



Queensland Agriculture and Food Research, Development and Extension 10-Year Roadmap and Action Plan

May 2018



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Foreword

The world is changing rapidly and it is vital that Queensland meets the challenges and takes advantage of the opportunities that this rapidly changing world brings.

The traditional industries that have supported us and been the backbone of our state remain strong and are transitioning to a new future. This is especially true of the agriculture and food sector and the communities it supports throughout Queensland. The Queensland Government is committed to meeting the challenges of the future head-on and is driving innovation to create the knowledge-based jobs of the future.

Our Government is committed to developing a forward-looking blueprint for the State's agriculture and food research, development and extension (RD&E). As confirmed by stakeholder consultation, this commitment reflects the need to enhance scientific collaboration, ensure it is aligned with emerging opportunities and help to seek new and innovative ways to attract additional funds. The Queensland Government also confirmed a major focus on continuing to grow agriculture export capacity and enhance innovation throughout the agricultural supply chain.

The Queensland Agriculture and Food Research, Development and Extension 10-Year Roadmap and Action Plan fulfils that commitment and is the outcome of an extensive consultation process. Our thanks go to all those who participated.

This Roadmap and Action Plan is one of a suite of industry roadmaps developed as part of our Advance Queensland

initiative. Other roadmaps relate to advanced manufacturing, aerospace, biofutures, biomedical, defence and the mining equipment technology and services industries. Advance Queensland is providing support to develop the industries, and jobs, of the future. It is fostering industry and research collaborations to tackle the big innovation challenges.

This Roadmap and Action Plan articulates our vision for RD&E in the context of the broader industries it supports through to 2028. The Roadmap clarifies how we will capitalise on our competitive advantages and realise the opportunities for growth.

Queensland's agriculture and food industries have long been supported by world-leading RD&E. This must and will continue. However, Queensland's RD&E needs to adapt to the opportunities and challenges of the future to support economic development, open the door to new investment and grow employment, especially in regional Queensland.

Queensland is fortunate to have all the best ingredients of a globally competitive agriculture and food sector. We are uniquely placed as a high performing advanced economy with a tropical and sub-tropical climate, and ideally positioned close to some of the fastest growing economies in the world. But most of all, we have the people, we have the ideas and we have world-class agriculture and food RD&E.



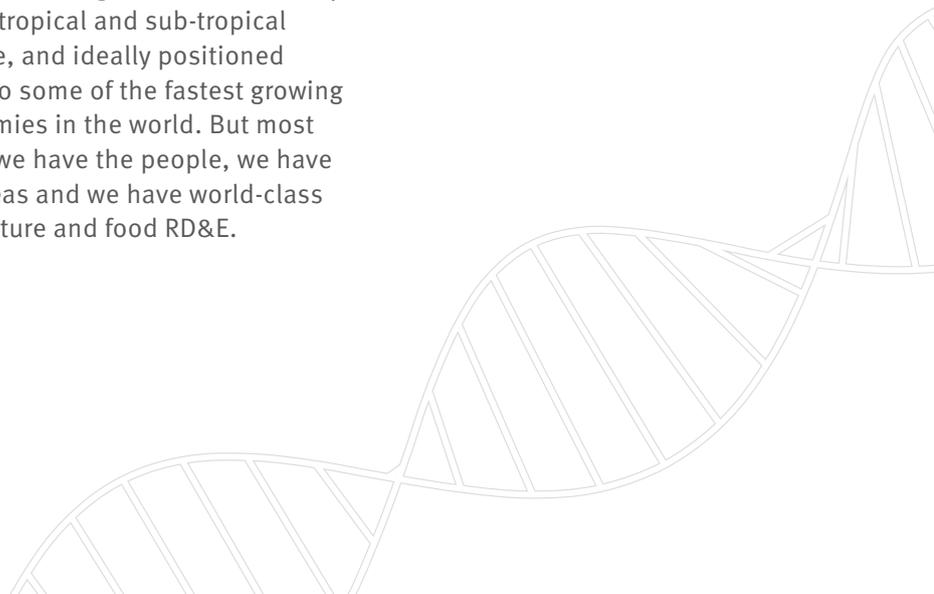
**The Honourable
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Premier of Queensland,
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Vision

Queensland's internationally recognised agriculture and food RD&E underpins a productive, profitable and sustainable sector.

The Queensland Government is committed to growing the Queensland economy to raise living standards and generate the high-value, high-skilled jobs of the future.

The Queensland Government's \$513 million Advance Queensland (AQ) initiative is positioning the state as a place where entrepreneurs, industry, universities and government work collaboratively to turn great ideas into investable products and grow businesses that create the jobs of the future.

Through AQ programs, Queensland's agriculture and food sector is being supported to innovate, apply new ideas, conduct original research, deploy new technologies, and create new market opportunities.

Agriculture is a key strength of the Queensland economy, with a long and proud history of innovation.

Innovation offers opportunities to grow the agriculture and food sector through the application of new and novel ideas, research and technology. Supporting research, development and extension (RD&E) activities is critical to realising these opportunities and harnessing the benefits of innovation to grow the agriculture sector.

The benefits of agriculture and food RD&E are:

- For producers - new technologies, tools and plant varieties enable businesses to remain economically viable, grow, support families and communities, and continue to produce quality food and agricultural products

- For consumers - high quality, safe food and agricultural products remain affordable, are available year-round, and are produced in an ethical and environmentally sound manner
- For the Queensland economy - increased exports and growth in regional jobs.

To continue to deliver these benefits it is vital that the RD&E effort be integrated with industry needs. It is also important that this research effort addresses the challenges and opportunities of the future. That is what this Roadmap seeks to achieve.



Industry snapshot

Queensland's agriculture and food sector is a major part of the state's economy. It is the foundation of livelihoods for many Queenslanders and the backbone of many rural and regional communities across the State. Queenslanders enjoy readily available, safe, affordable, ethically produced, quality food and agricultural products.

Compared with many competitor countries, Australia's agriculture and food sector is highly market-oriented and therefore highly attuned to the need for innovation to meet consumer demands, with relatively low levels of government assistance for production and marketing. Along with drought, biosecurity and other natural disaster assistance, RD&E is the major form of support provided by Australian governments to the agriculture and food sector.

Rural Research and Development Corporations (RDCs) play a key role

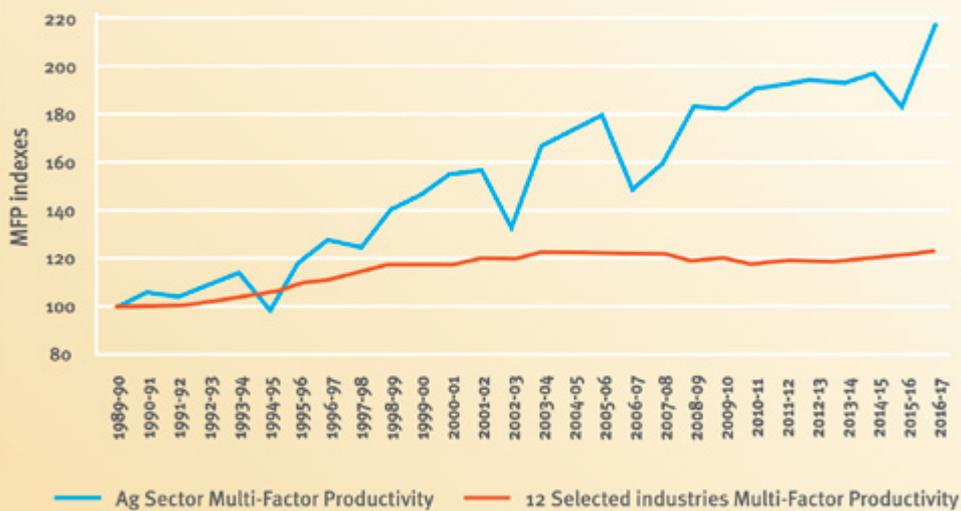
in agriculture RD&E funding. The Australian Government matches funds raised by industry levies up to 0.5% of each industry's Gross Value of Production (GVP). The RDCs manage this investment in RD&E across the public, university and private sectors.

State agencies, universities, the private sector, and Commonwealth agencies such as the CSIRO also play a key role in agriculture and food RD&E.

This RD&E has helped underpin productivity growth in agriculture in Australia of 2.8% per annum compared with 0.7% per annum in the economy as a whole for the 27 years to 2016-17 (figure 1). RD&E also underpins responsible management of Queensland's resources and our response to challenges as varied as climate variability, climate change, changing market trends, and biosecurity incursions.



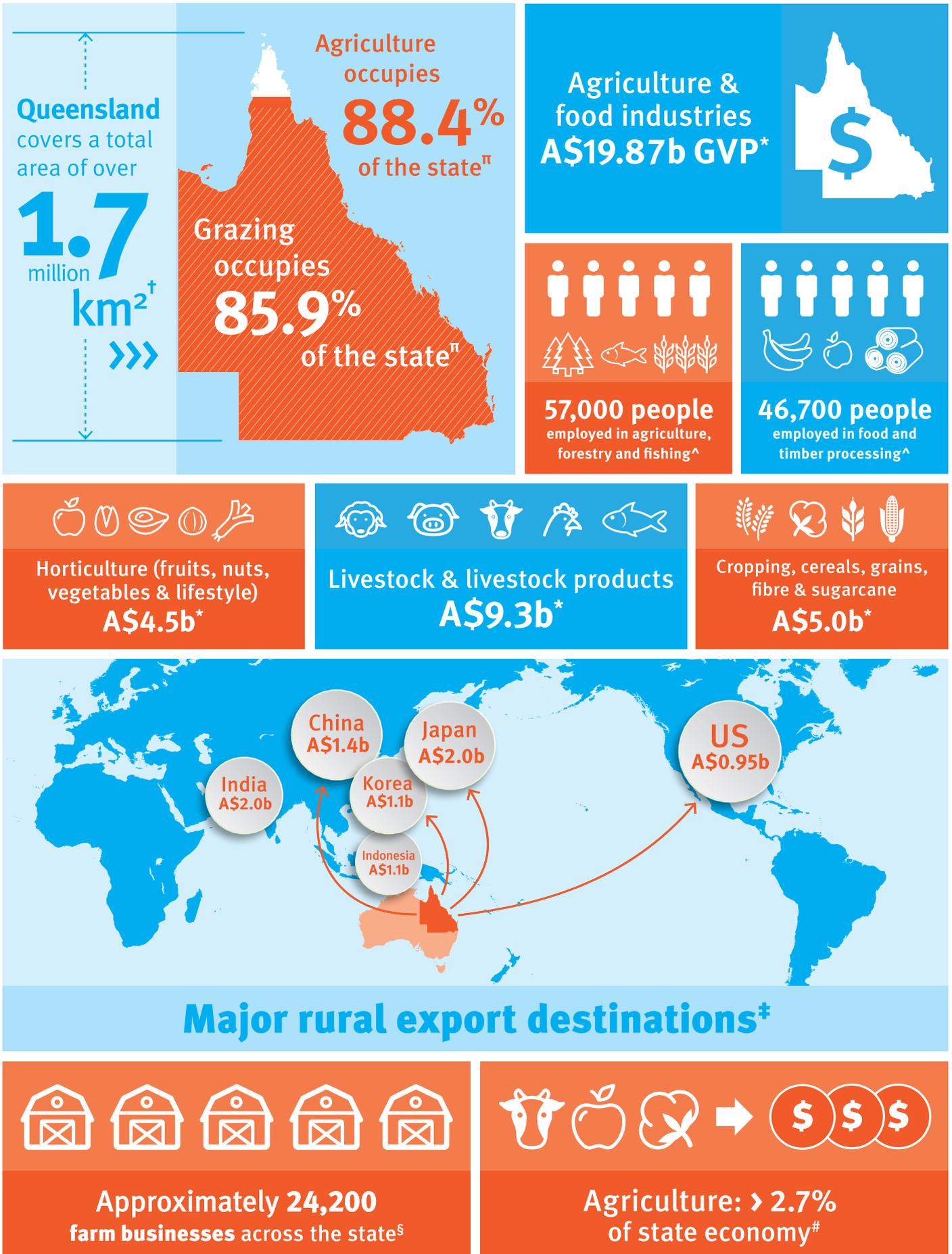
Figure 1 - Multi-Factor Productivity, 1989-90 to 2016-17



2.8%
 productivity growth
 in agriculture in
 Australia per annum
 for the 27 years
 to 2016-17



Figure 2 - Queensland agriculture sector's contribution to the state



Megatrends and drivers

CSIRO recently identified five global megatrends and lower level drivers for the agriculture and food sector which can be expected to have a significant impact on the Queensland sector for the duration of this Roadmap and Action Plan (figure 3). These drivers have been confirmed through the consultation process for this Roadmap and Action Plan.

Figure 3 - Global food and agribusiness megatrends*



Queensland agriculture and food RD&E strengths

Diverse agro-climatic zones and natural resources

Over 88% of Queensland's 1.72 million square kilometres is used for agriculture. Across the State we have a range of soils, land systems, topography and climate which support a large diversity of agriculture and food industries. This diversity of natural resources also enables extended or even year-round growing seasons for some agricultural products.

Increased use of technology in the sector

Agriculture is experiencing a new technology boom, with the potential to radically change farming and boost productivity. The next generation of precision agriculture involving remotely operated sensors, vehicles and robots are being trialled or already used in soil and land mapping, decision support and pest management. Internet access is expanding, and a

large proportion of farm businesses regularly engage in e-commerce. All of this depends on improving connectivity – which is occurring as the National Broadband Network brings improved bandwidth to rural areas.

Large-scale computing is supporting faster processing of complex and diverse data, and enabling better event and correlation detection. Tools such as genome editing will allow precise genetic changes,

North Queensland

Queensland is one of the most significant advanced economies in the tropics with extensive expertise and experience in tropical and sub-tropical agriculture. A quarter of Queensland's agricultural output is produced in tropical north Queensland, dominated by cattle (34%), sugarcane (34%), bananas (13%) and vegetables (9%).

The north has significant land and water resource opportunities which are still to be fully assessed and utilised. Initiatives such as the Cooperative Research Centre for Developing Northern Australia will help foster collaborative RD&E to grow the agriculture and food sector in north Queensland.



of Queensland's agricultural output is produced in tropical north Queensland



34%
sugarcane



34%
cattle



13%
bananas



9%
vegetables



Platform technologies

The emergence of platform technologies, such as sensors, remote monitoring and drones have proven highly applicable to agriculture. Our agriculture and food sector is demanding these technologies, building these technologies, and gaining world class expertise.

Advance Queensland (AQ) is helping to fast track the development of platform technologies to improve the competitiveness of our agricultural industries and support the growth of new industries specialising in the platforms themselves.

For example, through the AQ Ignite Ideas Fund which supports Queensland startups and small to medium Queensland businesses to commercialise market ready innovative ideas, funding was provided to Ditterich Agriculture to develop their BlockGrain platform – a fully automated agricultural commodity analysis, logistics and trading platform to increase

grower margins. Local startup Apunga, also received funding under the program to improve their customer onboarding process and expand their cloud-based horticultural farm management system.

AQ PhD Scholarships support scholars in gaining a research PhD degree to lay the foundation for a future research career. Mr David Johnston of the University of Southern Queensland received funding for research to investigate the use of big data analytics and machine learning processes to develop crop models. The research will look at new cotton crop models with the techniques developed applicable across a range of crops.

AQ investment in the development of platform technologies is seeding new industries, businesses and jobs.

with the potential to improve yields and quality in both crops and livestock. Production waste and by-products are increasingly being utilised through the application of new technologies.

Taken together, these trends mean that increasingly the skill requirements of the sector are met from non-traditional areas – such as science, engineering and IT – as well as more traditional agriculture courses.

World leading tropical/ subtropical agriculture and food R&D expertise and infrastructure

Queensland’s agriculture and food RD&E system includes:

- State agencies with over 30 research facilities across the State
- Commonwealth agencies such as CSIRO and the Australian Institute of Marine Science. CSIRO has 14 research sites in Queensland

- Eight Queensland universities
- Consultants, private RD&E companies and companies undertaking their own RD&E.

Queensland has strengths across the range of agriculture and food RD&E disciplines such as plant breeding, plant and livestock pathology and diagnostics, robotics and automation, food value adding, modelling and remote sensing. Perhaps one of the greatest strengths is the ability to pull it all together





into a systems approach. Research in State Government agencies, and research paid for directly by industry, tends to be more “applied” whereas university research tends to have a greater emphasis on “basic” research.

Strong links and partnerships with industry and support services

There is extensive engagement between the Queensland Government, industry, research funders, such as the Commonwealth Government and RDCs, and other RD&E providers. In particular university alliances are an important part of the Queensland Government investment. In 2017-18, the Queensland Government through Department of Agriculture and Fisheries (DAF) will fund \$9.32 million in university alliances including The

University of Queensland (UQ) in the Queensland Alliance for Agriculture and Food Innovation (QAAFI), the University of Southern Queensland, University of the Sunshine Coast, and Central Queensland University.

The Queensland Government is also an active participant in the National Primary Industries RD&E Framework – a system to increase collaboration and the efficiency of the RD&E system nationally. Queensland leads the beef and sugarcane strategies, in partnership with the relevant industry organisations. Leadership is also delegated to Queensland for specific areas within the grains and horticulture strategies.

Proximity to export markets

The transformation of much of Asia to middle income status, even attaining high income status in the foreseeable future, has significant

implications for Queensland’s agriculture and food sector.

The most obvious of these is simply growth in demand for food and agricultural products. Agricultural exports, from all sources, to North Asia have been growing by 7% per annum, to ASEAN countries by 12% per annum, and to Central and South Asian countries by over 16% per annum.

More important than the volume of demand for food and agricultural products are changes in its composition. Rising living standards mean rising demand for quality food products, and hence for additional value-adding, in all dimensions of quality.

Queensland is well-placed to supply this demand and has the ability to grow and diversify to meet consumers’ expectations.

Queensland agriculture and food RD&E challenges

Access to RD&E funding and investment capital

ABARES has recently estimated that total funding for rural R&D in Australia increased from \$2.3 billion to \$3.0 billion over the past decade in real terms (figure 4). Public sector funding is the largest overall component, although the composition of this has changed over time, with:

- Public sector funding from the Australian and State and Territory Governments and universities growing from \$1,376 million to \$1,537 million
- Private funding of rural R&D increasing from \$912 million to \$1,462 million, comprised of:
 - Increased investment by companies in their own R&D from \$681 million to \$1,185 million
 - Levy payments to the RDCs increasing from \$231 million to \$277 million.

In addition to rural R&D funding, ABARES estimated that an additional \$316 million was invested in 2014-15 in extension activities, comprised of:

- Public sector funding of \$179 million
- Private sector funding of \$137 million.

Access to capital is essential for the growth of Queensland’s agriculture and food industries, including the adoption of RD&E outputs. Ten percent of Australian primary producers report access to capital as an impediment to innovation (figure 5).

Agriculture has been traditionally and successfully financed by debt for

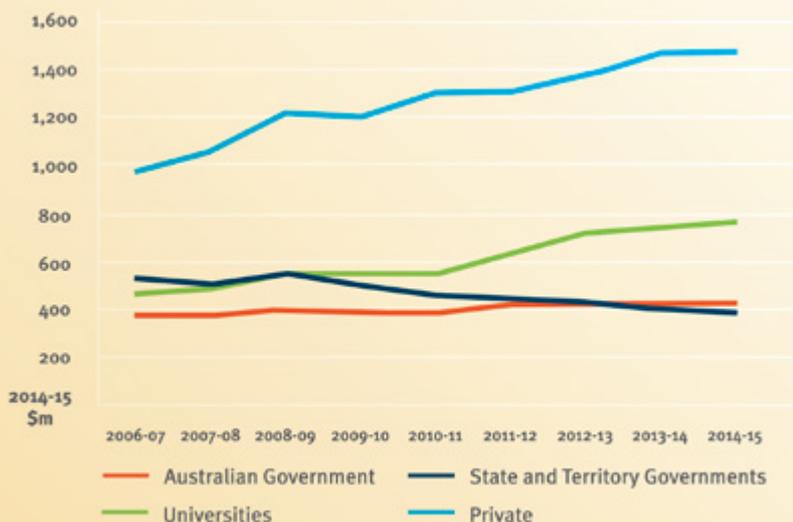
generations, however other sources of capital are increasingly interested in agriculture worldwide, including institutional investors. In 2015-16, 27% of Australia’s primary producers sought external sources of finance – well above the all-sector average of 15%.

Adoption of R&D outputs to increase productivity in a sustainable way

The translation of research into valued outcomes has been and continues to be a challenge, with a number of factors acting as barriers to innovation (figure 5). RD&E systems need to encourage providers to respond to the adoption challenge through:

- Close collaboration with industry to ensure that research undertaken is in line with industry needs

Figure 4 - Rural R&D expenditure, 2006-07 to 2014-15

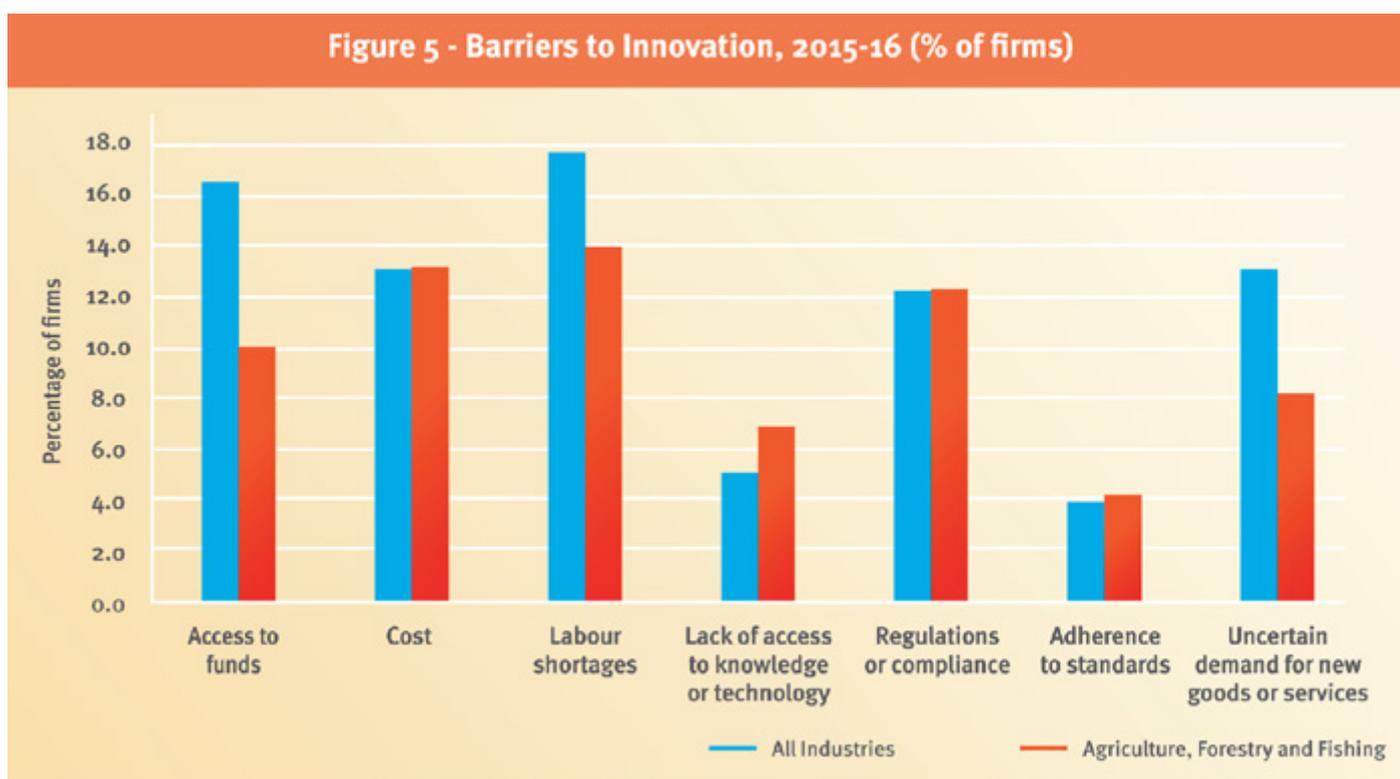


27%

of Australia’s primary producers sought external sources of finance



Figure 5 - Barriers to Innovation, 2015-16 (% of firms)



- Collaboration where possible with producers in the conduct of research itself
- Effective extension and commercialisation, particularly demonstration of the commercial value of research outcomes
- Systems that enable better access to knowledge and technology, including communication systems and farmer education and training, and aligning incentives, where appropriate, with extension of R&D outcomes.

RD&E agencies not only need to collaborate with industry, they also need to collaborate with:

- Other RD&E providers - across the public/private/university sectors

- Private firms and investors, e.g. in the commercialisation process.

Biosecurity

Queensland is Australia's "frontline" State for biosecurity. It has a large proportion of Australia's land-mass and coastline; it is the closest State to another country, and hence the only State with direct cross-border movements of people, and the most international movement of migratory species. Its diverse range of habitats and tropical/sub-tropical climate is conducive to many pests, and it is an open economy with relatively high levels of international trade and tourism. Globalisation and climate change are increasing biosecurity risks.

The Queensland Government, more than 32 peak industry organisations and members of the community have worked together to produce the recently released draft *Queensland Biosecurity Strategy: Our Next Five Years (2017-2022)*. The final strategy and the underlying six theme action plans will document Queensland's biosecurity RD&E priorities.

Agriculture and food RD&E capability and skills gaps

The capability and skills challenge for agriculture and food RD&E is whether the pipelines are in place to deliver the researchers, extension officers and other experts that will be needed by the sector in 10 years' time and beyond.

As discussed earlier, agriculture is now approaching a new technology boom, with the acknowledgement that the skill requirements of the sector will be met from a combination of non-traditional and traditional areas. For non-traditional areas of expertise the challenge will be to get those researchers interested in working in the agriculture and food sector. There is a real need to document Queensland's agriculture and food sector's RD&E skills and capabilities and identify any future gaps. More generically, there is a need to promote career opportunities in science, technology, engineering and mathematics at all levels.

The Roadmap consultation process also identified career pathways for researchers as a challenge, especially for mid-career researchers. The AQ early- and mid-career fellowships that support PhD qualified researchers in undertaking original research that will benefit Queensland are a positive step to help address this challenge.

Climate variability and climate change

Climate risk (or variability) is one of the major risks Queensland's primary producers need to manage. The key aspect of climate variability is rainfall variability. More accurate and

longer lead time seasonal rainfall forecasts remain a priority for most Queensland agricultural industries.

Producers adopt a range of strategies to manage climate variability. An example is the use of irrigation and, to a far lesser extent, hydroponics. Access to irrigation water remains a priority for many Queensland producers. Another expanding approach is protected cropping which, combined with irrigation or hydroponics, allows producers to manage the variability and extremes of temperature, wind and rainfall to ensure production consistency and maximise product quality.





Changing farming practices – SIX EASY STEPS

Changing farming practices can seem like a daunting task and sometimes the potential benefits are just not clear. One example project where producers have changed practices that have improved both their bottom line and reduced their impacts on the local waterways and the reef is the Burdekin Nitrogen Trials (RP2o) project. The trial data in the project showed that where a trial site has run for more than one year, the SIX EASY STEPS method is more profitable to the farmer 100% of the time. In fact, some producers have gained up to \$50,000 in profitability as a result of farm management adjustments.

The trials were established to determine whether the SIX EASY STEPS method provided adequate nitrogen application rates following the introduction of regulations for nitrogen and phosphorous inputs in sugarcane production.

Where variation in yields was observed between farms in the Burdekin it has been found to be primarily due to soil types and farm management. This project demonstrated that high nitrogen application rates do not compensate for poor farm management practices – good farm management is the key component for achieving high yields.

Yes, changing practices can be time consuming and change is daunting, however gains to be made by changing nitrogen application rates, just as one example, and improving farm management can have multiple flow on effects on farms for years to come.

The RP2o project has been a successful collaboration between cane farmers in the Burdekin, Sugar Research Australia and the Queensland Government.

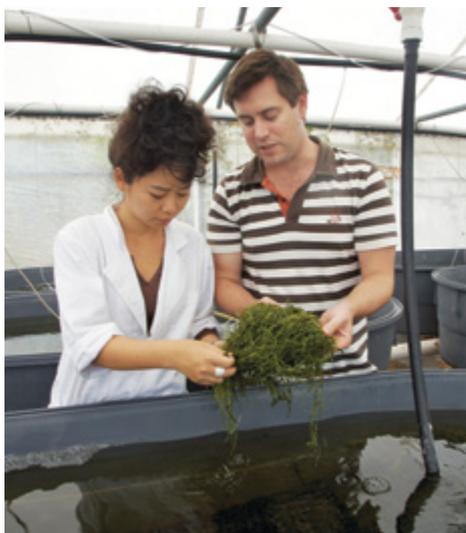


Drought and Climate Adaptation Program (DCAP)

This five-year \$17.5 million program funds a portfolio of projects to improve drought resilience and preparedness, drought management and adaptation to climate change.

DCAP includes the Queensland Drought Mitigation Centre, which is a partnership between DAF,

the Department of Environment and Science, and the University of Southern Queensland. The Centre is focussed on improving seasonal forecasts and weather reports for agriculture in northern Australia, and decision support tools for producers to improve their climate risk management.



Overlaid on climate variability is the impact of climate change on temperature, total rainfall and rainfall variability, and weather/climate extremes, e.g. droughts, flood events, cyclones. Not all impacts are negative – increased concentrations of atmospheric CO₂ can stimulate plant growth for some commodities, and some regions may experience higher rainfall. However, on average Queensland is expected to become drier – with annual precipitation falling by 2-3% by 2050 – as well

as warmer. Most seriously, extreme events – droughts and cyclones – are predicted to increase in severity and hence impact, while climate change is expected to widen the range of many significant pests and diseases.

Agriculture accounted for 14% of Queensland's greenhouse gas emissions in 2015. This is mainly methane from cattle with additional emissions coming from land use change (mainly tree clearing) and forestry.

The Queensland Government's ambition to achieve net zero emissions status within the state by 2050 can only be achieved if there is a significant degree of carbon sequestration or "carbon farming". This brings significant opportunities to the agriculture sector, and particularly to forestry. Agriculture therefore features prominently in the Government's mitigation and adaptation plans.



Action to date

The Queensland Government’s Food and Fibre policy outlines its vision to support the growth of a productive and prosperous food and fibre sector in Queensland. The policy nominates five priority areas in pursuit of this vision:

- Drive growth, efficiency and sustainability
- Support a modern and skilled workforce
- Advance research and development
- Improve Queensland's biosecurity capability
- Deliver service innovation.

This Roadmap and Action Plan addresses the “Advance research and development” priority and is part of the Queensland Government’s Advance Queensland initiative. AQ is the Government's vision for the future and represents a significant investment in a stronger Queensland economy. Funding of \$513 million over four years is supporting programs that drive innovation,

build on natural advantages, and help raise Queensland’s profile as an attractive investment destination. The Advance Queensland Initiative focuses on five key areas:



Inspire



Discover



Connect



Invest



Grow

Inspire	Discover	Connect	Invest	Grow
Inspiring Queenslanders to embrace new ways of thinking and working, and back themselves and their ideas.	Helping our young minds, big thinkers and doers deliver new solutions to improve our everyday lives.	Connecting Queenslanders with local and international innovators and investors.	Increasing access to capital and positioning Queensland as a globally attractive investment destination.	Accelerating the growth and competitiveness of our businesses, industries and regions by opening the door to new ideas, opportunities and markets.





The Roadmap and Action Plan sits alongside a number of other Queensland Government plans and strategies and its implementation will complement, draw upon and build on their actions. These plans and strategies include:

- *Queensland Climate Adaptation Strategy 2017-2030* - helps Queenslanders prepare for current and future climate changes by understanding the impacts, managing the risks and harnessing the opportunities
- *Advancing North Queensland Plan* - nominates a number of priority areas to accelerate the Government's efforts to develop

and diversify North Queensland's economy, including research and innovation

- Other AQ industry roadmaps, including *Queensland Biofutures 10-Year Roadmap and Action Plan*
- Queensland Science and Research Priorities - guide future investments in R&D to ensure they are focused on well-defined areas, reflect the needs and activities government considers important and provide value for money
- Draft *Queensland Biosecurity Strategy 2017-2022* - includes a major focus on improving the

information base for biosecurity risk management in collaboration with the broad community

- *Sustainable Fisheries Strategy 2017-2027* - sets out the Government's fisheries reform agenda for the next ten years to deliver a world class fisheries management system, including additional biological monitoring, new technologies, vessel tracking, and more rapid stock assessments.





Advance Queensland: supporting local food businesses

Queensland's food industry is the largest manufacturing sector in the state (as measured by employment numbers), with demand for our produce and value-added food products both locally and globally, particularly by our Asia-Pacific neighbours.

Advance Queensland (AQ) is leveraging our competitive advantage in the food processing industry through supporting the adoption of innovations that respond to the challenges and opportunities arising from local and global food demands.

Under the AQ Ignite Ideas Fund, which supports startups and small to medium Queensland businesses to commercialise market ready innovative ideas, Goondiwindi based business, Woods Foods Pty Ltd received funding to introduce an extrusion process line to their manufacturing plant, and to develop a retail brand for their pulse and grain products. Through branding and an improved manufacturing process this family owned operation will be able to scale their business.



Small Tree High Productivity Project

This five-year \$13.4 million project aims to transform sub-tropical/tropical tree crop productivity, specifically for mango, macadamia and avocado growers.

Learning from the three-fold increase in apple industry productivity over 30 years, the project uses vigour management systems to promote fruit production over development of stems and branches. Rootstock screening trials, looking for low vigour, have been planted at DAF's Walkamin and Bundaberg Research Facilities. These trials are evaluating commercial and semi-commercial avocado rootstocks and approximately 20 new, unique rootstocks for macadamia. An evaluation of 90 diverse mango rootstocks aims to identify those that exhibit low vigour characteristics suitable for high productivity systems.

There is also a strong focus on improving orchard management systems. Large scale trials for each crop have been established to identify optimum tree planting densities, develop improved tree pruning systems, manage crop load and minimise effects of irregular bearing. Tree and plantation architecture are being optimised to most efficiently capture the sun's energy for fruit production.

Tree crop research is a long-term investment, and needs approximately 20 years to deliver the anticipated significant increases in productivity.

The initiative is a collaborative research program led by DAF, in partnership with QAAFI and the New South Wales Department of Primary Industries and co-funded through Horticulture Innovation Australia.

Future strategies and actions

The following sections set out the actions that will be carried out as part of the Roadmap. These actions will be delivered by a number of Queensland Government departments working with industry, Queensland universities, Commonwealth Government departments, CSIRO and other stakeholders.

The listed actions do not attempt to capture all the RD&E activities that the Queensland Government will undertake during the next 10 years – rather they are specific actions that will help address the identified challenges and opportunities, underpinned by the large body of ‘business-as-usual’ RD&E.

Strategy 1 - Increase innovation and commercialisation

- Support commercialisation and Queensland’s AgTech start-up ecosystem through AQ programs, partnering with Advancing Regional Innovation Program (ARIP) recipients where they have an agriculture and food focus
- Investigate alternative funding models including scoping AgTech and Innovation support for early stage private and public sector innovations
- Consider opportunities for enabling technologies and digital transformations, such as part of Australia’s first whole-of-government drones strategy to address the business opportunities and

regulatory challenges for this growing industry

- Encourage innovation in response to climate change and climate variability, including through the Drought and Climate Adaptation Program and the Queensland Climate Adaptation Strategy
- Provide support for sustainable biofuels, opportunities to mitigate climate change through reducing agriculture and food-related greenhouse gas emissions, and enhancing carbon farming, as described in the Queensland Climate Transition Strategy
- Support projects that trial innovative approaches to land management, monitoring, systems repair and water treatment, particularly in Great Barrier Reef catchments.

Strategy 2 - Identify and promote agriculture and food RD&E opportunities

- Proactively work with industry and key stakeholders to promote future career opportunities in agriculture and food across the education sector and encourage the focus on science, technology, engineering

and mathematics (STEM) in schools to prepare young people for careers in agriculture and food RD&E, recognising that a broad range of STEM-related fields are relevant to careers in the sector. Also undertake a skills and capability review of Queensland’s agriculture and food RD&E system

- Encourage information sharing, skill development and collaboration through online portals which promote existing sector capabilities, provide links to training resources and to agriculture and food related data
- Participate in targeted events domestically and internationally to promote opportunities deriving from agriculture and food RD&E in Queensland and attract leading agriculture and food RD&E to Queensland
- Agriculture and food research capability and activity will be enhanced through Advance Queensland fellowships and scholarships and related programs.

Strategy 3 - Support existing sector to grow and develop new business

- RD&E to support supply chain access to current and new markets for both commodity and branded products to meet consumer demands through the new Growing Queensland's Food Exports Program grants, identify growth opportunities within the supply chain for unique qualities

and value added products, and undertake relevant R&D to support government-to-government negotiations for improved market access

- Partnering with industry to refine and further develop best management practice approaches, particularly for industries in sensitive GBR catchments. As there is a growing ability for consumers to engage, question, influence and disrupt agriculture

and food production systems, this will include Government support for producers and processors to demonstrate environmentally and ethically sound production systems to their consumers

- Through the final *Queensland Biosecurity Strategy: Our Next Five Years (2017-2022)* and the underlying action plans, deliver research and develop control strategies for pest animals, weeds and major diseases



Queensland's strawberry variety improvement program

The strawberry industry continues to benefit from the Queensland national variety improvement program. This industry co-funded program continues to produce outstanding sub-tropical and temperate strawberry varieties for year-round strawberry production. The highly successful Rubygem strawberry variety is grown widely in Queensland and has sold well overseas with over 16 million plants sold per annum.

Other new varieties include Red Rhapsody, Sundrench and Parisienne Kiss which are experiencing rapidly increasing commercial plantings. Scarlet Rose ASBP (Australian Strawberry Breeding Program) is the newest variety released for commercial evaluation and promises improved berry quality, favourable production characteristics and timing of production to ensure an extended production season for improved producer profitability.



Grazing best management practice delivers on-farm practices benefiting the reef

The Grazing Best Management Practices (Grazing BMP) program is an industry-led, voluntary program, focussed on assisting beef cattle producers identify on-farm best management practices to improve the long-term profitability of their enterprise, while reducing chemical and sediment load to the Great Barrier Reef (GBR).

Grazing BMP is delivered through a partnership between multiple organisations that includes AgForce, the Fitzroy Basin Association, the Queensland Government (Department of

Environment and Heritage Protection and DAF) and Natural Resource Management Groups. A cost-benefit analysis of the DAF Grazing BMP Extension Support project in the Burdekin catchment estimated that the program returned between \$2 to \$5 in industry benefits for every dollar invested into the program. Significant public benefits were also achieved, including the reduction of sediment loads entering the GBR lagoon and the ecosystem service of maintaining healthy rangeland.

- The *Sustainable Fisheries Strategy 2017-2027* will help deliver a more modern and responsive fisheries management system that is transparent and based on good monitoring and research. Fisheries Queensland will continue to work closely with stakeholders and the community to implement these important reforms
- Created a Rural Economies Centre of Excellence to undertake integrated research and specialised programs to deliver sustainable growth of Queensland rural communities and rural jobs
- Explore opportunities related to agriculture and food waste minimisation and utilisation
- A Department of Agriculture and Fisheries (DAF) RD&E Strategic Plan for agriculture and food, fisheries and forestry will be developed, addressing collaboration with other RD&E providers, collaboration with key stakeholders such as Rural Research and Development Corporations in the context of the national industry plans, continued support for Cooperative Research Centres, and strategic investment in agriculture and food RD&E including extension and infrastructure.

Agriculture and Food RD&E 10-Year Roadmap and Action Plan Summary

Vision	Queensland's internationally recognised agriculture and food research, development and extension underpins a productive, profitable and sustainable sector.				
Opportunities	Diverse agro-climatic zones and natural resources	Increased use of technology in the sector	World leading tropical/subtropical agriculture and food RD&E expertise and infrastructure	Strong links and partnerships with industry and support services	Proximity to export markets
Challenges	Access to RD&E funding and investment capital	Adoption of RD&E outputs to increase productivity in a sustainable way	Biosecurity	Agriculture and food RD&E capability and skills gaps	Climate variability and climate change
RD&E Benefits	Agriculture and food businesses are productive, viable and growing	Food and agriculture products are affordable, and sustainably and ethically produced	Globally renowned food quality and safety	Year-round supply of food and agricultural products	Growing food and agricultural exports

Strategy 1 Increase innovation and commercialisation

Actions

- Support commercialisation and Queensland's AgTech start-up ecosystem through
 - A range of Advance Queensland programs such as the Business Development Fund, Engaging Science Grants, Platform Technology Program and Queensland Startup Events and Activities Fund
 - Partnering with Advancing Regional Innovation Program (ARIP) recipients where they have an agriculture and food focus
 - Investigate alternative funding models including scoping AgTech and Innovation support for early stage private and public sector innovations
- Develop targeted strategies and initiatives for enabling technologies, including Australia's first whole-of-government Drones Strategy
- Encourage innovation in response to climate change, climate variability and other sustainability issues
- Provide RD&E support for meeting the target of zero net emissions in 2050 by seeking opportunities to mitigate climate change through reducing agriculture and food related greenhouse gas emissions and enhancing carbon farming
- Drought and Climate Adaptation Program, including strategic investment in improved seasonal forecasts and decision support tools for producers to improve their climate risk management
- Implement the Queensland Climate Adaptation Strategy and the Queensland Climate Transition Strategy
- Support industry to shift to sustainable biofuel production and use
- Support projects that trial innovative approaches to land management, monitoring, systems repair, and water treatment, particularly in Great Barrier Reef catchments.

Strategy 2 Identify and promote agriculture and food RD&E opportunities

Actions

- Address skills issues by
 - Proactively working with industry and key stakeholders to promote and enhance future career opportunities in agriculture and food across the education sector and encourage the focus on STEM in schools to prepare young people for careers in food and agriculture RD&E
 - Undertaking a skills and capability review of Queensland's food and agriculture RD&E system
- Encourage information sharing through online portals which
 - Promote existing sector capabilities
 - Provide links to training resources
 - Provide links to agriculture and food related data
- Participate in targeted events domestically and internationally to
 - Promote opportunities deriving from Queensland's food and agriculture RD&E
 - Attract leading food and agriculture RD&E to Queensland
- Enhance research capability and activity through Advance Queensland fellowships and scholarships and related programs.

Strategy 3 Support existing sector to grow and develop new business

Actions

- Support supply chain access to current and new markets for both commodity and branded products including
 - Support for exporters to meet consumer demands through the new Growing Queensland's Food Exports Program grants
 - Identify growth opportunities within the supply chain for unique qualities and value added products, including through participation in relevant CRCs
 - Undertake relevant R&D to support government-to-government negotiations for improved market access
- Partner with industry to refine and further develop best management practice approaches, particularly for industries in sensitive Great Barrier Reef catchments
- Continue biosecurity research and development of control strategies for pest animals, weeds and major diseases
- Implement fisheries monitoring and research priorities as part of the *Sustainable Fisheries Strategy 2017-2027*
- Establish Rural Economies Centre of Excellence to undertake integrated research and specialised programs to deliver sustainable growth of Queensland rural communities and rural jobs
- Explore RD&E opportunities related to agriculture and food waste minimisation and utilisation
- Develop a DAF RD&E Strategic Plan for agriculture and food, fisheries and forestry that aligns with the Roadmap and builds on the numerous National Primary Industry RD&E Framework Strategic Plans.



