play an important role in agricultural investment strategies that reduce overall volatility. Doing so in both geographies (across climates) and product type is important. Australian farmers have often done the former – owning multiple plots with different weather, pasture and resource conditions – however product diversification is equally important. The fall and rise of citrus in Australia, where growers were pulling trees out due to poor yields and lack of demand, only to hastily replant soon after due to North Asian trade agreements and export demand, indicates the value of growing multiple products.

Share farm models can have a similar effect. Contracts placed between farmers, whereby those with high yields or specific varieties (farm managers) partner with those that have access to

larger amounts of land (land owners), enable industry stakeholders to leverage one another's competitive advantages and diversify or intensify their operations to manage risk. Pooling capital and resources together within industry will create economies of scale and protect the current value held by individual farmers in their operations⁶⁶.

Finally, as well as financial instruments and portfolio optimisation, there is a highly practical way for farmers to manage volatility and therefore attract investment as an individual. Controlling the environment on the farm, using AgTech solutions such as greenhouses, smart irrigation and temperature controls, provides more reliable growing conditions and steady yields. Sundrop, a group based out of Port Augusta, have been successful in doing this. They achieve regularity in supply through hydroponics and renewable technologies that enable constant supply of fresh water, heating and electricity. Utilising the technological options available to our farmers, alongside financial innovations and strategies, will improve yields and thus investment.

“Governments and industries should work together to create new models to reduce risk of volatility and hence increase opportunities to attract investments.”

65 <http://www.abc.net.au/news/rural/2017-07-07/crop-insurance-viable-without-government-subsidies/8688946>

66 KPMG report, 2015, The Road to Riches: Driving investment in Western Australian agriculture

What emerging ownership models can help to maintain and support the farm of the future?



**By Robert Poole, Partner,
National Lead Agribusiness
– Management Consulting
KPMG Australia**



Traditional family farm ownership structures remain the core of Australian agriculture. However, the growth of family corporates and increased use of external capital is increasing as the Australian farm sector transitions and expands at the same time. As this continues there is a need to encourage varied and innovative systems to support access to capital that will facilitate farm ownership and in turn generate growth through new value and increased volume.⁶⁷

Capital constraints preventing growth of value and volume

“Around \$600 billion in additional capital will be needed on farms and in supply chains between now and 2050.... a further \$400 billion will be needed to support older farmers exiting the sector, allowing the next generation of farmers to buy them out.”

Source: Port Jacksons Partners, 2012, Greener Pastures: The Global Soft Commodity Opportunity for Australia and New Zealand, commissioned by the ANZ Bank

Looking to international markets, this already exists in the form of:

- improved succession planning tools – moving away from primogeniture to collective, transparent and multi-generational farming;
- equity partnerships – where silent investment is sourced to finance expansion and productivity;
- vertically integrated agribusinesses – where most, or all, of the supply chain is owned by the same business, generating greater economies of scale and efficiencies; and
- leasing arrangements – whereby land ownership remains with a single entity and primary production rights are leased to a farmer who can thus leverage their working capital more effectively.

The use of non-farm equity alongside traditional debt finance is essential if Australian agriculture is to meet the NFF’s \$100 billion target.

The role of the Australian superannuation and broader investment sectors in agri-business is still limited. Increased investment by Australian institutions is needed alongside the foreign capital that will also flow into Australia.

“The role for industry and government is to ensure that farm businesses that seek to access capital are investment ready. Furthermore, that the regulatory environment for investment is appropriate for growth.”

67 Heath R and Tomlinson A, 2016, *A review of farm funding models and business structures in Australia*, Australian Farm Institute

Industry leadership and coordination



How does our industry coordinate to deliver the best representation for farmers?



**By Tony Mahar, Chief
Executive Officer, NFF**



Agriculture and its related sectors are an integral part of the Australian economy earning \$155 billion per year, representing a 12 per cent share of GDP.

Representing Australian farmers and an agricultural industry of that scale is an enormous honour — but with that honour comes responsibility. While the challenges are many, the need for the industry to be recognised for its economic value and national importance is paramount. Maintaining that recognition and ensuring governments and decision makers deliver policy that eases access to markets and streamlines supply and delivery channels is the key role of an effective representative organisation.

In today's fast-changing and challenging environment, it has been clearly recognised that a strong and united approach to advocacy is optimal to achieve long-term benefits and sustainability within the industry.

A more consolidated and efficient, more engaged structure will enable those chosen to represent the industry to

listen, act and deliver outcomes in a more relevant and nimble way. It will attract our key stakeholders and also those that aspire to be our stakeholders. We can and must become more effective, more agile and more engaged through an innovative structure that amplifies a united industry voice if we are to remain at the front of the key decision makers' minds.

By consolidating and seeking efficiencies and embracing a more unified platform, farmers, farm businesses and the broader agribusiness community increase their ability to have their voice heard and hence their issues constructively addressed.

External perceptions of farm sector disunity and inability to coordinate nationally have contributed towards a legacy-based structure defending 'parts' rather than the 'whole' structure of farm sector representation. There is a real and tangible risk of continuing duplication of resources and effort across all levels of representation (national,

state, commodity) from what we know is limited funds available for representation.

The problem is not the performance of individual organisations so much — many of which are performing well — but about the underlying structure within which all farm bodies operate and interact.

Any future model can be a strong stand-alone, national organisation representing the core of Australia's farming community and industries. It will be a positive and engaging model reflecting the needs of the next generation of farmers and industry leaders who demand new representation and communication systems. It will represent commodities both traditional and emerging and also represent the needs of strong, vibrant regions. We must continue to seek the support to update, to ensure the farm sector voice is strong and relevant. Those interests would be best represented under a more efficient national structure, with grassroots liaison a priority by putting the interests of farmers first.

Authors and contributors

On behalf of the NFF and KPMG, we would like to thank all the people that have contributed to this discussion Paper.

Authors and co-authors, by order of appearance

NFF

Fiona Simson, President

Tony Mahar, Chief Executive Officer

KPMG

Bernard Salt, Managing Director of the Demographics Group and contractor to KPMG Australia

Brendan Rynne, Partner and Chief Economist, KPMG Australia Economics and Tax Policy Centre

Trent Duvall, National Leader – Consumer and Retail

Ronan Gilhawley, Partner, Strategy Group

Ben van Delden, Partner, Head of AgTech

Robert Poole, Partner, National Lead Agribusiness – Management Consulting

Peter Liddell, Asia Pacific Leader for Strategy and Operations Advisory Services

Leonie Ferretter, Director, Trade & Customs

Graham Matthew, Partner, Head of Infrastructure and Projects Group, Queensland

Dmitry Danilovich, Head of Clean Energy

Cassandra Hogan, Partner, National Sector Leader – Power & Utilities

Amanda Goddard, AgTech Specialist

Tony Morganti, Partner, Corporate Tax

Piers Hogarth-Scott, Partner, IoT National Lead

Anthony Coops, Partners, Innovation & Digital solutions

Laszlo Peter, Partner, Head of Digital Ledger services

Khoa Duong, Associate Director, Technology and Cyber Security

Praveen Thakur, Director, Management Consulting

Richard Boele, Partner, Global Head KPMG Business and Human Rights Network

Meg Brodie, Associate Director, Human Rights Service Line Head

Glen Kelly, Director, Arrilla Indigenous Services

Sam McClure, Partner, Deal Advisory

Telstra

Sami Makelainen, Technology Insights Manager, Chief Technology Office Strategic Planning and Foresight

Industry Experts

Sue Middleton, Director, Brennan Rural Group, WA

Andrew Spencer, CEO, Australian Pork Limited

The Hon. Andrew Robb AO, Chairman, The Robb Group

Luke Bowen, General Manager, Northern Australia Development & Trade, Department of Trade, Business and Innovation, Northern Territory Government of Australia

John Brakenridge, Chief Executive, New Zealand Merino Company

Phillip Glyde, Chief Executive, Murray-Darling Basin Authority

Lucinda Corrigan, Chair, Farmers for Climate Action

Dr Michele Allan, Chair, Meat and Livestock Australia

John Manners, Director, CSIRO Agriculture and Food

David Hudson, Managing Director, SGA Solutions Pty Ltd

Mick Keogh, Executive Director, Australian Farm Institute

Salah Sukkarieh, Professor of Robotics and Intelligent Systems, University of Sydney

Emma Germano, Managing Director of I Love Farms and President of VFF Horticulture Group

Contributors

NFF

Charles Thomas, General Manager, Digital & Industry Partnerships

Heidi Reid, Project Manager

Laureta Wallace, General Manager – Media & Communications

KPMG

Marie-Claire Renault, Manager

Nick Everingham, Associate Director

Daniel Ginger, Consultant

Lucy Gubbins, Senior Consultant

Evie Murdoch, Consultant

Sally Pyke, Associate Director

Earl Hekking, Manager

David Evans, Director

Suneeta Kamdar, Consultant

Jenny Lam, Marketing Manager

Sarah Belin, Communications Manager

Telstra

Nicole Ward, Regional Engagement Manager

Marnie McKew, General Manager, Regional Directorate

Abby Brown, Senior Communication Advisor

Key statistic references

Section of the report	Figure	Key stat	Reference-Source
Foreword	85,681	Estimated total farms in Australia	Australian Bureau of Statistics http://www.abs.gov.au/ausstats/abs@.nsf/mf/7121.0
Foreword	372 million hectares	Land use in Australia for agricultural production	Australian Bureau of Statistics http://www.abs.gov.au/ausstats/abs@.nsf/mf/4627.0
Foreword	4,331 ha	Average farm size which is up 0.3% since 2014-15	Australian Bureau of Statistics http://www.abs.gov.au/ausstats/abs@.nsf/mf/7121.0
Foreword	Australia – 2nd	largest agricultural area in the world (after China and before the USA)	Science Direct https://www.sciencedirect.com/science/article/pii/S0305750X15002703
Foreword	309,000	People directly employed in Australian agriculture, forestry and fishing	ABARES – Agricultural commodities: March quarter 2018 http://data.daff.gov.au/data/warehouse/agcomd9abcc004/agcomd9abcc20180306_6R2bY/AgCommodities201803_v1.0.0.pdf
Foreword	\$59 billion	Forecasted gross value of Australia's farm production in 2017-2018	ABARES – Agricultural commodities: March quarter 2018
	\$61 billion	Forecast gross value of farm production In 2018–19 (+3%)	http://data.daff.gov.au/data/warehouse/agcomd9abcc004/agcomd9abcc20180306_6R2bY/AgCommodities201803_v1.0.0.pdf
Foreword	\$30.2 billion Crops \$19.5 billion – Livestock slaughtering and other disposals \$9.3b – Livestock products	Forecasted gross value of Australia's farm production in 2017-2018 by industry	ABARES – Agricultural commodities: March quarter 2018 http://data.daff.gov.au/data/warehouse/agcomd9abcc004/agcomd9abcc20180306_6R2bY/AgCommodities201803_v1.0.0.pdf
Foreword	\$47.0 billion	Forecasted farm exports in 2017-2018	ABARES – Agricultural commodities: March quarter 2018 http://data.daff.gov.au/data/warehouse/agcomd9abcc004/agcomd9abcc20180306_6R2bY/AgCommodities201803_v1.0.0.pdf
Understanding our future customer <i>Population growth</i>	9.8 billion	By 2050, the earth population is projected to reach 9.8 billion i.e. +2.2 billion estimation vs today	UN Department of Economic and Social Affairs – World Population Prospects: The 2017 Revision https://esa.un.org/unpd/wpp/Publications/Files/WPP2017_KeyFindings.pdf
Understanding our future customer <i>Population growth</i>	1st	Africa is expected to represent half of the anticipated growth in global population between now and 2050.	Ibid

Section of the report	Figure	Key stat	Reference-Source
Understanding our future customer <i>Population growth</i>	2nd	Asia is expected to be the second largest contributor to this future growth, adding over 750 million people by 2050.	Ibid
Understanding our future customer <i>Market growth</i>	60%	FAO's latest projections indicate that global food production will increase by 60 percent between 2005/07 and 2050.	FAO http://www.fao.org/fileadmin/user_upload/esag/docs/AT2050_revision_summary.pdf
Understanding our future customer <i>New trends</i>	3rd	Australia – fastest growing vegan market in the world (after Arab Emirates and China)	Euromonitor https://www.smh.com.au/business/consumer-affairs/australia-is-the-thirdfastest-growing-vegan-market-in-the-world-20160601-gp972u.html Refer to Ben van Delden section
Supercharging our supply chain <i>Connecting our farms to market</i>	85%	Of the Australian population currently lives in urban areas	Population Australia http://www.population.net.au/
Supercharging our supply chain <i>FFP</i>	12,000	Jobs – this is the potential that a Fresh Food Precinct close to Western Sydney Airport could create	Think big. Think Fresh. WSA Fresh Food Precinct https://assets.kpmg.com/content/dam/kpmg/au/pdf/2017/western-sydney-fresh-food-precinct.pdf
Supercharging our supply chain <i>In-land rail</i>	32 million tonnes	Of freight estimated on the highways and railways by 2030 between Melbourne and Brisbane the equivalent of 1.2 million b-double truckloads of freight per year.	Inland Rail https://inlandrail.artc.com.au
Supercharging our supply chain <i>In-land rail</i>	1,700km	The new inland freight rail infrastructure and largest project in Australia with first train operating by 2024	Inland Rail https://inlandrail.artc.com.au
Supercharging our supply chain <i>e-commerce</i>	US\$10.6 billion	Estimated revenue of the Ecommerce market in 2017 in Australia (B2C)	https://www.statista.com/outlook/243/107/ecommerce/australia#marketStudy
Growing sustainably <i>Intensification</i>	48%	Agricultural businesses occupy and manage 48% of Australia's landmass	Australian Bureau of Statistics Land Management and Farming in Australia, 2015–2016, Catalogue No. 4627.0
Growing sustainably <i>Water</i>	9.2 million mega litres	Total amount of water used on Australian farms	Australian Bureau of Statistics http://www.abs.gov.au/ausstats/abs@.nsf/mf/7121.0

Section of the report	Figure	Key stat	Reference-Source
Growing sustainably <i>Water</i>	\$251m	Australian agricultural businesses spent \$251m on irrigation related expenditure in 2015-16	Australian Bureau of Statistics Water Use on Australian Farms 2015–16, Catalogue No.4618
Growing sustainably <i>Intensification</i>	94%	Australian farmers actively undertaking natural resource management.	National Farmers Federation – Farm Facts, Environmental http://www.nff.org.au/farm-facts.html
Growing sustainably <i>Emissions</i>	63%	Reduction in greenhouse gas emissions between 1996-2016 by Australian primary industries	Australian Bureau of Statistics Australian Environmental-Economic Accounts, 2017, Catalogue No. 4655.
Unlocking new technology <i>R&D</i>	0.015%	Australia's venture capital investment is less than 0.015 per cent of GDP, Israel and the US more than double that investment spend at 0.38 and 0.28 respectively.	Powering Growth https://home.kpmg.com/content/dam/kpmg/au/pdf/2016/powering-growth-realising-potential-agtech-australia.pdf
Unlocking new technology <i>R&D</i>	\$306 million	The Australian government provided \$306 million of R&D support to agriculture between 2015-2016; \$252 million of this was allocated to rural research programs in particular. In 2016-2017 they committed \$271.7 million.	Powering Growth https://home.kpmg.com/content/dam/kpmg/au/pdf/2016/powering-growth-realising-potential-agtech-australia.pdf http://www.agriculture.gov.au/SiteCollectionDocuments/about/annualreport/2016-17/annual-report_16-17.pdf
Unlocking new technology <i>IoT/Agtech</i>	\$20 billion	The Government estimates food waste costs the Australian economy \$20 billion each year	Australian Government http://www.joshfrydenberg.com.au/siteData/uploadedData/Minister%20Frydenberg%20-%20Media%20Release%20-%20Pre%20Food%20Waste%20Roundtable_d0300e69-58ce-44ca-820d-8ccdfd1dac0b.pdf
Unlocking new technology <i>Automation</i>	US\$ 5.7 billion	Estimated global market for agriculture robots by 2024	https://www.engineering.com/AdvancedManufacturing/ArticleID/14142/A-Growing-Industry-Farming-Robots-Market-Projected-to-Reach-57-Billion-by-2024.aspx
Unlocking new technology <i>Automation/IoT</i>	US\$2.9 billion	Estimated global market for drones in agriculture in 2021	https://globenewswire.com/news-release/2017/05/12/984423/0/en/Global-Agriculture-Drone-Market-estimated-to-reach-USD-2-978-69-Million-by-2021-Zion-Market-Research.html
Unlocking new technology <i>Automation</i>	1st	The first robotic fruit picking machine is expected to be released to market this year, joining other robotic devices now being used on farm.	http://www.abc.net.au/news/rural/2017-05-30/apple-picking-robot-could-solve-labour-shortage-issues/8573036

Section of the report	Figure	Key stat	Reference-Source
Access to people and capital <i>People employed in the sector</i>	216,100 male, 88,110 female	216,100 males and 88,100 females were employed in the Australian farm sector at May 2017	Australian Bureau of Statistics Labour Force, Australia, Detailed, Quarterly, May 2017 Catalogue No. 6291.0.55.003
Access to people and capital <i>Ownership model</i>	99%	Of the Australia's farms are estimated to be operated by families	NFF https://www2.deloitte.com/au/en/pages/consumer-business/articles/succession-family-farm.html http://www.nff.org.au/farm-facts.html
Access to people and capital <i>Capital</i>	0.3%	The Australian superannuation industry invests only 0.3% of its total capital pool in Australian agriculture.	http://www.afr.com/real-estate/australian-super-funds-investment-in-rural-just-03-per-cent-20150423-1mrhbs#ixzz4zVe7NjOX

Contacts

KPMG

Robert Poole
Partner, National Lead Agribusiness
– Management Consulting
E: robertpoole@kpmg.com.au
T: +61 3 9288 6209

Ben van Delden
Partner, Head of AgTech
E: bvandelden@kpmg.com.au
T: +61 3 9288 5894

Peter Liddell
Partner, Head of Supply Chain
– Asia Pacific
E: pliddell@kpmg.com.au
T: +61 3 9288 5693

National Farmers Federation

Fiona Simson
President
E: fsimson@nff.org.au
T: +61 2 6269 5666

Tony Mahar
Chief Executive Officer
E: tmahar@nff.org.au
T: +61 2 6269 5666

Charles Thomas
General Manager, Digital & Industry Partnerships
E: cthomas@nff.org.au
T: +61 2 6269 5666

[KPMG.com.au](https://www.kpmg.com.au)

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