



Australian Government
Department of Agriculture,
Water and the Environment



NATIONAL AGRICULTURAL INNOVATION POLICY STATEMENT

October 2021



© Commonwealth of Australia 2021

Ownership of intellectual property rights

Unless otherwise noted, copyright (and any other intellectual property rights) in this publication is owned by the Commonwealth of Australia (referred to as the Commonwealth).

All material in this publication is licensed under a Creative Commons Attribution 4.0 International Licence except content supplied by third parties, logos and the Commonwealth Coat of Arms.

Inquiries about the licence and any use of this document should be emailed to copyright@awe.gov.au.



Cataloguing data

This publication (and any material sourced from it) should be attributed as: DAWE 2021, National agricultural innovation policy statement, Department of Agriculture, Water and the Environment, Canberra, August. CC BY 4.0.

ISBN 978-1-76003-437-5

This publication is available at awe.gov.au/innovation.

Department of Agriculture, Water and the Environment
GPO Box 858 Canberra ACT 2601
Telephone 1800 900 090
Web awe.gov.au

Disclaimer

The Australian Government acting through the Department of Agriculture, Water and the Environment has exercised due care and skill in preparing and compiling the information and data in this publication. Notwithstanding, the Department of Agriculture, Water and the Environment, its employees and advisers disclaim all liability, including liability for negligence and for any loss, damage, injury, expense or cost incurred by any person as a result of accessing, using or relying on any of the information or data in this publication to the maximum extent permitted by law.

MINISTER'S FOREWORD



This national agricultural innovation policy statement is an important part of the Australian Government's National Agricultural Innovation Agenda that I announced in September 2020. It takes another step in the journey of modernising our research and development system.

A world class agricultural innovation system is an Australian Government priority and a key pillar in Delivering Ag2030 that supports the industry's target of \$100 billion sector by 2030. Our job is to put the environment and framework around our researchers, farmers, fishers, and foresters and let them do what they do best.

Agriculture Innovation Australia (AIA) is an exciting new vehicle to drive a cross-industry approach to innovation and harness the power of all 15 rural Research and Development Corporations (RDCs). AIA is not only about the RDCs but will work with the private sector to attract investment and bring in new perspectives and players to agricultural innovation. That is why the Australian Government committed \$2.8 million to AIA to develop investment prospectuses.

These investment prospectuses will have a focus on four priority areas – exporting agricultural products, championing climate resilience, biosecurity, and digital agriculture. The four priorities will also provide a way for all innovation participants to collaborate.

Key to driving innovation has been to develop a digital platform and a physical platform.

The digital platform is grow^{AG} – where the world can see what we are doing in research and development. Grow^{AG} will entice the world to come and invest in Australia and show we are ready for their investment.

The eight Innovation Hubs are our physical platform and there are over 40 locations across Australia. They provide a 'shop front' where farmers, industries, RDCs and agribusiness can connect to researchers and experts. There is a lot of good research being done and the Innovation Hubs will focus on translating research for our farmers and provide an avenue for them to be part of the co-design process – aligning research effort with what is needed on the ground. These Innovation Hubs will also provide a place where our best and brightest of regional and rural Australia can be part of agriculture.

If we are going to grow Australian agriculture to \$100 billion, we must be able to assist our farmers to adopt the latest research and technology. Innovation will drive productivity, meaning more dollars in the pockets of our farmers and stronger regional communities.

The Hon. David Littleproud MP
Minister for Agriculture and
Northern Australia

TABLE OF CONTENTS

Growing importance of agricultural innovation	05
Our vision for Australia's agricultural future	07
National agricultural innovation priorities that will guide us	09
Agricultural reforms: what we are already achieving	11
Agricultural reforms: what we still need to undertake	17
Key participants in the agricultural innovation system	19
Monitoring and evaluation of our success	22
Attachments: Agricultural Innovation Priorities	25
Previous reviews	29

GROWING IMPORTANCE OF AGRICULTURAL INNOVATION



Innovation plays a crucial role in primary production and the post-farm supply chain of Australia's agricultural system. It is through continued investment into Research, Development and Extension (RD&E) that Australia has been able to establish itself as a major contributor to global food and fibre production. Now, with agricultural industries facing unprecedented changes, innovation has never been more important.

For the past four decades our sector has benefitted from public-private research partnerships, most notably through commodity-based Rural Research and Development Corporations (RDCs). The CSIRO, universities, Cooperative Research Centres, state and territory government research agencies and private sector entities have also made significant contributions to agricultural innovation.



More than **50%** Australian agricultural productivity growth has been attributable to RD&E investments.

Research from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) has shown that investment in RD&E pays productivity dividends. More than half of Australian agricultural productivity growth has been attributable to RD&E investments.



\$1 of public investment in agricultural RD&E = **\$12 benefit for Australian farmers within 10 years**

Even so, agricultural industries are still being challenged by factors such as increasing international competition, resource limitations, technological disruption, climate variability, increasingly complex supply chains, threats from pests and disease, and water scarcity.

This has caused productivity growth in Australian agriculture to become sluggish in recent years. Figures from ABARES has shown average annual

productivity growth of 0.6% per year in the 15 years to 2019-20. This is significantly slower than the average of 3.6% per year from 1989-90 to 2004-05.

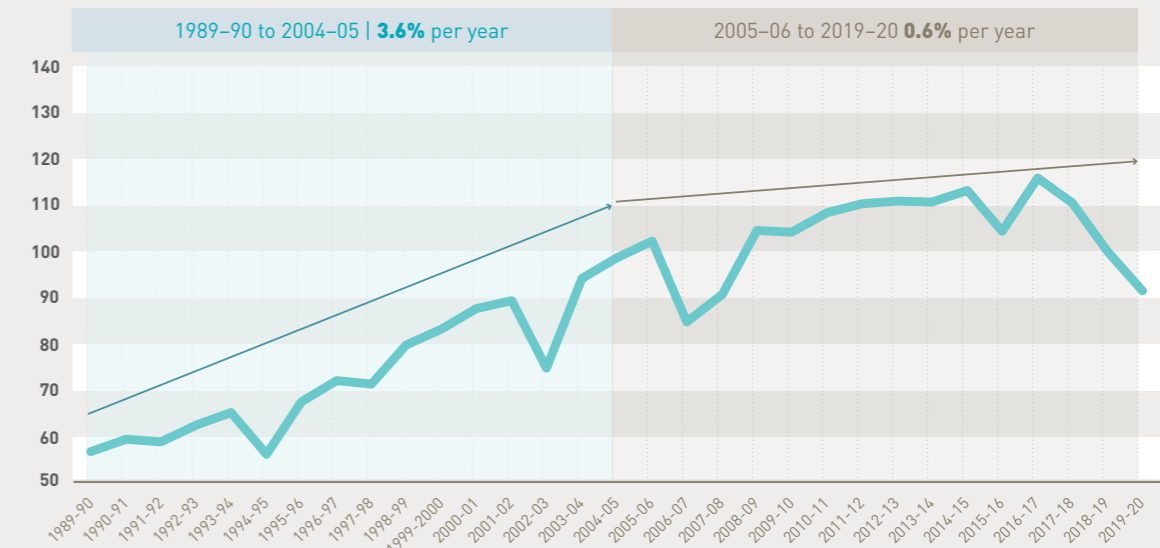
RD&E is needed to help Australian agriculture overcome these cross-sectoral challenges and assist the industry in meeting its target of \$100 billion in output value by 2030. To ensure that investment is effective we need to drive the greatest returns, improve transparency of outcomes and

drive efficiencies and greater uptake of our innovation efforts.

To enable this, the innovation system needs to effectively allocate and encourage public and private RD&E investment so that the technology and tools are available for our farmers to continue to produce the best food and fibre in the world.

Agriculture, Forestry and Fishing MFP Index (1989-90 to 2019-20)

Figures from ABARES average annual productivity growth was 0.6% per year in the 15 years to 2019-20. This is significantly slower than the average of 3.6% per year from 1989-90 to 2004-05.



Source: Australian Bureau of Statistics

OUR VISION FOR AUSTRALIA'S AGRICULTURAL FUTURE

To be a strong, vibrant and collaborative agricultural sector where our producers are empowered to adopt the latest science, technology and tools. This will improve how they operate, making our food and fibre systems more competitive, prosperous and sustainable.

We are providing national leadership and driving improvements by targeting five pillars of reform through the National Agricultural Innovation Agenda

01	02	03	04	05
Strengthening leadership, cohesion and culture through clear strategic direction and increased collaboration	Improving the balance of funding and investment to deliver both incremental and transformational innovation, and growing private sector and international investment	Embedding world-class innovation practices through greater transparency and entrepreneurship	Empowering our regions to achieve greater uptake of innovation	Creating a next generation innovation platform by improving the foundations of agricultural innovation, including data and regulatory settings

The policy statement provides accountability and transparency to achieve this vision

Detailing new National Agricultural Innovation Priorities to drive collaboration and focus investment	Setting out how we will deliver and monitor implementation of the National Agricultural Innovation Agenda	Providing guidance on the system through its many participants, organisations and structures
---	---	--

How we will know we have achieved our vision



More farmers, industries and businesses adopt research outcomes, including through faster commercialisation of products



Private and foreign investment in Australian research and agricultural technology development increases



Rural research and development investments are optimised, maximising productivity improvements and ensuring the long-term prosperity of the Australian agriculture sector



Collaboration across the agricultural innovation system is improved and results across the innovation sector are maximised

NATIONAL AGRICULTURAL INNOVATION PRIORITIES THAT WILL GUIDE US

We have established four ambitious targeted priorities based on the key challenges Australia's agricultural innovation system needs to address by 2030.

They will help to align efforts, enable Australian agriculture to embrace strategic opportunities, and set a stronger culture that supports and encourages effective collaboration and action to address innovation for the public good.

Our targeted priorities replace the National Rural Research, Development and Extension Priorities established through the Agricultural Competitiveness White Paper. The priorities acknowledge stakeholder feedback to keep them specific and targeted to drive investment.

Through the priorities, there is an opportunity to grow the total funding pool through new collaboration, engagement of non-traditional participants and greater private sector participation to drive increased efficiency and greater impact of innovation on farms. A positive outcome of this is an innovation culture that is more dynamic, encourages entrepreneurship and a more open approach to risk taking. This will better position our future agricultural innovation system within the global landscape and lead to improved outcomes for farmers.

The four new National Agricultural Innovation Priorities provide a way for all innovation participants to collaborate to achieve a more profitable, productive and sustainable agricultural industry.

Australia by 2030

PRIORITY 1



Trusted exporter of premium food and agricultural products

This will:

Amplify Australia's reputation as a trusted exporter of high-quality products

Deliver greater returns to farmers and processors and increase the value-add to products

Protect our food and agricultural products through adoption of enhanced biosecurity and technology

Provide market and consumers confidence in the provenance, quality and safety of Australian products

Enable value-add to Australian agricultural commodities and ingredients on-shore.

PRIORITY 2



Champion of climate resilience to increase the productivity, profitability and sustainability of the agricultural sector

This will:

Protect and enhance our natural capital assets (for example, water and soil health)

Expand the use of varieties and genetics that thrive under future climate scenarios

Improve efficiencies along the value chain to increase profitability and productivity, and reduce emissions

Improve the ability of the sector to respond to external factors (for example, climate, technology disruptions, current and future pandemics, and trade requirements or disruptions), including by utilising new technologies and tools

Increase on-farm resilience by improving management practices and skills and diversifying income streams.

PRIORITY 3



World leader in preventing and rapidly responding to significant pests and diseases through future-proofing our biosecurity system

This will:

Accelerate efforts to create a strong, future-oriented and efficient national biosecurity system

Roll out advancements in detection technologies and capabilities including on-farm and in supply chains

Enhance on-farm biosecurity practices, product traceability and supply chain integration

Expand biosecurity assurance arrangements, intelligence, research and data sourcing and sharing

Generate greater shared responsibility through improved awareness and understanding

Lift national preparedness, response and resilience to significant pests and diseases.

PRIORITY 4



Mature adopter, developer and exporter of digital agriculture

This will:

Mean having the people, skills, systems, data, digital technology and connectivity to deliver a productivity increase

Mean becoming a leading developer and exporter of agritech

Reduce the barriers to the digitalisation of Australian agriculture

Drive the adoption of digital agricultural solutions available to end-users across the agricultural industry

Grow the value of Australian food and fibre through innovation and technology adoption.

AGRICULTURAL REFORMS: WHAT WE ARE ALREADY ACHIEVING

It's important to acknowledge the significant progress that we have made together in maintaining innovation in agriculture.



Established Agricultural Innovation Australia to facilitate joint investment and collaboration in cross-industry agricultural issues of national importance



Increasing the accountability and transparency requirements of the RDCs to ensure they remain consistent and adaptive to the needs of stakeholders



Supported the development of R&D outcomes platforms to attract investment and commercialisation partners from Australia's private sector and around the world



Extended and supported the adoption of new knowledge and technology (generated through R&D) to farmers and other end users by establishing Innovation Hubs across Australia

Agricultural reforms: what we are already achieving



ESTABLISHMENT OF AGRICULTURAL INNOVATION AUSTRALIA (AIA)

A core component of the innovation agenda has been the establishment of AIA – a not-for-profit, public company established by the 15 RDC's in 2020.

Its aim is to facilitate joint investment and collaboration in cross-industry agricultural issues of national importance.

The establishment of AIA is evidence of the significant need to shift investment toward transformational and cross-sectoral outcomes, increase flexibility of investment across the system and encourage new collaborations and global partnerships.

AIA will identify, develop and invest in strategies that address shared challenges. It will also seek out opportunities to deliver outcomes that drive sustainability, productivity and profitability across Australian agricultural value chains.

AIA attracts investment from public, private, not-for-profit and global commercial entities to deliver agricultural innovation initiatives.



INCREASING ACCOUNTABILITY AND TRANSPARENCY

Our Rural Research and Development Corporations model is unique and held in high regard both in Australia and overseas.

It offers industry an opportunity to invest through levy collections and is matched by government funding, which the government intends to continue.

The commodity-focus of Australia's rural sector, reflected in industry structures and the RDC system, is a source of strength. It means that many challenges and issues can be tackled at the right level and with the highest chance of success. But the commodity arrangements also bring trade-offs – it can be more difficult to align strategy, resources and activity across multiple organisations, and it is difficult to assess the impact of the collective. In the absence of a strong collaborative culture, the commodity focus placed less emphasis on the large scale, cross cutting and transformational issues.

To ensure the RDCs continue to succeed into the future and demonstrate value to the levy payer and tax payer, the government is increasing stakeholder transparency, removing duplication and driving commercialisation by working with the RDCs and industry to put in place an accountability framework.

We will work with the RDCs and industry organisations to develop three products:

- Guidelines for mandatory statutory funding agreements that will have KPIs against the five principles for increased commercialisation
- Best practice guide to stakeholder engagement
- Best practice guide to commercialisation

To shift the balance from monitoring compliance towards demonstrating outcomes from RDC investment, there are five interlinked performance principles:

- 01 Stakeholder engagement:** engage stakeholders to identify RD&E priorities and activities that provide benefits to portfolio industries.
- 02 Research, Development and Extension activities:** ensure RD&E priorities and activities are strategic, collaborative and targeted to improve profitability, productivity, competitiveness and preparedness for future opportunities and challenges through a balanced portfolio.
- 03 Collaboration:** undertake strategic and sustained cross-industry and cross-sectoral collaboration that addresses shared challenges and draws on experience from other sectors.
- 04 Governance:** governance arrangements and practices to fulfil legislative requirements and align with contemporary Australian best practice for open, transparent, and proper use and management of funds.
- 05 Monitoring and Evaluation:** demonstrate positive outcomes and delivery of RD&E benefits to Levy Payers and the Australian community in general, and continuous improvement in governance and administrative efficiency.

EXTENSION OF KNOWLEDGE AND TECHNOLOGY TO FARMERS AND END USERS

For knowledge and technology to achieve the best results, research outcomes must be extended to and adopted by farmers and other end users.

However, the main challenge preventing this in the past has been a complex extension model (i.e. system of communication channels) for private consultants, agribusiness and input suppliers, and local grower groups to communicate and share information.

This is why in April 2021 we invested \$66 million from the Future Drought Fund in Drought Resilience Adoption and Innovation Hubs to simplify and enable the free flowing exchange of information.

The eight Innovation Hubs are located in regional areas that reflect the key agricultural and climate zones. Their collective aim is to bring together farmers, industry, agribusiness and communities so that they can connect with drought resilience expertise and contribute to the design of innovative technologies and practices. Each hub includes nodes throughout their region, providing an Australia wide footprint of over 40 locations for delivery of support.

Each hub has been designed to respond to the specific needs and conditions of its region and are tasked with translating research into impact through a focus on development, extension, adoption and commercialisation. In doing so, they enable better leveraging of existing tools and initiatives across government and industry.

In addition to drought, the Innovation Hubs strive to ensure agricultural research is useful and accessible to create greater impact and opportunities to commercialise R&D. Many of the RDCs are or will be key partners of the Innovation Hubs to collaborate with regional networks.

We have committed to Innovation Hubs that broaden the activities that will deliver outcomes for agriculture, aquaculture and fisheries, in addition to delivering outcomes for drought resilience from the Future Drought Fund investment.

An additional \$20 million has been provided to expand them into Innovation Hubs.



To support grassroots activities, our Drought Resilience Innovation Grants are available to many innovation organisations, the private sector, industry, not-for-profit organisations and community groups to develop drought resilience projects to assist farmers and communities to adapt and transform. The Future Drought Fund has allocated \$34.2 million for Drought Resilience Innovation Grants. They are available to support development, extension, adoption and/or early stage commercialisation activities.





photo attribution: Ben White

DEVELOPMENT OF R&D OUTCOMES PLATFORMS

Digital platforms act as innovation marketplaces for RDCs, research organisations and inventors to list and provide detail on technologies that can attract investment and commercialisation partners from around the world.

They work to attract overall greater investment in innovation from Australia's private sector, accelerate the commercialisation of agrifood technologies by enabling users to see opportunities in Australia, New Zealand and the Asia-Pacific region, and provide further transparency of RDC RD&E projects.

The grow^{AG} case study provides an example of a game-changing online platform that has successfully showcased our world leading agricultural research, unique technologies and commercialisation opportunities to the world (see next page for more detail).

It has expanded over time to include:



2000+
research projects.



41 commercial opportunities for investors

Case Study | grow^{AG} Bringing commercialisation of R&D to the world

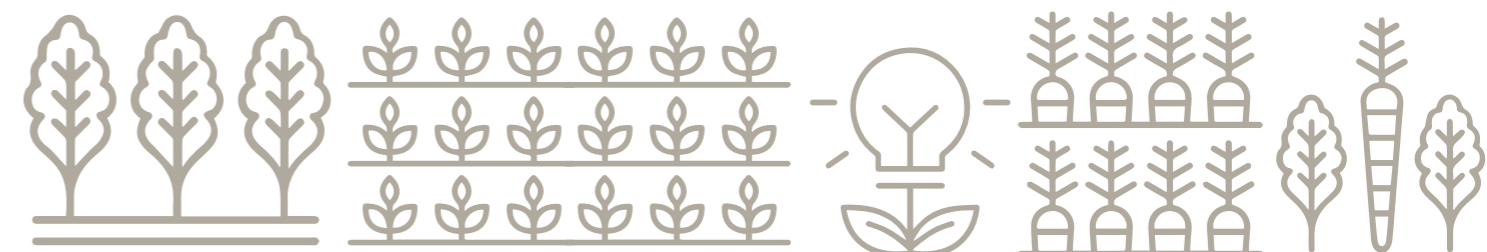
Australia's 15 Rural Research & Development Corporations, led by Agrifutures, and the Australian Government have joined forces to create grow^{AG}, the gateway to Australia's agrifood innovation system.

grow^{AG} is a free, easy-to-use, single source of information for investors, corporates, startups, researchers, industry, government and universities from Australia and around the world. It allows them to locate information and opportunities to deliver innovation back to the farm and the food supply-chain, ensuring our excellent agricultural research translates to real benefits for our farmers.

Launched in April 2021, grow^{AG} has already hosted over 2000 research projects and over 40 commercialisation opportunities. One such opportunity was to commercialise novel biological controls for insect pests developed by the NSW Department of Primary Industries (DPI) in partnership with Cotton Research and Development Corporation (CRDC).

As more insects are developing resistance to traditional insecticides, Australian farmers need more weapons in their arsenal to control pests effectively. The project set out to harness the "natural enemies" of insect pests by encouraging beneficial insects to establish, and to develop biological controls that could be deployed together with chemical solutions.

The products developed by the project, based on fungal isolates and plant extracts, help to control a range of pests across all stages of life while allowing beneficial insects to remain. Within the first month of being listed on the grow^{AG} platform, NSW DPI and CRDC received 13 enquiries from partners interested in commercialising this technology. While they had previously had trouble finding investment through more traditional means, the increased interest generated by grow^{AG} meant the group was forced to close expressions of interest earlier than expected.





We are continuing to build on the great work that has been done.



We have provided \$2.8 million to AIA for the development of investment prospectuses to support the delivery of the four National Agricultural Innovation Priorities.

The prospectuses will identify areas where public and private investment should be focused – seeking out opportunities to deliver outcomes that drive sustainability, productivity and profitability across Australian agricultural value chains. The prospectuses will be open for investment by governments, RDCs and the private sector.

The Digital Foundations for Agriculture Strategy is being created and will form part of the National Agricultural Innovation Agenda.

In particular, it will align with the fourth new innovation priority.

The strategy will unify stakeholders across government, research, business and industry to work together to realise the benefits of digital agriculture.

The strategy will help drive the widespread adoption of digital technologies to increase productivity, economic growth, sustainability and long-term resilience of the agricultural industry and its related value chains. This strategy is specific to the agricultural, fisheries and forestry sector. Broader work to deliver a modern digital economy is outlined in Australia's Digital Economy Strategy. It maps the course for Australia to become a leading digital economy and society by 2030.

We are supporting industry to improve the sharing of data across the agriculture and food supply chain, through the Australian AgriFood Data Exchange project led by Integrity Systems (a subsidiary of Meat and Livestock Australia).

The Australian AgriFood Data Exchange will create an interconnected data highway for Australia's agrifood value chain. The data exchange will allow the timely and permissioned exchange of data between participants across the agriculture and food supply chain.

This will allow for an initial testing phase to help demonstrate the value of data sharing, identify areas for improvement and business case development, before the full Australian AgriFood Data Exchange is established.

We are helping the Innovation Hubs to grow and support producers.

This support includes:

- \$4m for priority projects, including opportunities for the regional hubs to collaborate as a national network
- \$9m to enable the hubs to employ adoption officers as part of the "shopfront" service provided to farmers and others
- The development of a drought resilience research and adoption investment plan, to provide a national perspective on priorities and gaps
- A digital platform, and annual science to practice forums, to capture and disseminate knowledge generated through the hubs.

KEY PARTICIPANTS IN THE AGRICULTURAL INNOVATION SYSTEM

The Australian Agricultural Innovation system consists of numerous organisations with diverse roles and responsibilities.

End users of agricultural innovation are typically participants within the agricultural value chain. Innovation extends to the education and finance sectors, as human and financial capital act as important inputs for innovation.

Participants in the innovation system traditionally work together through funding programs focused on areas of common interest. The RDCs have long been the cornerstone of these relationships creating large networks largely focussed on their relevant commodities.

Recent initiatives such as *evoke^{AG}*, *grow^{AG}* and AIA have opened the doors for the agricultural innovation sector. These provide a gateway outside traditional channels, particularly to innovators and investors who may not typically engage with the agricultural industry. We are pleased to support these initiatives as they are a significant opportunity to bring new ideas and investment to agriculture. The establishment of the Drought Resilience Adoption and Innovation hubs and expansion of their focus is essential to linking existing participants and helping new entrants navigate the system's many players, organisations and structures.

These new initiatives strengthen collaboration, maximise results and increase the returns on the investments to levy payers through increasing the impact and commercialising the outcomes of R&D. They will be an important feature of the innovation system providing additional ways for new investment and ideas for our agricultural industries underpinning future prosperity, with benefits for regional and national economies, community and landscape.



The key participants in the agricultural innovation system are:

- Rural Research and Development Corporations (RDCs):** RDCs have helped drive agricultural innovation since 1989. They allow Australian governments and primary producers to co-invest in R&D to benefit industry and regional communities. Currently, there are 15 RDCs that are funded through R&D grower levy payments and Commonwealth Government funding arrangements.
- Innovation Hubs:** our Innovation Hubs are the new focal point to help farmers and rural and regional communities build drought resilience and other agricultural outcomes through investment into collaborative research, development, extension, adoption and commercialisation activities.
- Commonwealth Scientific Industrial Research Organisation (CSIRO):** the national science agency tasked to undertake research for the betterment of the Australian community. CSIRO works with industry, government and the research community to turn science into solutions to address Australia's greatest challenges. Food and agriculture is a key area of focus for CSIRO.
- Cooperative Research Centres (CRCs):** our CRC program supports Australian industries' ability to compete, produce and partner with the research sector. Several CRCs are directly relevant to agriculture.
- Universities and other education providers:** the 43 universities across Australia providing facilities for a range of educational services and research. Topics directly relevant to agricultural industries are researched at many of these institutions providing the basic research effort for agricultural innovation in Australia.
- Agricultural Innovation Australia (AIA):** it is a not-for-profit, public company established to facilitate joint investment and collaboration in cross-industry agricultural issues of national importance. AIA attracts investment from public, private, not-for-profit and global commercial entities to deliver agricultural innovation initiatives.
- Governments across Australia:** the state, territory and commonwealth governments support agricultural innovation through a range of policies and programs aimed at building the capacity of agricultural industries.
- Farming system groups:** work is often a farmer-scientist partnership, with research mainly conducted at the farm scale. The groups are farmer-driven, often non-profit organisations focusing on improving outcomes and sharing ideas across the group. Many groups operate at a regional scale where common commodities are produced.
- Agricultural value chain:** this group includes producers, processors, grower groups and others within the agricultural value chain.
- Startups and entrepreneurs, agribusiness and other private sector organisations:** this is a large dispersed group of innovators ranging from farmers to tech developers. They have a strong history of innovation as a product of problem solving or the application of existing technologies to new problems. An example of an organisation within the private sector is the Australian Farm Institute.



MONITORING AND EVALUATION OF OUR SUCCESS

Regular monitoring and evaluation is key to the success of the National Agricultural Innovation Agenda as it will depict whether initiatives and investments are delivering on their intended outcomes.

Crucially, it will also inform efforts by government, research providers and investors and provide opportunities to regularly review and adjust their investments and activities.

The Australian Government is investing \$2.7 million to fund the collection and analysis of data that will form the basis of annual performance reports, as well as an in-depth evaluation of the National Agricultural Innovation Agenda's success in 2024–25.

The monitoring and evaluation framework is made up of three core components:

- 01 an innovation baseline that measures the innovation system's current performance
- 02 key outputs that measure efforts to improve innovation
- 03 innovation outcomes that measure the overall innovation system impact.

ATTACHMENTS



ATTACHMENT AGRICULTURAL INNOVATION PRIORITIES

PRIORITY 1

Trusted exporter of premium food and agricultural products

Areas of focus across the value chain

FARM GATE	PROCESSING	DISTRIBUTION	EXPORT AND RETAIL	CONSUMER
Whole-of-farm approach to define what and how we grow to create a highly sought-after, premium brand globally.	Adopting technologies and assurance systems (including traceability systems) to produce healthier and safer agrifood products and capture value from our international reputation.	Supply chain efficiency – getting products to market safer, faster, cheaper.	Improve existing market access and diversifying to new markets, including by demonstrating world-leading land management / supply chain practices.	Enabling transparency & trust as a producer of differentiated products aligned to consumer preferences.

RATIONALE

The value of agriculture, fisheries and forestry production is forecast to reach \$78.4 billion in 2021-22. Australia exports around 75% of total agricultural production.

Global agricultural demand is growing strongly, but export competition is also increasing.

Australia currently accounts for 3% of global agricultural trade and ranks 12th in the world for agricultural trade.

Uncertain trade relationships have highlighted the need for diversification and the seeking of new market opportunities to maintain growth.

Building consumer trust will be key to competing with exporters who can afford to sell their products for less.

Australia's growth to a \$100 billion sector by 2030 will depend on a range of factors, including growing exports and markets. Positioning the sector as a premier exporter of high-quality and ethically produced agrifoods is one strategy.

ATTACHMENT AGRICULTURAL INNOVATION PRIORITIES

PRIORITY 2

Australia will champion climate resilience to increase the productivity, profitability and sustainability of the agricultural sector

Areas of focus across the value chain

FARM GATE PROCESSING DISTRIBUTION	EXPORT AND RETAIL	CONSUMER
<p>Deliver new varieties, genetics and management practices that allow farmers to thrive in a changing climate.</p> <p>Enable mixed farming systems and more diverse enterprise mixes.</p> <p>Create more technologies, tools, systems and opportunities to assist decision making, improve performance, deliver efficiencies, diversify income streams and access new or premium markets.</p> <p>Optimise the supply chain, including minimising waste.</p> <p>Adopt energy conserving and emissions reduction and mitigation technologies to reduce costs and improve efficiency across the supply chain.</p> <p>Create new and improve existing data to underpin and demonstrate performance.</p>	<p>Improving existing market access and diversifying to new markets, including by demonstrating world leading land management / supply chain practices</p>	<p>Enabling transparency & trust as a producer of differentiated products aligned to consumer preferences.</p>

RATIONALE

Australian farmers are facing increasingly frequent droughts, floods, hailstorms and bushfires. Without further adaptation changes to our climate could impact agricultural productivity.

Farmers have responded to changes in climate and farm production has grown since 1990.

Technology will unlock further improvements in production and adaptive capacity which will maintain or enhance Australian International Competitiveness.

Continued investment in research, development, extension and adoption will be essential to realise these gains.

Further efforts are required to understand and reduce agriculture's carbon footprint, particularly in crop and livestock systems.

Currently agriculture is responsible for around 14% of Australia's greenhouse gas emissions and is a key source of methane and nitrous oxide.

Agriculture has made a good contribution to date, with emissions from cropping and grazing falling by 71% over the past 3 decades. Agriculture is a key player in the government's Emissions Reduction Fund, with over 167 million tonnes of contracted abatement linked to land and agriculture sector projects.

Further opportunities exist to reduce emission, improve efficiencies and tap into diversified income streams through, for example, carbon capture and storage in trees and soil, renewable energy use, converting organic waste into electricity and investing in solar and wind technologies.

ATTACHMENT AGRICULTURAL INNOVATION PRIORITIES

PRIORITY 3

Australia is a world leader in preventing and rapidly responding to significant pests and diseases through future-proofing our biosecurity system

Areas of focus across the value chain

FARM GATE	PROCESSING	DISTRIBUTION	EXPORT AND RETAIL	CONSUMER
More effective offshore management of biosecurity risks will protect farmers. Farmers will have innovative tools and systems to better manage biosecurity seamlessly as part of farm operations, and to enable early detections of pests and diseases. There will be a culture of using and sharing data to drive better decision making, driving up productivity.	World class traceability and quality assurance systems that underpin confidence in the safety of Australian products while ensuring any biosecurity risks can effectively be traced and managed.	Innovated supply chain assurance systems will support efforts to deliver integrated product and transport tracing capability and will enable rapid response to incursions.	Strong assurance systems, supported by pest and disease monitoring and access to real-time data, will enable export market access and satisfy consumer expectations. There will be increased efforts with importers and the logistics sector to deliver more integrated business process solutions, with a focus on co-designing, piloting, and rolling out initiatives supporting faster, safe clearance of products. Adoption of auto-detection screening technology and innovative diagnostic tools will enable rapid movement of goods across borders and better management of biosecurity risks.	Monitoring, assurance and traceability systems provide confidence to domestic and international consumers, and increase responsiveness of the system to changing consumer demands.

RATIONALE

A robust, effective and multi-layered biosecurity system is essential to keeping Australia safe from exotic pests and diseases.

Protecting our biosecurity status supports market access and avoids unnecessary costs for our producers. More effective management options further reduce pest and disease management costs.

As set out in the Commonwealth Biosecurity 2030 strategic roadmap, by working smarter and more collaboratively – and with best data, tools, and capability – Australia will rise to this challenge. It is one of increasingly complex global and local threats. It is about supporting our jobs and environment and protecting the Australian way of life into the future.

Harnessing innovation will help farmers and producers stay protected into the future as challenges increase and become more complex. Improved awareness and understanding of roles and responsibilities will generate partnership opportunities between governments and industry.

Our direct investment in Australia's biosecurity system, and partnerships with government, industry and the community, complements work underway towards digital transformation and simplifying trade.

ATTACHMENT AGRICULTURAL INNOVATION PRIORITIES

PRIORITY 4

Australia is a mature adopter, developer and exporter of digital agriculture

Areas of focus across the value chain

FARM GATE	PROCESSING DISTRIBUTION EXPORT AND RETAIL CONSUMER
<p>Leadership – Enhancing connection and coordination across the sector and setting a clear plan.</p> <p>Skills – Delivering the skills and expertise needed by both the current and future workforce.</p> <p>Data and Governance – Maximising data use, ensuring good data management, common data standards, and ensuring interoperability.</p> <p>Opportunities and Value Proposition – Helping producers understand and realise the benefits from digitising their businesses; ensuring appropriate and agile regulation, together with faster commercialisation.</p> <p>Connectivity and Infrastructure – Ensuring that agricultural businesses understand their connectivity options and can access the infrastructure they need.</p>	<p>Traceability assurance across the supply chain, from farm-gate to consumer.</p> <p>Demonstrating product assurance and characteristics in line with purchaser and consumer values such as sustainable, clean, provenance.</p>

RATIONALE

Digital adoption in the Australia agriculture industry is estimated at just 10%.

A 3-fold increase in active technology users is required for agriculture to reach its ambitious goal to move to a \$100 billion industry by 2030¹.

Uptake of digital technology could create a \$20.3 billion per year increase to industry production².

Digital technologies and data can enable farmers and the broader supply chain to make faster, more informed decisions, automate processes and predict future events. Digital supply chains also help mitigate risks and allow the system to more readily respond to shocks.

There is an opportunity to establish a world-class Australian agritech industry, and create new export opportunities.

1. Nolet, S and Mao, C 2018, Accelerating the development of Agtech solutions worth adopting, AgriFutures, Wagga Wagga

2. Leonard, E. (Ed), Rainbow, R. (Ed), Trindall, J. (Ed), Baker, I., Barry, S., Darragh, L., Darnell, R., George, A., Heath, R., Jakku, E., Laurie, A., Lamb, D., Llewellyn, R., Perrett, E., Sanderson, J., Skinner, A., Stollery, T., Wiseman, L., Wood, G. and Zhang, A. (2017). Accelerating precision agriculture to decision agriculture: Enabling digital agriculture in Australia. Cotton Research and Development Corporation, Australia.

ATTACHMENT PREVIOUS REVIEWS

Strategies of Australian agricultural innovation

Agricultural innovation is not static – multiple strategies have been developed by different organisations to drive the agricultural innovation sector forward.

Some of the key strategies, outlining priorities and opportunities for the future include:

Agricultural Innovation – A National Approach to Grow Australia’s Future: Full report March 2019	The ACOLA Horizon scan the future of agricultural technologies report September 2020	National Farmers’ Federation: The Voice of Australian Farmers (National Farmers’ Federation 2018) and 2030 Roadmap (National Farmers’ Federation 2018)	CSIRO: Australia’s innovation catalyst CSIRO Strategy 2020 (CSIRO 2015)
Council of Rural R&D Corporations: Vision 2050 (Rural R&D Corporations 2018)	The Australian Academy of Science: Decadal plan for Australian Agricultural Sciences (2017–26) (Australian Academy of Science 2017)	Innovation and Science Australia: Australia 2030: Prosperity through Innovation (Innovation and Science Australia 2017)	

ATTACHMENT PREVIOUS REVIEWS

Agricultural Innovation – A National Approach to Grow Australia’s Future: Full report March 2019

Shared vision for the future of Australian agriculture identified 5 key recommendation areas:

- 01 Strengthening ecosystem leadership, cohesion and culture:**
Stronger ecosystem leadership and cohesion across Australian agricultural innovation will generate greater and more diverse outcomes, driving our global competitiveness through clear strategic direction and increased collaboration
- 02 Funding and investment:**
Growing and improving the balance of investments will help the Australian agricultural innovation system to deliver both incremental and transformational innovation by addressing cross-commodity challenges, and targeting economic, environmental and social outcomes

- 03 World-class innovation practices:**
Establishing world-class innovation practices through collaboration, entrepreneurship and ambition will be critical in order to maximise opportunities from investment in agricultural innovation
- 04 Strengthening regions:**
In the future, regions will play a greater role in Australian agricultural innovation, to fully realise its benefits and maximise our innovation uptake
- 05 Next generation innovation platform:**
Improving the foundations of Australian agricultural innovation, including data, physical infrastructure and the regulatory environment, will support the transformation of our agricultural sector into the future

The ACOLA Horizon scan the future of agricultural technologies report September 2020

Part of ACOLA’s horizon scanning series the report examines the impacts, opportunities and challenges for Australian agriculture associated with sensors, the Internet of Things, automation, biotechnology and nanotechnology, and transactional technologies (such as blockchain).

Key findings include:
uptake of advanced technologies could significantly transform decision making, farm practices, labour requirements along the supply chain and agricultural productivity over the next ten years; and

significant opportunities exist to further develop drought-resilient crops, improve resource management, and better predict and understand climate variability.

- Key opportunities identified include:**
- Australia’s agricultural technology and innovation ecosystem needs revitalisation to provide more opportunity for stakeholder involvement and to break down sectoral and disciplinary silos.
 - The strength and resilience of Australia’s agricultural sector will be enhanced by supporting adoption of agricultural technology by Indigenous landholders.
 - Data are a powerful asset but will require appropriate national leadership and regulation to ensure their potential value to agriculture is realised.
 - New technologies – such as sensor, robotic, AI, data, biotechnology, nanotechnology and distributed ledger – if appropriately supported and adopted, can significantly enhance the sector’s productivity, diversity and profitability.



National Farmers' Federation: The Voice of Australian Farmers (National Farmers' Federation 2018) and 2030 Roadmap (National Farmers' Federation 2018)

Vision: To exceed \$100 billion in farm gate output by 2030

Pillar 1: Customers and the value chain

Pillar 2: Growing sustainability

Pillar 3: Unlocking innovation

Public and private R&D efforts work seamlessly to translate world-class research into tools and services which give Australian agriculture a competitive edge

The agricultural value chain is highly digitised, with the benefits of new technology shared fairly among participants

The agricultural value chain has reduced its reliance on fossil fuels, in favour of biofuels and renewable sources of electricity that are affordable and reliable

Pillar 4: People and communities

Pillar 5: Capital and risk management.

This will require industry collaboration:

The NFF family: Including state farming organisations, commodity groups and partner organisations

Value chain partners: Transporters, processors, input providers, investors, retailers, and others in the agricultural value chain

Community: The Australian and global community

Education and training providers: Schools, higher and vocational educational providers, leadership and professional development bodies

Research and extension bodies: Corporations, universities, government research & extension agencies, grower groups, and technical advisers

Farm businesses: Individual farmers and farm businesses

Government: Federal, State, Territory and local governments

CSIRO: Australia's innovation catalyst CSIRO Strategy 2020 (CSIRO 2015)

Vision: Australia's innovation catalyst, collaborating to boost Australia's innovation performance

Mission: Create benefit for Australia through impactful science and innovation

Strategic actions:

Customer first: Create deeper innovation relationships with our customers and prioritise the highest value investments

Global outlook, national benefit: Deliver connectivity to the global science, technology and innovation frontier as well as access new markets for Australian innovation

Collaboration hub: Integrate the best solutions for our customers, increase our flexibility and enhance Australia's innovation performance

Breakthrough innovation: Increase our capacity to help reinvent existing industries and create new industries for Australia and deliver public good

Excellent science: Create breakthrough technology and knowledge and be a trusted advisor for Australia

Health, safety and environment: Enhance staff safety and wellbeing and further our aspiration towards zero harm

Inclusion, trust and respect: Fully enable and support the innovation capacity of our creative people and teams to create risk and deliver to customers

Deliver on commitments: Enhance our agility, financial sustainability and capacity to respond at the speed of business

Council of Rural R&D Corporations: Vision 2050 (Rural R&D Corporations 2018)

Vision: Rural R&D Corporations' vision is of flourishing agriculture, fisheries and forestry industries underpinning a thriving agrisystem. Driving future success is a globally-connected, highly effective and dynamic knowledge and innovation ecosystem

Recommendations:

Develop and implement a national framework to drive a globally-connected, high performing and effective knowledge and innovation ecosystem

Develop and implement a national, integrated, whole-of-government strategy for an enhanced agrisystem

Detailed analysis of the agrisystem and of Australia's involvement in global agrisystem value chains, to identify opportunities for intervention and improvement

The Australian Academy of Science: Decadal plan for Australian Agricultural Sciences (2017–26) (Australian Academy of Science 2017)

The Australian Academy of Science's plan outlines strategies to improve the strength and efficiency of agricultural research in Australia in ways that will increase the ability of governments and producers to maintain productivity and efficiency in the face of evolving natural challenges.

Recommendations:

The Australian Government establish a national agricultural research translation and commercialisation fund, to invest in promising agricultural discoveries and fast-track their commercialisation into new and improved Australian products and services in domestic and international markets. It is suggested that this fund be modelled on the Biomedical Translation Fund; selecting appropriately qualified and experienced fund managers to stimulate private sector investment at the early stage of agricultural research translation

The academic, industry and government sectors partner to create a doctoral training and early career support centre for the agricultural sciences

The agricultural research community engage strongly with infrastructure planning processes at all levels to enable agricultural research to benefit from, and contribute to, shared national capabilities, including emerging data-infrastructure and maintaining the pool of skilled technicians that unlock value from national infrastructure capability

The Australian Government consider reviewing and updating arrangements for national coordination of agricultural research and innovation in Australia. One option would be to establish an organisation that provides a central point of coordination for agricultural research and its applications

All organisations in the agricultural sector do more to understand and effectively engage with the public on social acceptance of agricultural science and the enterprises it supports. This also applies to understanding that agriculture reaches far beyond the farm gate



Innovation and Science Australia: Australia 2030: Prosperity through Innovation (Innovation and Science Australia 2017)

Vision: Innovation and Science Australia's vision for 2030 is that Australia will be counted within the top tier of innovation nations. We will take pride in our global reputation for excellence in science, research and commercialisation.

Five imperatives are set out:

Education: Respond to the changing nature of work by equipping all Australians with skills relevant to 2030

Industry: Ensure Australia's ongoing prosperity by stimulating high-growth firms and raising productivity

Government: Become a catalyst for innovation and be recognised as a global leader in innovative service delivery

Research & Development: Improve R&D effectiveness by increasing translation and commercialisation of research

Culture & Ambition: Enhance the national culture of innovation by launching ambitious National Missions



