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Innovate.  
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# Statement of Corporate Intent

2016/17 – 2020/21



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Presented to the House of Representatives pursuant  
to Section 39 of the Public Finance Act 1989



OUR PRIORITIES ARE TO SUPPORT THE GROWTH AND COMPETITIVENESS OF THE ECONOMY, NATIONALLY AND REGIONALLY, THROUGH OUR WORK WITH LARGER EXPORT-ORIENTED SECTORS AS WELL AS EMERGING SECTORS WITH HIGH GROWTH POTENTIAL. OUR PARTNERSHIPS WITH THESE SECTORS AND WITH RESEARCH COLLABORATORS ACROSS THE SCIENCE AND INNOVATION SYSTEM ARE ENABLING US TO DELIVER HIGH IMPACT SCIENCE EXCELLENCE THAT HAS INCREASING AND MEASURABLE ECONOMIC AND SOCIETAL VALUE FOR NEW ZEALAND.



**Peter Landon-Lane**

CEO, The New Zealand Institute for Plant & Food Research Ltd



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## FOREWORD

Plant & Food Research is one of New Zealand's largest scientific research organisations, bringing together nearly 90 years of food, horticulture, arable and seafood research in a single institute to deliver knowledge and technology that serve New Zealand industry and society.

Plant & Food Research's mission, defined in our Statement of Core Purpose, is to make a high impact contribution to our nation's economic, social and environmental prosperity, achieved by engagement with the horticultural, arable, seafood, and food and beverage industry sectors. Undertaking excellent science is also a key driver for our organisation, since high quality science is a key determinant of impact. Collaboration with our research colleagues in Crown Research Institutes, universities, National Science Challenges and hubs, nationally and internationally, is extending our capacity to deliver even more value to New Zealanders. Furthermore, as a Crown-owned company, it is expected that Plant & Food Research will operate as a sustainable business.

Our research is helping to increase the contribution from the plant- and marine-based food sectors, particularly through growth in exports. Exports of fresh and processed horticultural products grew to reach a total of \$4.3 billion in the year ending June 2015, 8.8% of total merchandise exports. On top of this, exports of honey increased from \$202 million in 2014 to \$285 million in 2015, and exports of horticultural machinery were \$90 million. Seafood exports, currently valued at \$1.71 billion, increased 6% in 2014.

These sectors, with sustainably produced, high value premium products, are well placed to capitalise on global food trends such as food security, health, novelty, convenience and sustainability. While traditional Western markets are still large, there is strong growth in export markets in Asia driven by the rising incomes of consumers and demand for high quality New Zealand-origin foods and beverages.

Our strategy and vision aim to take us to the next level of performance. Building on our established strengths, we will focus on market-led as well as production-oriented opportunities, taking a proactive leadership role in the pursuit of impact, excellent science, and building New Zealand's competitive advantage for the future.

# OVERVIEW



PLANT & FOOD RESEARCH'S PURPOSE IS TO ENHANCE THE VALUE AND PRODUCTIVITY OF NEW ZEALAND'S HORTICULTURAL, ARABLE, SEAFOOD AND FOOD AND BEVERAGE INDUSTRIES, TO CONTRIBUTE TO ECONOMIC GROWTH AND THE ENVIRONMENTAL AND SOCIAL PROSPERITY OF NEW ZEALAND



From Plant & Food Research's Statement of Core Purpose

## OUR CONTEXT

Our Shareholding Ministers expect Plant & Food Research to deliver research with demonstrable impact on New Zealand's current and future prosperity, and to operate sustainably as a business.

The industry sectors highlighted in our Statement of Core Purpose make a significant contribution to the New Zealand economy. Combined exports in the horticultural, wine, arable and seafood industries are worth more than \$8 billion. The wider food and beverage sector accounts for about 10% of GDP<sup>1</sup> and nearly half of New Zealand's exports. Key industries with which we work in the primary sector have set ambitious growth targets for 2020 that our research will help to realise, ultimately increasing their contribution to New Zealand's GDP through increased export returns.

## ALIGNMENT WITH THE NATIONAL STATEMENT OF SCIENCE INVESTMENT

In October 2015 the Minister of Science and Innovation launched the inaugural National Statement of Science Investment (NSSI), which sets the long-term strategic direction for the Government's investment in science. Key themes of the NSSI are science excellence and science impact. We have a strong focus on the quality of our science – not in an abstract sense but because it is a key determinant of impact. The science we do is strategy-driven, focused on impact, with clear line of sight to benefits for New Zealand.

As outlined later in this document, we view and manage investments in our research as a portfolio that considers all our sources of funding. This allows us to align our research with our strategy and with the priorities of Government, industry and other stakeholders.

<sup>1</sup> [www.mbie.govt.nz/info-services/sectors-industries/food-beverage/documents-image-library/INVESTORS%20GUIDE.pdf](http://www.mbie.govt.nz/info-services/sectors-industries/food-beverage/documents-image-library/INVESTORS%20GUIDE.pdf)

## ALIGNMENT WITH THE BUSINESS GROWTH AGENDA

The Government's Business Growth Agenda outlines a vision for New Zealand in 2025, to be one of the prosperous small economies in the world, with an economy that grows our productivity and incomes, and delivers real and ongoing improvements in the quality of life for all New Zealanders<sup>2</sup>.

There are six key areas in the Business Growth Agenda: export markets, investment, innovation, skills, natural resources and infrastructure; and three cross-cutting themes: Māori economic development, regional economic development, and regulatory reform.

The way we align with these six areas and cross-cutting themes is summarised below.

### BUILDING INNOVATION

Plant & Food Research's mission and purpose sits squarely in this space. Our research and innovation generate premium products and processes, technologies to protect and enhance market access, and systems to sustain sector growth, efficiency and resilience.

We play a leading role in the development of New Zealand's science and innovation ecosystem, continuously investing in our capabilities, and collaborating with others here and abroad to meet New Zealand's needs and opportunities.

### BUILDING EXPORT MARKETS

We focus on export-oriented sectors and firms, including horticulture, wine and seafood, and the value chains related to them. A priority is developing food and beverage products for which consumers around the world are willing to pay a premium. We provide the science required for new and existing export market access for New Zealand.

### BUILDING INVESTMENT

We work closely with business and science partners to develop high quality research programmes that attract industry investment. Plant & Food Research has been successful in bringing overseas firms to invest in research and its uptake and application here in New Zealand.

### BUILDING NATURAL RESOURCES

Our research focuses on more productive, sustainable and profitable production systems that have a lighter environmental footprint. Water, nutrient management and ecosystem services will continue to be strong areas of focus for the coming period.

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<sup>2</sup> [www.mbie.govt.nz/info-services/business/business-growth-agenda](http://www.mbie.govt.nz/info-services/business/business-growth-agenda)

## BUILDING SKILLS AND SAFE WORKPLACES

We will continue our active role with universities and the wider education sector to encourage and support students who will provide the science, technology and business skills New Zealand needs in the sectors and areas on which we focus. We will continue to grow our summer student programme and support the university teaching and supervision activities of our staff.

In the coming period we will maintain a strong focus on continuous improvement in health and safety, continuing to build our health and safety culture and framework while investing in facilities, equipment, training and procedures.

## BUILDING INFRASTRUCTURE

Our science capabilities – our people and facilities – are an important part of New Zealand’s critical science infrastructure. We will continue to invest in both. In the coming period we will continue a significant programme of capital investments to upgrade and refresh our research facilities across New Zealand.

## MĀORI ECONOMIC DEVELOPMENT

In the section below on Te Rārangā Ahumāra we outline our engagement with Māori. Our work with Māori businesses and other organisations is starting to accelerate as we build on the progress and experience of recent years.

## REGIONS

The industries, sectors and firms we support with science and innovation are strongly represented in New Zealand’s regions outside the main centres, and our 15 sites throughout New Zealand directly contribute to the regional economies.

## REGULATION

Our science contributes to evidence-based policy development and provides tools and solutions to achieve key policy goals in areas such as food safety, food quality, water quality, nutrient management, export market access, bioprotection and biosecurity.

## OUR SCIENCE STRATEGIC FOCUS

Our science strategy is focused on delivering growth, performance and resilience for New Zealand through:

1. Better cultivars faster™
2. Residue-free pest and disease control
3. More sustainable and profitable systems
4. Proprietary foods with premium prices
5. Sustainable premium seafood and marine products.

Science delivered through these five areas enhances the value and productivity of the primary industries through sectors that make an important contribution to New Zealand's economy. Our research and innovation generate premium products and processes, technologies to protect and enhance market access, and systems to sustain sector growth, efficiency and resilience.

We take a strategic approach to our investments in research, with the aim of maximising the impact of our research for New Zealand and considering factors such as the expected scale of impact, time until impact, the probability of success, and an appropriate weighting between larger growth sectors and emerging high growth sectors. We assess our research as an investment portfolio, across all sources of funding, including Core Funding, New Zealand Government contestable funding, and commercial (customer) funding.

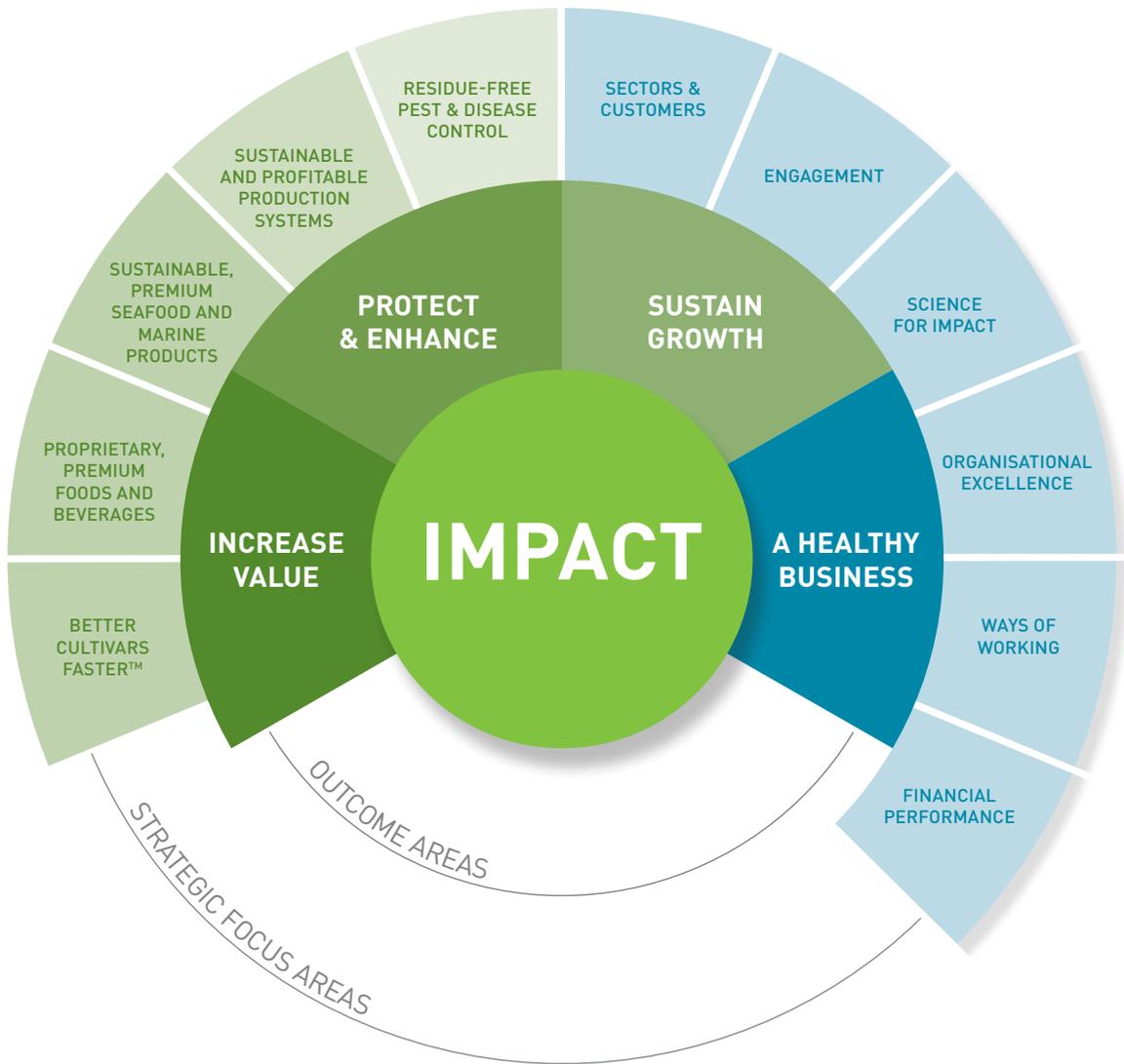
Continued growth in commercial funding and our re-investment of royalties are driving some change in the sector balance in our portfolio and in the mix of work within our five science areas. Overall, the allocation of resources for research in our five science areas in the coming period will be similar to that in the current period.

We will continue the current sector investment levels of Core Funding in 2016/17. There are changes within each sector as research projects are completed or terminated and others start. Our sector investment allocations are all resulting in significant delivery of impact. This, in turn, is supporting the growth of more strategic partnerships with endusers and customers, and business investment in R&D, as evidenced by the strong growth in our commercial revenue. Our measures of science excellence and feedback from our international Science Advisory Panel also indicate that current investment patterns are enabling us to deliver excellent science and to forge strong research collaborations across the science and innovation system.

## OUR BUSINESS STRATEGIC FOCUS

Strategic focus areas of our business are:

1. Sectors and customers — growing the value and volume of our customer base
2. Engagement — partnering for success
3. Science for impact — optimising science quality and building the best teams
4. Organisational excellence — enhancing our performance
5. Ways of working — creating inspiring workplaces and work styles
6. Financial performance — sustaining profitability to create flexibility.



**Figure 1: Plant & Food Research's outcome areas and strategic focus areas.**

## SECTORS AND CUSTOMERS — GROWING THE VALUE AND VOLUME OF OUR CUSTOMER BASE

Our science enhances the value and productivity of the primary industry through sectors that make an important contribution to New Zealand's economy, including kiwifruit, seafood, wine, pipfruit, avocados, summerfruit, berryfruit, potatoes, vegetables, onions, consumer and health, apiculture, mixed cropping, biosecurity and the environment.

To achieve the link between desired impacts and research outcomes, we are developing even stronger partnerships with our national and international clients and stakeholders. Together we are creating long-term plans based on a shared view of the market and science, working collaboratively to convert those plans into tangible actions and jointly monitoring and evaluating our collective progress. These activities will support growth in our key industries, increasing profitability and evidence of impact, thus increasing funders' confidence in investing in research, science and technology.

Te Rāanga Ahumāra is our partnering approach with Māori to deliver on Vision Mātauranga. There continue to be new opportunities right across our key outcome areas and sector focus, as well as activities specific to Māori, to increase economic growth and enable Māori to pursue their economic, environmental, cultural and spiritual aspirations. In the coming period we will continue to increase our investment in capability building and research in this area, as well as move to co-invest in research that will deliver value to iwi through the development of crops via the new Plant & Food Research Growth Fund and other mechanisms.

To best fulfil our Core Purpose, Plant & Food Research must be active internationally to access research that is important for New Zealand, to strengthen our research capabilities, to understand key market and consumer trends, and to identify and develop opportunities for our New Zealand stakeholders. We have seen good growth in our international activities in the current period, focusing on New Zealand's key export markets and relevant international science collaborations, and are forecasting more in the years ahead.

In 2016/17 we will:

- Continue to develop joint strategic plans with our sectors which will increase our revenue from New Zealand commercial customers to \$39.9 million
- Convert interest from new customers into contracted projects, resulting in \$2.7 million from new customers
- Grow our relationships with business-ready Māori organisations so that the value of science involving Māori increases from \$3 million to \$4 million
- Build on our international platforms so that 15% of our revenue originates offshore.

## ENGAGEMENT — PARTNERING FOR SUCCESS

We will continue to have a strong focus on effective partnerships with clients and other stakeholders, so that we can identify high impact research opportunities based on industry and market opportunities, work with endusers and research collaborators to deliver research and technology transfer effectively, and subsequently assess the uptake and impact of the research. We are also committed to communicating science, and its role in delivering innovation and building our economy, to all New Zealanders. Key strategic priorities in this area include building our brand, technology transfer, and digital engagement.

In 2016/17 we will:

- Strengthen our partnerships with some of our largest clients through joint appointments and secondments
- Actively manage our brand by obtaining feedback through client surveys and an active communication programme
- Initiate work to explore the digital dimensions of technology transfer.

#### SCIENCE FOR IMPACT — OPTIMISING SCIENCE EXCELLENCE AND BUILDING THE BEST TEAMS

We regularly review our science through our established annual programme of science reviews and through the work of our Science Advisory Panel. We also regularly audit our capability to ensure we have the best skills to deliver high quality and relevant science. The National Science Challenges and Hubs are opportunities to strengthen research collaborations further, to integrate our activities to enhance their efficiency, and to deliver top quality, internationally benchmarked science.

To ensure we have sufficient early stage, highly innovative science, we have a discrete Future Science portfolio for research projects with a potential impact in longer-term planning horizons, and which test and develop innovative new science ideas, platforms and capability.

We will continue to strengthen our systems and culture that recognise and support the pursuit of robust, innovative and creative science while building the necessary capability to sustain scientific discoveries that will deliver impact to our sectors now and in the future.

In 2016/17 we will:

- Grow our science capacity by investing \$10 million in a portfolio of Future Science projects
- Maintain our support for the National Science Challenges, Hubs and KiwiNet through the provision of senior staff time in governance roles and through alignment of our activities with those of these collaborations
- Continue our programme of external reviews of our science led by our Chief Scientist and Science Advisory Panel
- Initiate a series of cross-cutting workshops to generate new ideas and support innovation.

#### ORGANISATIONAL EXCELLENCE — ENHANCING OUR PERFORMANCE

Plant & Food Research has a strong and enduring commitment to continual improvement across all our business system areas. We seek to reach beyond complying with legislative requirements and to set high performance goals across areas, including people and asset management. We view a safe workplace as a reflection of a positive culture characterised by a high degree of pride in the work we do, and by respect and consideration for others.

We are continuing to apply high standards to Biosafety Compliance through a range of policies under the leadership of a dedicated Biosafety & Environmental Compliance Manager and Biosafety Committee. The CIMS framework is used to deal with any incidents.

Productivity gains will allow projected growth in revenue over the next five years to be achieved with only modest increases in overall staff numbers.

In 2016/17 we will:

- Continue our workplace health & safety programme, leading to further improvements in our health & safety measures and the maintenance of our tertiary-level standard in the ACC Workplace Safety Management Programme
- Continue our focus on biosafety through the replacement of aging facilities and equipment, and the further development of operational controls
- Increase revenue per science FTE to \$236,000, while still investing in new capability to support future revenue and impact.

#### WAYS OF WORKING — CREATING INSPIRING WORKPLACES AND WORK STYLES

Significant capital expenditure is under way to upgrade or replace aging laboratories, containment facilities and buildings across our organisation, with a particular focus on our Mt Albert site. We will continue to participate actively in developments at the Palmerston North and Lincoln sites based on a hub vision and site master plan shared with other organisations at those campuses.

We will fund the redevelopment of our facilities from retained earnings, the sale of non-strategic assets and, in the later years of the plan, debt.

Our Ways of Working initiative is creating inspiring workplaces, information and technology solutions to support and enable great science, and work styles that enhance collaboration and increase our innovative capacity.

In 2016/17 we will:

- Have completed the development and have fully operational the science laboratory floors in the Hamilton building
- With our partner and landlord Port of Nelson, have completed the development of the replacement Nelson site
- Roll out new IT infrastructure solutions to support our Ways of Working programme, including the doubling of wireless connectivity across sites, new telephony and data and information management capabilities.

#### FINANCIAL RESILIENCE — SUSTAINING PROFITABILITY TO CREATE FLEXIBILITY

Over the five-year period of this Statement of Corporate Intent, the projection is for growth in commercial science revenue, growth in royalty income as the kiwifruit industry recovers from the Psa disease incursion, and continued cost containment and productivity measures. Overall profitability will continue to increase over the five-year period.

In 2016/17 we will:

- Grow revenue by 4% (from \$135 million to \$140 million)
- Grow operating profit (EBITDA) by 10% (from \$13.5 million to \$14.8 million).

## OUR ROLE

The following excerpt from Plant & Food Research's Statement of Core Purpose defines our role, purpose and scope. A copy of the full Statement of Core Purpose is available online. [www.plantandfood.co.nz/file/pfr-scp.pdf](http://www.plantandfood.co.nz/file/pfr-scp.pdf)

### PURPOSE

Plant & Food Research's purpose is to enhance the value and productivity of New Zealand's horticultural, arable, seafood and food and beverage industries to contribute to economic growth and the environmental and social prosperity of New Zealand.

### OUTCOMES

Plant & Food Research will fulfil its purpose through the provision of research and transfer of technology and knowledge in partnership with key stakeholders including industry, government and Māori to:

- Increase the value of these industry sectors to the New Zealand economy through the development of high-value products and processes that meet current and future global market needs
- Protect and enhance market access in New Zealand's horticultural and arable sectors
- Sustain growth in these industry sectors, driving ongoing efficiency gains with the development of environmentally resilient production systems.

### SCOPE

To achieve these outcomes, Plant & Food Research is the lead CRI in the following areas:

- Novel fruit, vegetable and crop cultivars for the horticultural and arable industries
- Sustainable production and processing systems for the horticultural and arable industries
- Plant- and seafood-based foods, ingredients and biomaterials.

Plant & Food Research will work with other research providers and end-users to contribute to the development of the following areas:

- Biosecurity, land, soil and freshwater management
- Climate change adaptation
- Seafood, and food and beverage sectors (including foods for human nutrition and health, and food technologies)
- Pastoral forage varieties.

## OUR CONTEXT

### THE EXPECTATIONS OF OUR SHAREHOLDING MINISTERS ARE CLEAR

This Statement of Corporate Intent charts our goals, strategies and priorities to meet the expectations of our Shareholding Ministers.

The Government's expectations are clear: Plant & Food Research has a vital role to play in contributing to New Zealand's economic growth, and social and environmental prosperity. At the same time, we must operate sustainably as a business.

### SIZE AND SIGNIFICANCE OF OUR SECTORS

The industry sectors highlighted in our Statement of Core Purpose make a significant contribution to New Zealand.

- The food and beverage sector contributes about 10% of New Zealand's GDP, and (at \$23 billion per annum) nearly half New Zealand's total exports.
- The horticulture industry has a turnover of \$6.6 billion per annum<sup>3</sup>, with a strategy to grow to \$10 billion by 2020. Exports reached a total of \$4.3 billion in 2015.
- Wine sector exports were \$1.5 billion in 2015, up 14% on 2014.
- With a farm gate value of \$1.5 billion per annum<sup>4</sup>, the arable sector is a key contributor to the wider food and beverage sector, and mixed cropping systems make important contributions to the profitability and sustainability of dairy and other livestock production systems.
- Seafood industry exports are \$1.71 billion per annum<sup>5</sup>, with the aims of doubling that through growth in aquaculture, and of increasing profitability with a lower environmental impact in the wild catch sector.

### OPERATING ENVIRONMENT

We expect the current business environment to continue for at least the first part of the five-year period, characterised by strong growth in New Zealand food and beverage exports led by markets in Asia, ongoing fiscal restraint, and modest growth in both public and private sector investment in research in New Zealand and elsewhere.

Key markets for the food industry sectors we support will continue along current trends. Rising incomes in Asia continue to be a major driver of New Zealand's export growth, and markets in Asia will continue to increase their share of New Zealand exports. Recent and projected improvements in market access will be important factors in this. Exports to more mature markets in Europe, Japan and the USA will still be important and will vary with local and global supply and demand factors.

<sup>3</sup> FreshFacts 2015 [www.freshfacts.co.nz/](http://www.freshfacts.co.nz/)

<sup>4</sup> <http://s3.documentcloud.org/documents/2094757/mpi-report.pdf>

<sup>5</sup> Statistics New Zealand

Global consumer and market trends continue to influence the value and volume of New Zealand food and beverage exports. To help our sectors to meet current and increased demand for exports, we deliver research to maximise export opportunities, improve productivity, increase sustainable resource use, and protect New Zealand from biological risks.

Delivering impact in these areas continues to be a major driver of our strategy, research activities, investment decisions, and industry and Government interactions.

We will work closely with industry to prioritise resources for existing and new markets. We expect increased demand for research in areas such as market access, new cultivar development and consumer and sensory science. We are projecting overall growth in investment in research by our New Zealand industry clients, with some increases and decreases in different sectors during the period of this plan.

Our plans to build engagement with iwi, hapū, tribal incorporations and other Māori organisations to support their aspirations with relevant science, technology and commercial knowledge, are delivering success.

Recent biosecurity and food safety threats have highlighted the importance of our bioprotection and sustainable production research to ensure the resilience of our industries. Pest and disease threats are always present, and food industries around the world face the challenge of feeding growing populations with a lighter environmental footprint.

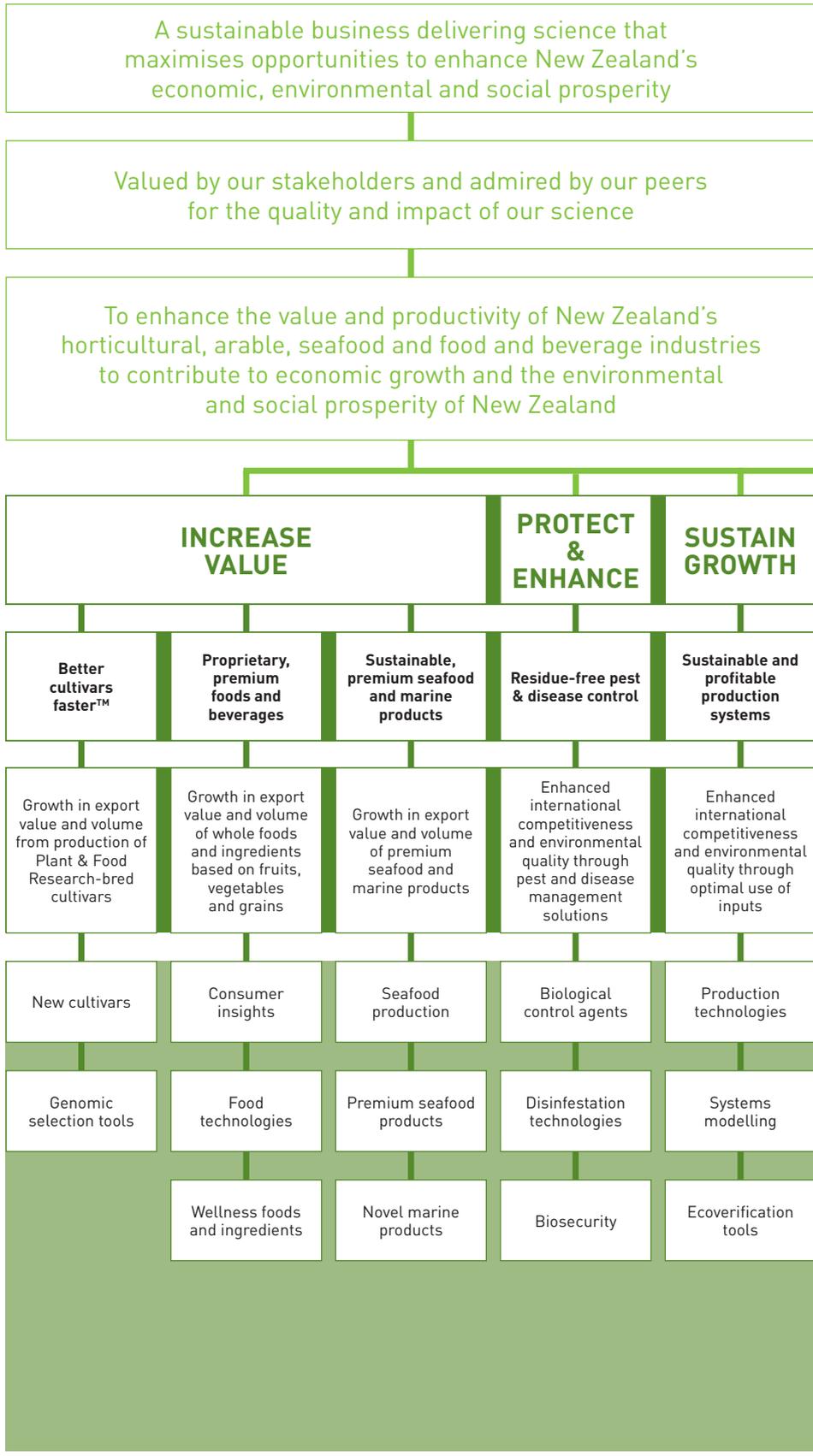
Within the kiwifruit industry there is continuing confidence in the recovery from the impact of the Psa disease incursion, backed by new orchard management practices and new cultivars that are less susceptible to Psa and deliver higher yields.

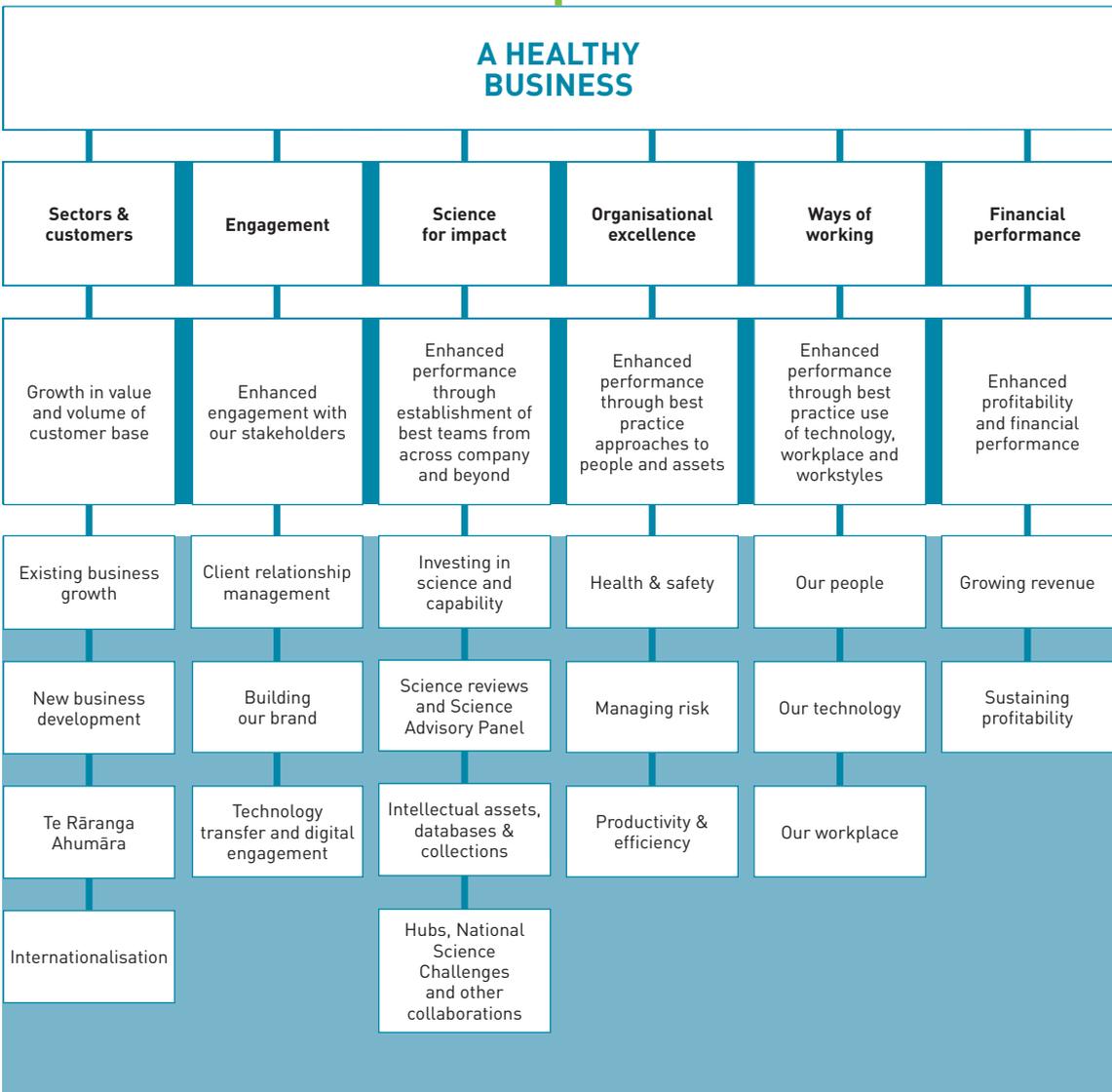
Internationally, Plant & Food Research is increasing its activities in ways that directly support our New Zealand stakeholders. We will continue to build and participate in strong international research collaborations in programmes relevant to our Core Purpose. We will also continue to grow our research collaborations and commercial research contracting in countries with which New Zealand has strong economic ties and interests, including Australia, China and Southeast Asia.

Collaboration with research and industry partners through New Zealand's National Science Challenges will be an important focus for us in the future, particularly through participation in High Value Nutrition, New Zealand's Biological Heritage, and Our Land and Water. We will continue to engage with and support the work of Callaghan Innovation as well as the hub-based collaborations at the Lincoln campus and FoodHQ® in Palmerston North. The KiwiNet partnership is a valuable means of accessing connections with businesses, investors, collaborators and commercialisation expertise to help to turn our technologies and expertise into innovative products and services.

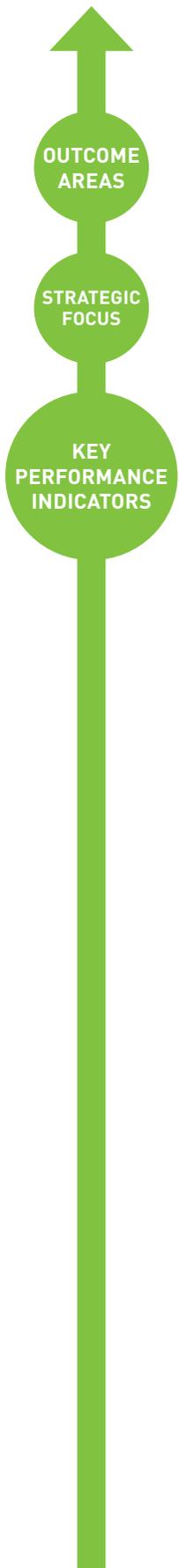
Plant & Food Research will continue to access leading international science and resources, and be a vehicle for introducing new technologies and concepts to New Zealand. This will be achieved through participation and partnerships with global programmes and international research consortia in areas of relevance for our science and for New Zealand.

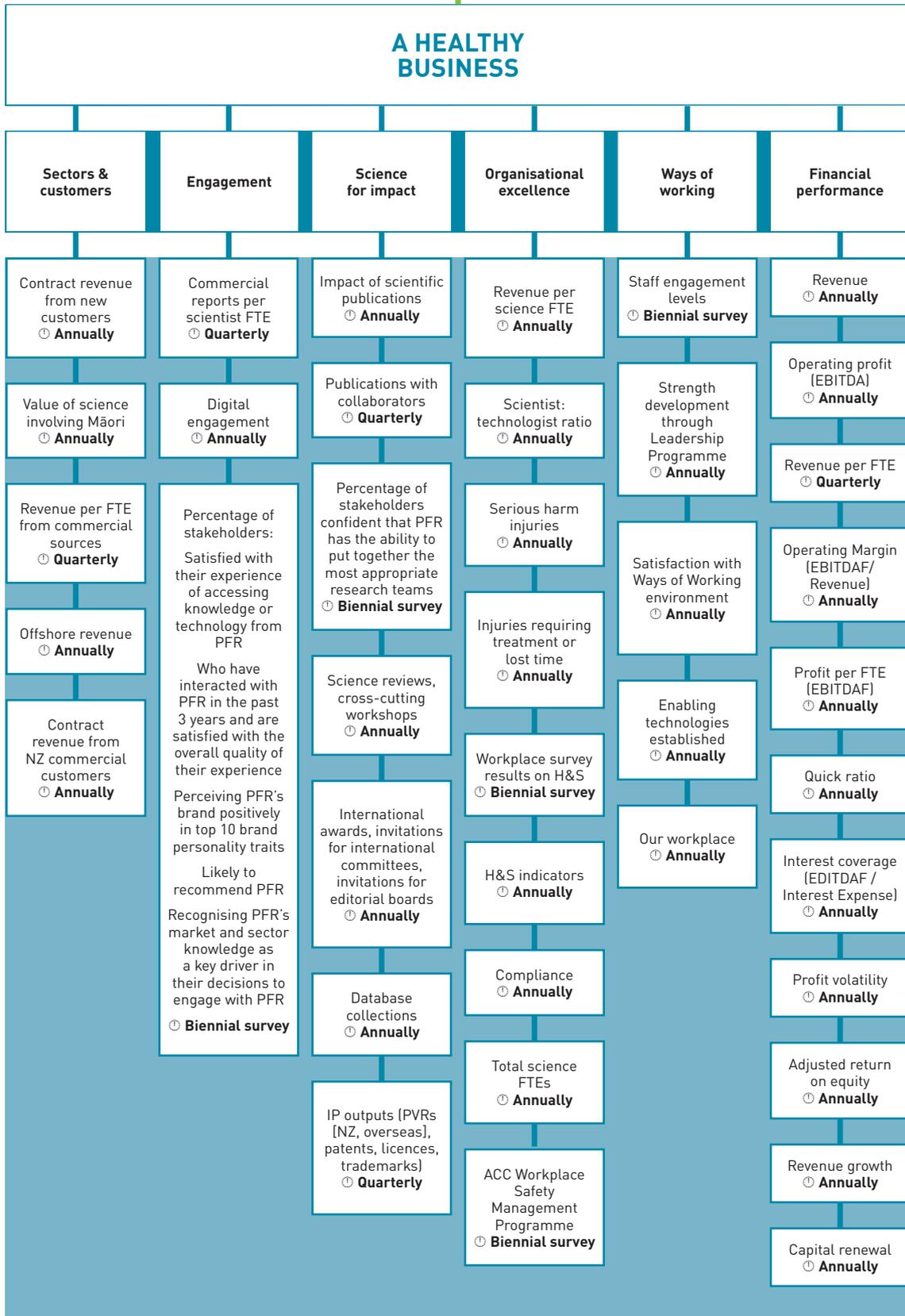
# OUR STRATEGY ROADMAP





# OUR KEY PERFORMANCE INDICATORS





# OUR PERFORMANCE

## DELIVERING IMPACT

We invest in five science strategic focus areas for industry that drive our science strategies, resource allocation and performance assessment. Investments are focused on delivering science in the following areas:

Better cultivars faster™	Residue-free pest and disease control	More sustainable and profitable systems	Proprietary foods with premium prices	Sustainable premium seafood and marine products
<p>An evolving platform of breeding tools delivering cultivars, against industry-agreed development targets and concepts.</p> <p>A growing portfolio of evidence for genomic selection technologies being used to support breeding in New Zealand plant-based food crops.</p>	<p>Progress towards the development of new tools and systems for biologically based pest and disease control.</p> <p>Steps towards new cultivars with targeted pest and disease resistance.</p> <p>Progress towards the development of new 'safe' disinfestation technologies.</p> <p>Improved biosecurity risk assessments, detection technologies, optimised surveillance approaches and new tools for readiness, response and eradication.</p>	<p>Progress towards improved understanding of a wide range of arable, vegetable, forage and fruit crop production systems, and the optimization of fresh product supply.</p> <p>Translation of these insights into practical tools such as decision support systems and sensor technologies to underpin profitable production systems, enhance supply chain performance, improve customer experience, and minimise environmental impact.</p>	<p>In-market consumer insights, alongside in depth knowledge of product attributes to guide development/ placement of premium New Zealand foods for export markets.</p> <p>Progress towards the development of new tools and technologies to deliver premium food products effectively to export markets.</p> <p>Steps towards the development of functional foods/ ingredients and biomaterials, utilising knowledge of raw materials, nutrition, health and wellness, developed with local and multinational companies.</p>	<p>Progress towards new harvest and postharvest technologies to support higher-value seafood products.</p> <p>Steps towards the development of new technologies to support extended shelf-life and food safety.</p> <p>Understanding and responding to consumer preferences for seafood and seafood-based products.</p> <p>Progress towards the development of extraction technologies with maximum value capture and minimised wastage to produce novel high-value products.</p>

This science generates impacts for our key sectors (kiwifruit, seafood, wine, pipfruit, avocado, summerfruit, berryfruit, potato, vegetable, onion, consumer & health, honey & hives, mixed cropping, biosecurity, environment) from the application of new knowledge, products, practices and technologies.

We use a comprehensive framework for research investment and portfolio management to determine the research programmes in which we will invest and for which we will seek funding, across the outcome areas on which we focus and the sectors with which we work. The goals of this framework are to optimise the allocation of the resources available to us and to maximise the impact of our research for the benefit of New Zealand.

As all our research is involved in delivering on the three outcomes identified in our Statement of Core Purpose, we use this framework for our total research portfolio from all funding sources, not just the Core-funded portion.

Plant & Food Research's research investment and portfolio management strategy follows seven key principles:

1. Impact/Outcome orientation – research must be “on strategy”. Investment decisions will be aligned and sized to strategic targets and be driven by the expected impact for the horticultural, arable and seafood industries in line with the agreed outcomes to which Plant & Food Research contributes
2. Science excellence – the quality of our science and our capacity to deliver it
3. Transparency – research areas will be evaluated on a set of criteria that will be communicated to the relevant stakeholders effectively
4. Flexibility – Plant & Food Research will be able to adapt and respond to changing conditions and priorities
5. Transactional efficiency
6. Encouragement of collaboration – among research and industry, and among researchers
7. Monitoring and evaluation – to assess the extent to which Plant & Food Research is delivering research outputs and impacts that align with the high-level outcomes defined in our Statement of Core Purpose.

This process is central to Plant & Food Research's requirements for management, visibility and accountability of research investments to implement our strategies for the delivery of impacts and outcomes with excellent science.

Appendix 1 sets out the sector impact targets and critical steps for each of the high-level outcome areas in our Statement of Core Purpose.

## KEY ACTIVITIES

- Critical steps to delivering impact for our sectors from across our five science strategic focus areas and all revenue sources are outlined in Appendix 1.
- Investment of Core funding in a portfolio of projects that supports the delivery of impact for our sectors (Table 1).

**Table 1: Plant & Food Research Core funding investment mapped by Government budget output expense categories – sector-aligned, Future Science and National Science Challenge (NSC)-aligned research activities.**

<b>Biological Industries</b>	<b>Category</b>		
Primary industry productivity and sustainability	Research	\$29,169,734	
	NSC: High value nutrition	\$500,000	
	NSC: New Zealand’s biological heritage	\$1,655,593	
	NSC: Our land and water	\$2,065,778	
<b>High-value food and biological products and processes</b>	Research	\$2,949,695	
	NSC: High value nutrition	\$1,500,000	
	NSC: New Zealand’s biological heritage	\$500,000	
	NSC: Our land and water	-	
	NSC: Resilience to nature’s challenges	-	
<b>Environmental Research</b>	<b>Category</b>		
	Land and fresh water (including terrestrial ecosystems)	Research	\$544,360
		NSC: High value nutrition	-
		NSC: New Zealand’s biological heritage	\$1,536,114
	NSC: Our land and water	\$2,303,697	
	<b>Category</b>		
	Collections and Databases	\$378,008	
	<b>Total</b>	<b>\$43,102,978</b>	

## PERFORMANCE TARGETS

85% of critical steps to impact delivered by 30 June 2017. **Annually.**

Total Plant & Food Research impact assessment. **Three-yearly** (a baseline for this metric was set during the 2015/16 financial year and in the 2016/17 financial year we will further refine and extend the analysis to include value delivered for the diverse range of smaller sectors with which we partner).

At least nine impact case studies. **Annually.**

A glass of red wine is shown in the lower-left corner of the image. A large, semi-transparent green circle is overlaid on the right side of the glass, containing white text. The background is plain white.

**SECTORS AND  
CUSTOMERS –  
GROWING THE VALUE  
AND VOLUME OF OUR  
CUSTOMER BASE**

## OUR CUSTOMERS

Our science generates impacts for our key sectors:

- Kiwifruit
- Seafood
- Wine
- Pipfruit
- Avocado
- Summerfruit
- Berryfruit
- Potato
- Vegetable
- Onion
- Honey & hive
- Mixed cropping.

Sector-aligned research constitutes 80% of our research portfolio. It is based on joint investment and dialogue with the sectors and key stakeholders towards agreed outcomes and impacts. The focus of this category is the outcome areas in Plant & Food Research's Statement of Core Purpose, and industry and sector strategies, and areas in which we have the necessary capability to meet industry and sector needs. We also invest in pan-sector research platforms that exploit opportunities and address needs that span multiple sectors. These platforms include consumer & health, farming within limits, enabling technologies, and biosecurity.

In the past year (2015/16), detailed road maps of sector impact targets, supported by critical steps along the way to these impacts, have been refreshed to guide monitoring and evaluation activities. Our targets are derived from the strategies and targets of the relevant industry/sector organisations and firms, so our research is fully part of the achievement of their strategies.

## GROWING EXISTING BUSINESS PARTNERSHIPS

### CURRENT SITUATION AND VISION

To achieve the link between desired impacts and research outcomes, we need strong partnerships with our national and international clients and stakeholders. Our aim is to have close relationships with our partners so that we:

1. Jointly create longer term plans for both organisations, based on a shared view of market and consumer needs and what science can provide
2. Work collaboratively to convert those long-term plans effectively into tangible actions, using the capabilities of both organisations
3. Jointly review and monitor progress, ensuring that research outputs are effectively communicated and taken up, commercial outcomes achieved, and long-term impacts secured.

Along with our industry partners, we are part of a constantly evolving global economy. Change is ongoing, driven by global markets (for example, the rise of China) and by technological advances. A number of the sectors with which we work at Plant & Food Research are benefiting, particularly the food and beverage sector. New Zealand's exports are becoming more diverse, with emerging strengths in processed foods, high technology manufacturing and a range of commercial services. Our export mix is considerably more diverse today than in the past. Foods and beverages remain the heart of New Zealand's exports, with our primary industry base becoming increasingly diversified through high growth, high-value fruit, vegetable and seafood products.

Our role is to deliver R&D that supports the growth of our key industries, increasing profitability by reducing costs or adding value. Our scientists are working on both sides of this equation to demonstrate the return on investment (ROI) of R&D: on the one hand helping to fight industry issues like Psa disease in kiwifruit, the tomato potato psyllid (TPP) in potatoes, biennial bearing in avocados and the high cost of vineyard management; and on the other hand revolutionising the way the world fishes, understanding the health benefits of New Zealand berryfruits, and developing new and novel fruit cultivars.

Ultimately, whether we're delivering new cultivars from our breeding programmes, protecting crops from pests and diseases, increasing sustainability, or adding value through food innovation, our drive remains the same – the success of our industry partners through excellent science.

#### KEY ACTIVITIES

- Develop strategic plans jointly with industry sectors and peak industry bodies to contribute to their growth aspirations and targets, with the aim of doubling the value of food exports by that sector through innovation
- Develop and update impact roadmaps with each sector, charting the timeline of initiatives and critical steps required from R&D and industry implementation to meet future growth targets
- Leverage Government investment initiatives (the Primary Growth Partnership, MBIE Partnership Funding, etc.) to accelerate R&D to reach those goals (e.g. in wine, seafood, avocados, pipfruit, forage brassicas)
- Leverage Plant & Food Research Core Funding to focus industry R&D on growth in price premiums and valuable offshore export markets
- Work with emerging sectors (e.g. avocados, onions) and small-to-medium sized enterprises to develop a stronger export focus and to build increased R&D investment to create premium, added-value products
- Deepen existing partnerships through joint appointments to key leadership roles (e.g. kiwifruit) to create more synergies
- Encourage greater staff engagement with commercial customers and refocusing of science targets towards impact for industry.

Against a background of no significant growth in MBIE funding, we are attracting significantly more revenue from our existing commercial domestic customers. The average annual growth rate calculated for this commercial New Zealand revenue growth over the Business Plan period from 2016/17 to 2020/21 will be significant, at 7%. This is in line with the growth rate achieved in recent years.

## PERFORMANCE TARGETS

Contracted revenue from New Zealand commercial customers is \$39.9 million. **Annually.**

Revenue per FTE from commercial sources is \$50,000–\$54,000. **Quarterly.**

## NEW BUSINESS DEVELOPMENT

### CURRENT SITUATION AND VISION

In addition to our work to deepen our relationships with our existing clients, we are actively engaged in increasing our impact by building new relationships with organisations who are not currently our clients.

Our five science strategic focus areas offer the potential to create substantial value for a wider range of organisations. In some cases the pathway to value creation is clear, but in other cases substantial work is required to understand market demands, to determine how our science can meet those demands, and to identify which organisations have the resources and appetite to work with us to develop and apply the science to deliver impact and create value.

Some of these potential new clients are New Zealand-based organisations, while others are international organisations with a connection to New Zealand. Over the last 3 years we have focused on:

- Understanding consumer preferences and how science and technology can support premium price positions in the marketplace
- Attracting multi-national investment into New Zealand – as a result of this work, three companies are now investing collectively over \$2 million per annum of new investment into New Zealand science
- Supporting the New Zealand Government’s international interests through the provision of international development projects for the Ministry of Foreign Affairs and Trade
- Growing our linkages in China and Australia (see our internationalisation initiative below).

### KEY ACTIVITIES

- Creating approaches to enable new investment in small but high potential sectors
- Testing a new approach for co-investment in science and product development with SMEs
- Continuing our consumer insight work to identify new investment opportunities for New Zealand businesses
- Developing a commercialisation strategy for new digital horticultural technologies
- Continuing our multi-national engagement efforts and supporting the work of the MBIE, the Lincoln Hub and FoodHQ® in this area.

## PERFORMANCE TARGETS

Revenue from new customers is \$2.7 million in 2016/17. **Annually.**



## HE KAI KEI AKU RINGA HE KAI MO TE ORA HE KAI MO TE AO

Food from our hands, food for health, food for the world.



Investment in research that will benefit Māori spans our five outcome-oriented research portfolios and delivers value to a range of Māori business interests. Te Rārangā Ahumāra is our strategy for contributing to the economic, social and environmental aspirations of Māori.

Our refreshed strategy is guiding our efforts to support the growth of Māori enterprises through Māori-relevant science and innovation in food and related areas.

We have identified three goals that address economic, environmental and social/cultural needs to create greater impact with Māori:

- Introduce new technologies to business-ready Māori enterprises to grow the value and productivity of their assets
- Develop new approaches to utilise taonga Māori to create new Māori business opportunities in food
- Increase understanding of Research, Science and Technology (RS&T) opportunities for Māori customers, and embed understanding of Māori throughout Plant & Food Research.

Strategic partnership agreements with key groups have been established to support these goals:

- Wakatū Incorporation, with significant investments in seafood, wine, pipfruit, hops and processed foods through its Kono and Tohu brands
- Tūhono Whenua, developing new fruit crop initiatives and land conversions
- Te Tumu Paeroa, to develop new land use suitability methodology.

## KEY ACTIVITIES

Ongoing activities include:

- Grow new contract R&D with business-ready Māori organisations, Government and other funders
- Increase the connection of our existing sector-based activity with business-ready Māori organisations and enterprises so that the activity has greater direct impact for them
- Increase Māori participation in science through fellowships and studentships to grow a new generation of rangatahi who are connected with science

- Support the Government's regional economic growth initiative by concentrating our activity in three regions: (1) top of the South Island (Marlborough, Nelson, Motueka), to contribute to the development of Māori land holdings and businesses in high-value seafood, wine, fruit crops and processed food products; (2) North Island East Coast (East Cape, Bay of Plenty, Hawke's Bay), to develop seafood, horticulture and vegetable food opportunities; and (3) Northland, to develop seafood, horticulture and opportunities from mānuka.

New initiatives in 2016/17 include:

- Develop further strategic relationships with key Māori representative groups in food and regional economic growth
- Extend the Nuku ki te Puku Māori food innovation network in partnership with Callaghan Innovation to grow innovation in Māori food businesses
- Appoint a new senior Māori researcher
- Expand membership of our Te Rāanga Ahumāra oversight team, through inclusion of General Managers of Science, to enable increased engagement with Māori decision makers and deployment of resources
- Invest Core Funding in Māori initiatives
- Increase Māori scholarships and internships to grow the number of young Māori in Plant & Food Research and to build science knowledge in rangatahi.

## PERFORMANCE TARGETS

By 2018, the value of our science involving Māori is \$10 million per annum. **Annually.**

As a step towards this, the 2016/17 target for the value of our science involving Māori is \$4 million per annum. This represents \$1 million per annum growth over the current 2015/16 value.

## INTERNATIONALISATION

### CURRENT SITUATION AND VISION

Plant & Food Research will continue to have a strong international dimension to its activities. The New Zealand sectors and enterprises we support compete in international markets and many have global aspirations. In addition, science is highly connected internationally and this is increasing. To best deliver on our Core Purpose, we need to operate internationally as well as in New Zealand.

Our international activities are focused on four key objectives:

- Providing in-market and behind-borders support for New Zealand companies, industries and licensees
- Providing access to world-leading science capabilities
- Commercialising intellectual property to realise value where the New Zealand industry does not have capacity to do so, and in ways that create opportunities for New Zealand
- Directly supporting the New Zealand Government's interests and priorities.

These objectives shape our strategies and activities in any given international territory. Our priority territories are:

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## AUSTRALIA

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Australia has close business, economic and governmental ties with New Zealand and is the home of a number of high-quality research organisations in areas relevant to New Zealand. In addition, the Australian and New Zealand horticultural industries have a growing track record of collaboration on common research interests as wide ranging as crop productivity, pests, fruit breeding and irrigation (a number of which were initiated by Plant & Food Research). We will continue to work with industries, research organisations and funders in both countries to build this mutually beneficial collaboration and to diversify the sources of funding for research that benefits our New Zealand stakeholders. We expect to see continued growth in activities in Australia.

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## NORTH AMERICA AND EUROPE

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North America and Europe offer a broad range of opportunities that strongly support our core purpose, including behind-borders support for New Zealand companies, international science collaboration, and technology licensing opportunities. Our focus will be on expanding and deepening these collaborations with selected research organisations, clients and licensees.

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## ASIA

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With its proximity, strong growth in economic and in science capabilities and its importance for New Zealand exporters, Asia is also a priority region for Plant & Food Research's international business. We focus our efforts on selected countries and territories, with the mix of behind-borders support for New Zealand companies, international science collaboration, and support for the New Zealand Government's foreign affairs and trade agenda varying among the countries on which we focus.

We continue to expand our engagement with China, building on our long-standing research relationships with institutes there. The initiatives involve research collaboration that directly supports New Zealand businesses in that market, creates opportunities for New Zealand businesses, and supports the New Zealand's Government's China strategy.

Singapore is emerging as a focus for food innovation research in the region. We will continue established links and exchanges with research organisations in other countries, principally Japan and the Republic of Korea.

Our involvement in the New Zealand Government's foreign aid programme will be mainly in Asia and the Pacific Island states, reflecting the Government's priorities.

## KEY ACTIVITIES

- Support our licensees as they build offshore production bases for key fruit and vegetable varieties, to provide year-round product supply to retailers
- Build the scope and scale of projects operating through the recently developed joint laboratories in China
- Grow our support for the Ministry of Foreign Affairs and Trade (MFAT)'s international development programme.

## PERFORMANCE TARGETS

By 2020, we receive 20% of our revenue from offshore. As a step towards this, the 2016/17 target for the value of our offshore revenue is 15%. **Annually.**



**ENGAGEMENT –  
PARTNERING FOR  
SUCCESS**

## CLIENT RELATIONSHIP MANAGEMENT

### CURRENT SITUATION AND VISION

Our aim is to have close relationships with our clients so that we can develop strong partnerships that convert research into the desired impacts. Our approach is people-based, with cross-functional teams working with clients to understand their needs and to develop science programmes to meet those needs. This is aided by the geographic spread of our organisation, with sites in most of the key growing regions in New Zealand.

We work to align our interactions with clients to the nature of the relationships. For large, complex and long-term relationships, we often use formal governance structures designed both to oversee the work being undertaken and to ensure that the relationship is healthy and growing. For smaller clients, who prefer a single point of contact, we have dedicated account managers.

In all cases, our aim is to grow understanding, trust and value creation.

### KEY ACTIVITIES

In the 2016/17 financial year, we will focus on:

- Strengthening our partnerships with some of our largest clients through joint appointments and secondments
- Enhancing our ability to measure client perceptions of Plant & Food Research, their satisfaction with our work, and the economic value created through the application of our science
- Exploring new models for engaging with smaller enterprises.

### PERFORMANCE TARGETS

Outperform the CRI average for Overall satisfaction and Satisfaction with accessing knowledge or technology. **Biennial survey data.**

Achieve specific stakeholder sentiment in the key band 'Likelihood to recommend': 80–90%.  
**Biennial survey data.**

## BUILDING OUR BRAND

### CURRENT SITUATION AND VISION

During 2013/14 and 2014/15 we explored key areas of customer sentiment toward the overall Plant & Food Research brand. This work used customer and internal survey data to help to determine the role our brand plays in engaging stakeholders and staff and ultimately in the value of our brand to the Shareholder. Our research has focused on:

- The reasons customers choose Plant & Food Research
- Perceptions of Plant & Food Research's affordability versus those of other potential research providers

- The core traits recognised by customers and staff as forming Plant & Food Research's brand personality
- Plant & Food Research's relative brand strength compared with those of other New Zealand companies.

Our research has shown that customers perceive a range of potential options and partners for their R&D investment and are choosing Plant & Food Research based on well-defined perceptions of our capability and the quality of existing relationships.

In addition, there is a clear, stable perception amongst both staff and stakeholder groups of the key elements of Plant & Food Research's brand personality. Themes common across both groups include professional, expert, collaborative and connected.

External advice tells us that the overall set of words selected in the survey reflects a highly positive perception of Plant & Food Research as "competent, trusted and knowledgeable". Benchmarking against other New Zealand companies shows customer willingness to promote Plant & Food Research is as high, or higher, than those recorded by a large number of well-known New Zealand-based consumer brands.

Our vision is to enhance our understanding of the Plant & Food Research brand further and to leverage that knowledge in marketing and customer engagement activities. We believe this activity will help us to connect more closely with clients, to deepen relationships, and to enhance customer engagement and willingness to invest.

#### KEY ACTIVITIES

In 2016/17 we will continue to explore customer perceptions of our brand through quantitative and qualitative research, with a view to strengthening the connection between our brand and the innovation outcomes sought by client sectors.

- Repeat our established set of brand questions in the MBIE-led CRI stakeholder survey
- Engage directly with key partners to develop a qualitative view of the functional and emotional values our brand represents to them.

#### PERFORMANCE TARGETS

Achieve 90% positive brand perception in top 10 brand personality traits as selected by stakeholders in the MBIE survey. **Biennial survey data.**

Customers surveyed recognise Plant & Food Research's market and sector knowledge as a key driver in their decisions to engage with Plant & Food Research. Meet or exceed benchmark established in 2015/16 survey. **Biennial survey data.**

## TECHNOLOGY TRANSFER

### CURRENT SITUATION AND VISION

The majority of our technology transfer will continue to be direct to our clients, partners, and other end-users via a range of mechanisms, including reports, demonstrations and field days, training, and licensing. The technology transfer mechanisms will be agreed with our industry partners as part of our partner planning process, and incorporated into the research programme design and delivery. The adoption and impact assessments outlined in our science strategies will measure the results.

There will be some instances where scientific discoveries do not fit with any current stakeholders, or alternatively our plans are not sufficiently advanced to cover all eventualities. In these cases we will seek to commercialise the intellectual property in ways that maximise both the positive impact for New Zealand and a share of the value for Plant & Food Research, without exposing us to inappropriate risk.

### DIGITAL ENGAGEMENT

The world is going digital, and our stakeholders are no exception to that trend. Over the last few years we have developed a significant web presence through both our website and social media channels. Our focus to date has been on communicating the impact of our science. In the future we expect to see digital channels becoming an increasingly important vehicle for technology transfer, not just for communication. During 2015/16 we initiated work to explore this new digital dimension of technology transfer through the development of mobile applications.

### KEY ACTIVITIES

- Plan for technology transfer when designing research projects
- Actively license products and technology that flow from our research
- Take a design-based approach to review the delivery of scientific reports, including through digital channels.

### PERFORMANCE TARGETS

Commercial reports per scientist FTE is 0.71–0.75. **Quarterly.**

Narrative on our progress towards embedding a digital dimension to support our technology transfer activities. **Annually.**



**SCIENCE FOR IMPACT –  
SCIENCE EXCELLENCE  
AND BUILDING THE  
BEST TEAMS**

## INVESTING IN FUTURE SCIENCE AND CAPABILITY

### CURRENT SITUATION AND VISION

While our research portfolio is principally sector-aligned, we invest 20–25% of our Core Funding in Future Science, which supports higher risk/reward initiatives in new science, long-term fundamental research, over-the-horizon future-oriented initiatives, and the development and refreshing of science capability.

Fundamental science continues to provide the new ideas and capabilities that our sectors will require in the future. As well as Future Science, some basic research is also supported by the sectors. In total, Plant & Food Research investment in basic science is in the order of 28% of total science investment.

For our Future Science, we have moved to a targeted Request for Proposals process to better align capability development with the strategic goals of the organisation. In addition, we continue to promote our Future Science internally and to sectors, to transfer knowledge and to publicise the value created by fundamental research to our stakeholders.

With revenue from the Crown expected to remain static over the next 5 years, the development of new areas will be achieved through a combination of redirecting existing activity and growth through targeted recruitment, supported by additional commercial revenue and internal investments as royalty income grows. We will also access capability through collaboration with national and international partners, particularly where they have established strengths in areas of common interest.

More generally, we are strongly committed to growing a vibrant world-class science and technology-literate workforce at Plant & Food Research, with people who create new ideas and develop technology and opportunities from science in our areas of focus for the benefit of New Zealand.

To do this we will place a strong emphasis on achievement and on science and commercial outputs (papers, people, patents and products). We are setting high standards for achievement by our staff and will reward drive and energy with improved remuneration, state-of-the-art facilities and well-resourced technical teams. Lifting the ratio of technicians and technologists to scientists will ensure teams are well placed to perform optimally. This goal is supported by ongoing programmes targeted at promising science students.

### KEY ACTIVITIES

- Invest \$10.033 million of Core funding in a portfolio of Future Science projects, with a focus on data management, digital agriculture and great ideas
- Use the results of the capability audit to inform the development of a five-year road map for Future Science and its targets.

### PERFORMANCE TARGETS

Impact of scientific publications calculated using the mean citation score (SciMago index) for journals in which Plant & Food Research papers are published is 2.8–2.9. **Annually.**

Number of international awards is 10–15; invitations for international committees are 7–12; invitations for editorial boards are 5–10. **Annually.**

Percentage of stakeholders confident that Plant & Food Research has the ability to put together the most appropriate research teams outperforms the CRI average. **Biennial survey data.**

## NATIONAL SCIENCE CHALLENGES, HUBS, AND OTHER COLLABORATIONS

### CURRENT SITUATION AND VISION

New Zealand's National Science Challenges are an important focus for us. We participate actively in the Challenges and coordinate and align relevant resources and activities within the scope of our Statement of Core Purpose. Plant & Food Research is playing a leading role in three of the ten Challenges (High Value Nutrition, New Zealand's Biological Heritage, and Our Land and Water) and is a participant in most of the other Challenges (including Aging Well, A Better Start, Healthier Lives, Sustainable Seas and Science for Technological Innovation). Table 1 (page 22) outlines the alignment of Core funding with National Science Challenges that relate to our Core Purpose. We have representation at General Manager level on Governance and Research Committees in High Value Nutrition, New Zealand's Biological Heritage, and Our Land and Water.

We will continue to work with and support Callaghan Innovation. We have technologies and capabilities that, individually or in combination with other technologies, are relevant to the high value manufacturing sectors and industries on which Callaghan Innovation focuses. We are contributing to several of the National Technology Networks that Callaghan Innovation is establishing, such as those for food and sensing.

A third collaboration priority in this planning period will be the hub-based collaborations FoodHQ® in Palmerston North, and the one at the Lincoln campus. The focus areas of these two hubs are complementary to each other, and well aligned with Plant & Food Research's strategy and Statement of Core Purpose. We will continue to play a leading role in the governance, development and operation of these collaborations. During this planning period we expect further progress in discussions on investment in common or complementary infrastructure and facilities. FoodHQ® is already established and in its first two years has achieved good results, with new industry clients and new members joining.

As one of the founding partners Plant & Food Research was a signatory to the Lincoln Hub Programme Business that was submitted in December 2015 and subsequently endorsed by Ministers. To start implementation, with the other partners we then appointed a new independent Chair and interim governance group to develop the operating model for Hub, and progressed key customer-facing projects. During the coming period we will work with the other partners to activate the agreed model, a hub entity, and collaboration projects. This is well advanced and we expect implementation will commence at the beginning of 2016/17.

The KiwiNet partnership will continue to be a valuable means of accessing connections with businesses, investors, collaborators and commercialisation expertise, to help to turn our technologies and expertise into innovative products and services. We are increasingly using KiwiNet to showcase IP and technologies available for commercialisation or for use with other technologies.

Plant & Food Research will continue to access leading international science and resources, and to be a vehicle for introducing new technologies and concepts to New Zealand. This will be achieved through participation and partnerships with global programmes and international research consortia in areas of relevance for our science and for New Zealand.

## KEY ACTIVITIES

- Maintain our support for the National Science Challenges, Hubs and KiwiNet through the provision of senior staff time in governance roles and through alignment of our activities with those of these collaborations
- Further develop our strategic collaborations with world-class research organisations (e.g. Wageningen University, Chinese Academy of Agricultural Sciences)
- With the other Lincoln Hub partners, activate the agreed operating model, a hub entity, and key collaboration project.

## PERFORMANCE TARGETS

Publications with collaborators (% International/New Zealand and CRI) are 70–80%. **Quarterly.**

## SCIENCE REVIEWS AND SCIENCE ADVISORY PANEL

### CURRENT SITUATION AND VISION

We will continue our annual programme of science reviews to assess matters such as science quality, performance and strategy, relationships with commercial opportunities, and future needs in selected science areas. We will use internal and external reviewers, including members of our Science Advisory Panel. The Panel's current members are:

- Prof. Marston Conder, University of Auckland (Chair)
- Prof. Cathie Martin, John Innes Centre, United Kingdom
- Prof. Ernst van den Ende, Plant Research International/Wageningen University, The Netherlands
- Prof. Alistair Robertson, formerly of CSIRO, Australia.

In 2015/16 we commissioned the Panel to provide advice on precision agriculture. A key focus for 2016/17 is to finalise and to begin the implementation of our strategy in this area, with ongoing input from the Panel.

In 2016/17 we also plan to initiate a series of cross-cutting workshops. By bringing together researchers from different disciplines to interact on a new and emerging topic, we hope to generate novel future-focused ideas and new opportunities.

## KEY ACTIVITIES

- Complete the audit of Plant & Food Research's science capabilities
- Finalise the strategy for precision agriculture within Plant & Food Research and initiate its implementation.

## PERFORMANCE TARGETS

Four science reviews by 30 June 2017. **Annually.**

Two cross-cutting workshops by 30 June 2017. **Annually.**

## INTELLECTUAL ASSETS, DATABASES AND COLLECTIONS

### CURRENT SITUATION AND VISION

Our policy for management of intellectual assets is published on our website ([www.plantandfood.co.nz/page/about-us/our-views-intellectual-property/](http://www.plantandfood.co.nz/page/about-us/our-views-intellectual-property/)).

The policy is based on the following principles:

- Plant & Food Research aims to manage its intellectual assets strategically to achieve optimal impact for its partners and industries, and will strive to select the most appropriate method of technology transfer to achieve this on a case by case basis.
- Plant & Food Research supports a collaborative approach to research, development and commercialisation to create greater impact.
- When developing intellectual property in collaboration with others, Plant & Food Research will work with these partners to identify the party that is best placed to manage the IP and to develop the full scope of the technology and its potential utilisation.
- Plant & Food Research seeks to ensure that dealings and agreements with other parties appropriately preserve and protect IP, and provide a sound governance framework for IP decision making.
- Where appropriate, Plant & Food Research will retain sufficient IP access rights to enable the conduct of further research in accordance with our Core Purpose.
- Where intellectual assets are anticipated to generate commercial returns, an equitable return from the commercial exploitation of those assets should be expected.
- Plant & Food Research will enforce its IP and contractual rights in a manner consistent with our Core Purpose and roles within the innovation system.
- In managing its intellectual assets, Plant & Food Research aims to respect the Treaty of Waitangi and all relevant government policies and international protocols, including respecting the IP rights of others.
- Plant & Food Research acknowledges the international movement towards publication in open access journals and will support the stance of our funding bodies in relation to this.
- Plant & Food Research supports the aims of NZGOAL and where appropriate will make copyright and non-copyright works available on open terms.

A key aspect in the management of intellectual assets is the identification and tracking of assets. We are extending the processes we have successfully developed for plant materials and patentable inventions to cover other forms of intellectual assets.

Databases held by Plant & Food Research include general scientific and commercial information, together with highly specialised data relating to core business activities and specific research projects. These include fruit gene databases and germplasm collections. The Institute holds two collections that are designated as “nationally significant”:

1. The national collections of fruit crop germplasm, including plantings of kiwifruit, pipfruit, summerfruit, berryfruit and other fruit crops, at various Plant & Food Research sites
2. The arable crops gene bank, comprising a comprehensive collection of crop species of both agricultural importance and research interest, most significantly “landrace” varieties of small grain crops.

#### KEY ACTIVITIES

- Expand the identification and tracking of intellectual assets beyond patentable inventions and plant materials through intellectual asset workshops and audits
- Implement policies, practices and activities for the databases and reference collections in which Plant & Food Research has an interest (Appendix 4).

#### PERFORMANCE TARGETS

Number of patents granted is 10–12 per annum. **Annually.**

Number of new licences is 10–12 per annum. **Annually.**

Number of trademarks registered is 0–2 per annum. **Annually.**

Number of Plant Variety Rights granted in New Zealand is 5–7 per annum. **Annually.**

Number of Plant Variety Rights granted overseas is 5–7 per annum. **Annually.**

Requests for database collections are 7–10 per annum. **Annually.**



**ORGANISATIONAL  
EXCELLENCE –  
ENHANCING OUR  
PERFORMANCE**

## HEALTH & SAFETY

### CURRENT SITUATION AND VISION

Plant & Food Research has a strong and enduring commitment to continual improvement in workplace health & safety. We seek to reach beyond compliance with legislative requirements to a point where our people regard a commitment to safety as fundamental to all that we do. In short, we view a safe workplace as a reflection of a positive culture characterised by a high degree of pride in the work we do, and respect and consideration for others.

Across the organisation, there is ownership of and adherence at all levels to ongoing improvements to our health and safety practices. The active involvement and support from Senior Management and the Board in driving safety awareness is critical.

### KEY ACTIVITIES

- Continue to identify and mitigate health & safety risks across all aspects of our business through an effective accident and incident reporting system and via worker engagement and participation at regular meetings of the National Health & Safety Committee and local site committees
- Maintain our focus on potential hazards within our laboratories and on orchards, farms and at sea, where there are particular risks associated with working with machinery and equipment
- Give high priority to contractor management, in particular those operating in our field research network and on the various building construction projects under way, most notably at the Mount Albert Research Centre
- Increase the profile of health & safety through focused management of safety risks wherever these are identified, improved reporting and follow up of incidents, trend analysis, and near-miss reporting
- Provide the Board, Senior Management and the wider staff with the information, insights and resources they need to fulfil their responsibilities with confidence.

### PERFORMANCE TARGETS

Tertiary-level standard in the ACC Workplace Safety Management Programme maintained.

**Biennially.**

No injuries falling within the definition of serious harm. **Annually.**

Downward trends in injuries requiring medical treatment or lost time. **Annually.**

Performance against external benchmarks and lead indicators. **Annually.**

Workplace survey results indicating that, on average, all staff agree that they view health & safety as a priority and consider that they are provided with the tools and information they need to be safe.

**Biennial survey data.**

## COMPLIANCE

### CURRENT SITUATION AND VISION

We are continuing to apply high standards to Biosafety Compliance through a range of policies and through the establishment of a dedicated Biosafety Compliance Manager and consultative groups, including a widely representative Biosafety Committee and Coordinated Incident Management System framework to deal with any incidents.

### KEY ACTIVITIES

- Continue to improve and replace aging containment facility infrastructure or equipment in physical containment facilities, including prioritisation of capital expenditure on new equipment, to ensure we can meet compliance requirements
- Further develop and improve internal operational controls, including procedures and record keeping
- Expand training for staff and contractors.

### PERFORMANCE TARGETS

Narrative on our progress in this area will be provided. **Annually.**

Indicators to quantify progress are currently under development.

## PRODUCTIVITY/EFFICIENCY

### CURRENT SITUATION AND VISION

In recent years, revenue growth has been achieved without increasing overall staff numbers. The projected growth in revenue over the next five years will be achieved with only a small increase in total staff numbers, targeted at areas where this is required to deliver on new revenue opportunities. Over and above this, we expect attrition to be offset by internal progression of existing staff.

### KEY ACTIVITIES

- Enhance the productivity of our science teams further by continuing to decrease the ratio of scientists to technologists. This ratio has reduced from approximately 1.4:1 in 2009/10 to 1.15:1 in 2015/16. We intend to reduce the ratio further to 1:1 by 2017/18. As well, further capital investment will be required in science equipment to replace obsolete equipment and to achieve further gains in productivity and efficiency.

## PERFORMANCE TARGETS

Revenue per science FTE has increased from \$212,000 per FTE to \$267,000 per FTE by 2019/20. In 2016/17 revenue is \$236,000/science FTE. **Annually.**

Scientist to technologist ratio is less than 1.1:1. **Annually.**

Total science FTEs 580-590. **Annually.**

The image features two green wheat stalks with long, thin awns, positioned vertically on the left side. A large, solid green circle is overlaid on the right side of the stalks. Inside this circle, the text "WAYS OF WORKING – CREATING INSPIRING WORKPLACES AND WORK STYLES" is written in white, uppercase, sans-serif font. The background is plain white.

**WAYS OF WORKING –  
CREATING INSPIRING  
WORKPLACES AND  
WORK STYLES**

## OUR PEOPLE

### CURRENT SITUATION AND VISION

The major redevelopment and modernisation of our Mount Albert Research Centre headquarters that is now under way is being guided by a set of principles and objectives that capture the way we aspire to work. Collectively known as Ways of Working, our future workplaces will be shared and open, with consistent designs throughout. They will provide a choice of tools and technologies that allow people to work efficiently and to perform at their best within environments that provide a safe and secure home base. Overall, our vision is for inspiring workplaces, technologies and work styles that enable us to deliver high impact science.

While the initial focus is on the Mount Albert redevelopment, the Ways of Working principles are being applied as we undertake new developments at other Plant & Food Research sites, including new facilities under way in Nelson, and at Lincoln as existing work areas are modernised.

More generally, we will continue to place a strong emphasis on ensuring Plant & Food Research remains an employer of choice for those with a passion for science. Exciting research programmes focusing on the major opportunities and challenges for our current and prospective clients, inspiring and supportive leadership, a positive work environment, career development opportunities, and excellent conditions of employment are all important elements in this.

We will continue to promote an organisational culture that is built around our shared values of achievement through leadership; the creative application of our knowledge; and relationships based on honesty, mutual respect and trust. These values, together with a compelling vision for the future, provide a robust and enduring foundation for the Institute's ongoing success.

Plant & Food Research takes its responsibilities as a Good Employer seriously. We take pride in our increasingly diverse and multicultural workforce and regard it as a strength as we develop and expand our international activities. Our flexible work arrangements recognise the seasonal nature of many of our research programmes and the fact that many of our staff balance their work and family responsibilities. Overall, our goal is to promote a culture where people work to their best and are recognised accordingly.

Our Good Employer policies are outlined in Appendix 4.

### KEY ACTIVITIES

- Evolve our Ways of Working change programme to ensure we transition into our new work environments effectively and, in doing so, gain the full benefits of the Ways of Working strategy and our investment. The programme integrates the development of the new work areas with the introduction of enabling technologies and the support we provide people as they accustom themselves to the new work settings. It builds upon the strong foundation provided by our well-established leadership programme, with the insights and understanding gained through this programme being highly relevant to the Ways of Working and for the successful implementation of change
- Involve people in the development of their new work environments, with effective communication promoted through a network of staff representatives

- Develop leadership capability at all levels in the organisation through our leadership programme, as a major element in a range of integrated initiatives for identifying and developing our next generation of leaders. This is important, as a significant number of our current leaders are expected to retire during the next decade
- Give high priority to supporting new team leaders through our Team Leader and team development programmes, acknowledging the key role that Team Leaders have in the planning and review of work and, more generally, in supporting high engagement among team members
- Ensure we develop capability in priority areas and provide successors for current leaders through highly effective recruitment and selection processes. With relatively low turnover among our scientists, it is vital that we regard every vacancy as an opportunity to recruit a future leader. This is enabled and supported by a well-developed internal recruitment capability, strong links to the universities, and a positive employment brand
- Secure and retain the talented individuals required to safeguard our future capacity, by offering a strong value proposition, career development and competitive remuneration.

## PERFORMANCE TARGETS

Engagement across the organisation continues to meet or exceed the sector benchmark across all sections of the survey. Continued ability to recruit and retain the people who are critical for our future success. **Biennial survey data.**

Impact and value of our investment in leadership development is assessed by improvements that leaders achieve through 360-degree capability surveys conducted prior to and one year after participating in a programme, confirming the proportion of leaders with clear strengths and whose strengths define them as great leaders. **Annual survey data.**

Tailored surveys measure satisfaction with the new work environments and the success of the Ways of Working programme. **Annual survey data.**

## OUR WORKPLACE

### CURRENT SITUATION AND VISION

Our physical footprint and its effective functioning are key to the delivery of our mission through our people. In the last 12 months we have committed considerable resources to planning and delivering a refreshed physical presence for our organisation, to ensure that it enables and enhances the performance of our people as well as their wellbeing. As outlined above, 'Our People' initiatives and 'Our Workplace' initiatives are integrated in our Ways of Working strategy.

Plant & Food Research operates from three large research centres at Auckland, Palmerston North and Lincoln and nine smaller sites across New Zealand. The smaller facilities are closely associated with key production and processing regions for the horticultural cropping industries, and in the case of the Nelson site, the seafood industry. Most of these facilities are owned by the Institute and comprise a diverse mix of largely specialist buildings and land used for experimental purposes.

Within this portfolio of facilities, there is considerable variation in their age, condition and overall suitability for our current and future needs. We will continue to review and where appropriate, redevelop buildings and associated research facilities, particularly at our three large centres, over the next five years. The priority for capital expenditure in this period will be essential remediation or upgrading of older buildings, laboratories and containment facilities.

## KEY ACTIVITIES

### → Mt Albert Campus Redevelopment

This investment is being staged over the next two years to optimise financial flexibility, and will be financed initially by cash surpluses and proceeds from the disposal of non-strategic land and buildings. In the later stages of the programme we will also use some debt funding.

The key project stages and milestones are as follows:

Task	Completion Date	Status
Preliminary design	Completed	Completed
Developed design	Completed	Completed
Detailed design	Completed	Completed
Award main contractor contract	Completed	Completed
Construction complete	June 2017	Stage 1 completed

### → Nelson Campus Redevelopment

The proposed new development involves a 2100 m<sup>2</sup> building consisting of laboratories and general offices on land owned by the Port of Nelson, adjacent to our existing finfish aquaculture facility and seafood industry partners. The new building will replace our existing leased premises in Nelson. These premises have a low seismic rating and the owner (Nelson City Council) has advised that it is not in a position to upgrade them at the present time.

Plant & Food Research has entered into an agreement with Port of Nelson who will design, build and lease back to us our replacement facility. Construction is expected to be completed at the end of the 2016/17 year. Port of Nelson is planning to develop the proposed site area from a low-value log storage area into a science and technology Seafood Precinct, and they are actively discussing opportunities with other relevant research, education and industry organisations.

## PERFORMANCE TARGET

Progress against key project milestones. **Annually by narrative.**

## OUR TECHNOLOGY

### CURRENT SITUATION AND VISION

Over the next three years we will be making significant investments in our IT infrastructure to improve the resilience of Information and Communications Technology (ICT) services and to protect our data, to support and enable high quality science. These projects will enable three categories of ICT services – Disaster Response, Business Critical, Remaining Services - to be restored following a major event.

The new Ways of Working environment being created at Mt Albert will enable greater staff mobility and feature spaces designed to encourage collaboration through content sharing and presentation, with:

- Wireless connectivity in conjunction with portable computing devices
- Video conferencing (VC) tools to extend collaboration to research partners, customers and government agencies
- Video conferencing with content sharing from desktops and laptops as well as from dedicated VC suites and meeting rooms
- Large monitors in collaboration/meeting spaces.

Investments are planned to upgrade the technology platform delivering intranet, document management and records management services. Office productivity applications and unified communications systems are being upgraded to deliver a revamped intranet for internal communications, improved search capability for documents and intranet content, enhanced connectivity for multiple device types both onsite and remotely, the ability to connect securely with external partners for easier collaboration, new functionality maximised across a common release of software solutions, and support for wider information management strategies, including Public Records Act compliance.

Multi-year programmes of work will continue to organise science data in structured database applications. These solutions include commercially developed software and in-house development to improve accessibility and use of data sets, and to secure and protect valuable digital assets. Opportunities to use externally hosted services (“cloud services”) for both science and non-science workloads will be explored as alternatives to building internal systems.

As a Government-owned research institute, we have a particular responsibility to ensure that the data and knowledge we generate are readily available to future generations of researchers. Initiatives to support this responsibility include the development of improved systems for information management, and alignment of data management policies and procedures with those of the wider research sector.

## KEY ACTIVITIES

- Complete the implementation of IT infrastructure solutions to protect systems and data
- Support increased staff mobility by expanding wireless connectivity across sites
- Upgrade collaboration and communication tools.

## PERFORMANCE TARGETS

Wireless access coverage doubled by June 2017. **Annually narrative.**

Improved systems for information management, and alignment of data management policies and procedures by June 2017. **Annually narrative.**



**FINANCIAL  
PERFORMANCE**  
– SUSTAINING  
PROFITABILITY TO  
CREATE FLEXIBILITY

## CURRENT SITUATION AND VISION

For the five years ending 30 June 2021 we are projecting similar total revenue growth to that in last year's Business Plan (2015-16), assuming a continuation of the generally positive economic environment. Our view is built on a strong commercial revenue pipeline and track record over the last two years. We have assumed Core Funding and MBIE contestable revenues remain at current levels, despite what we perceive as a more uncertain environment than in previous years, in particular for the 2016 MBIE contestable funding round.

Our revenue and profit growth over the last two years has been supported by productivity growth. We now need to invest selectively in some additional capacity (people) to enable the achievement of planned revenue growth in areas where we have identified with resource constraints, and to implement succession plans for key roles. This Business Plan has assumed more investment in these areas in Years 1 and 2 of the plan period. These investments result in a lower profit growth profile over the planning period than in last year's Business Plan. Our performance in recent years has provided a solid basis to make these investments now.

For the next year ending June 2017, this Business Plan is forecasting Earnings Before Interest, Depreciation and Tax (EBITDA) of \$14.8 million, \$3.5 million less than projected in last year's Business Plan for this year. Lower depreciation charges, interest costs and tax expenses than in the prior year's plan reduce this difference to \$1.3 million to a Net Profit after Tax (NPAT) of \$3.0 million for the year versus the prior year's plan of \$4.3 million.

## KEY ACTIVITIES

→ This document outlines a series of activities across our five science strategic focus areas and six business strategic focus areas that will deliver value to our customers while meeting our financial targets. We have initiatives to increase business for our existing customers, to identify new customers in New Zealand and other countries, to deliver research to support growth in the economy that will support Māori aspirations, to build our brand and digital engagement with our customers, to enhance our collaborations through the National Science Challenges and research hubs and centres, to extend our capability in key areas, to continue momentum in our Ways of Working initiatives, and to evolve our culture. With these, we will make good progress towards our vision of being a world-leading, sustainable business recognised and valued for innovation and science excellence.

## PERFORMANCE TARGETS

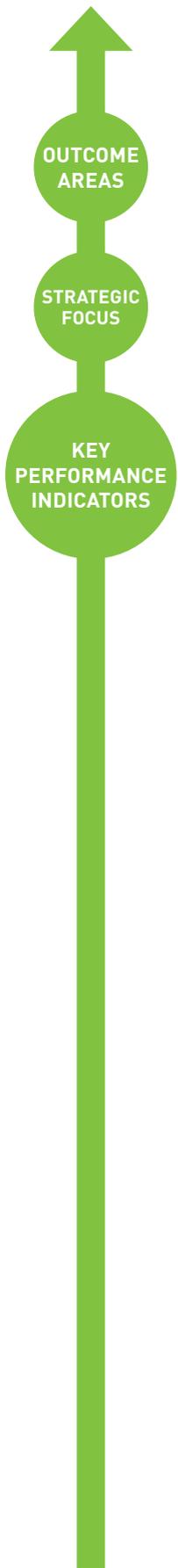
Revenue per FTE is \$153,000–162,000. **Quarterly.**

Revenue is up 4% (from \$135 million to \$140 million). **Annually.**

Operating profit (EBITDA) is up 10% (from \$13.5 million to \$14.8 million). **Annually.**

Additional financial targets are detailed in Appendix 3.

# OUR DASHBOARD – 2016/17 AT A GLANCE



INCREASE VALUE		PROTECT & ENHANCE		SUSTAIN GROWTH	
Better cultivars faster™	Proprietary, premium foods and beverages	Sustainable, premium seafood and marine products	Residue-free pest & disease control	Sustainable and profitable production systems	
<p>Proportion of critical steps delivered – a set of critical steps that describe value created for all our key sectors and customers through research delivered across our five outcome areas. These steps identify the delivery of impact to our industry stakeholders. Collectively, they provide a detailed evaluation of our progress to impact on an annual basis generated from all revenue sources.</p> <p>🎯 <b>85% delivered</b> 🕒 <b>Annually</b></p>					
<p>Total Plant &amp; Food Research (PFR) impact assessment</p> <p>🎯 <b>Benchmark established</b> 🕒 <b>3-yearly</b></p>					
<p>Impact case studies</p> <p>🎯 <b>≥ 9</b> 🕒 <b>Annually</b></p>					

KEY: 🎯 = Target 🕒 = Reporting Frequency

# A HEALTHY BUSINESS

Sectors & customers	Engagement	Science for impact	Organisational excellence	Ways of working	Financial performance
<p>Contract revenue from new customers ⊙ \$2.7M ⌚ Annually</p>	<p>Commercial reports per scientist FTE ⊙ 0.71-0.75 ⌚ Quarterly</p>	<p>Impact of scientific publications ⊙ 2.8-2.9 ⌚ Annually</p>	<p>Revenue per science FTE ⊙ \$236K/science FTE ⌚ Annually</p>	<p>Staff engagement levels ⊙ Narrative ⌚ Biennial survey</p>	<p>Revenue ⊙ 4% (from \$135M to \$140M) ⌚ Annually</p>
<p>Value of science involving Māori ⊙ \$4M ⌚ Annually</p>	<p>Digital engagement ⊙ Narrative ⌚ Annually</p>	<p>Publications with collaborators ⊙ 70-80% ⌚ Quarterly</p>	<p>Scientist: technologist ratio ⊙ &lt;1.1:1 ⌚ Annually</p>	<p>Strength development through Leadership Programme ⊙ Narrative ⌚ Annually</p>	<p>Operating profit (EBITDA) ⊙ 10% (from \$13.5M to \$14.8M) ⌚ Annually</p>
<p>Revenue per FTE from commercial sources ⊙ \$50-54K ⌚ Quarterly</p>	<p>Percentage of stakeholders: Satisfied with their experience of accessing knowledge or technology from PFR ⊙ &gt;CRI average</p>	<p>Percentage of stakeholders confident that PFR has the ability to put together the most appropriate research teams ⊙ &gt; CRI average ⌚ Biennial survey</p>	<p>Serious harm injuries ⊙ 0 ⌚ Annually</p>	<p>Satisfaction with Ways of Working environment ⊙ Narrative ⌚ Annually</p>	<p>Revenue per FTE ⊙ \$153K-162K ⌚ Quarterly</p>
<p>Offshore revenue ⊙ 15% ⌚ Annually</p>	<p>Who have interacted with PFR in the past 3 years and are satisfied with the overall quality of their experience ⊙ &gt;CRI average</p>	<p>Science reviews, cross-cutting workshops ⊙ 4, 2 ⌚ Annually</p>	<p>Injuries requiring treatment or lost time ⊙ Downward trend ⌚ Annually</p>	<p>Enabling technologies established ⊙ Narrative ⌚ Annually</p>	<p>Operating Margin (EBITDAF/Revenue) ⊙ \$0.10 ⌚ Annually</p>
<p>Contract revenue from NZ commercial customers ⊙ \$39.9M ⌚ Annually</p>	<p>Perceiving PFR's brand positively in top 10 brand personality traits ⊙ 90%</p>	<p>International awards, invitations for international committees, invitations for editorial boards ⊙ 10-15, 7-12, 5-10 ⌚ Annually</p>	<p>Workplace survey results on H&amp;S ⊙ Confirmed ⌚ Biennial survey</p>	<p>Our workplace ⊙ On budget, on time ⌚ Annually</p>	<p>Profit per FTE (EBITDAF) ⊙ 17.6 ⌚ Annually</p>
	<p>Likely to recommend PFR ⊙ 80-90%</p>	<p>Database collections ⊙ 7-10 requests ⌚ Annually</p>	<p>H&amp;S indicators ⊙ ≥ External benchmarks ⌚ Annually</p>		<p>Quick ratio ⊙ 1.1 ⌚ Annually</p>
	<p>Recognising PFR's market and sector knowledge as a key driver in their decisions to engage with PFR ⊙ Benchmark met or exceeded ⌚ Biennial survey</p>	<p>IP outputs (PVRs [NZ, overseas], patents, licences, trademarks) ⊙ 5-7, 5-7, 10-12, 10-12, 0-2 ⌚ Quarterly</p>	<p>Compliance ⊙ Narrative ⌚ Annually</p>		<p>Interest coverage (EDITDAF / Interest Expense) ⊙ 131 ⌚ Annually</p>
			<p>Total science FTEs ⊙ 580-590 ⌚ Annually</p>		<p>Profit volatility ⊙ 0.24 ⌚ Annually</p>
			<p>ACC Workplace Safety Management Programme ⊙ Tertiary ⌚ Biennial survey</p>		<p>Adjusted return on equity ⊙ 3% ⌚ Annually</p>
					<p>Revenue growth ⊙ 4% ⌚ Annually</p>
					<p>Capital renewal ⊙ 250% ⌚ Annually</p>

# APPENDIX 1: PLANT & FOOD RESEARCH CRITICAL STEPS TO IMPACT 2016/17

## OUTCOME AREA 1

INCREASE THE VALUE OF THE HORTICULTURAL, ARABLE, SEAFOOD AND FOOD AND BEVERAGE SECTORS TO THE NEW ZEALAND ECONOMY THROUGH THE DEVELOPMENT OF HIGH VALUE PRODUCTS AND PROCESSES THAT MEET CURRENT AND FUTURE GLOBAL MARKET NEEDS

### STRATEGIC FOCUS AREA: BETTER CULTIVARS FASTER™

#### ADOPTION INDICATOR

→ Plant & Food Research-bred cultivars grown in New Zealand and offshore.

#### IMPACT INDICATORS

- Economic growth to New Zealand from the production of Plant & Food Research-bred cultivars
- Category growth and market access maintained or increased in key markets through novel cultivar development.

## OUTCOME AREA 1

### Strategic Focus Area: Better Cultivars Faster™

Sector Impact Targets	Research Themes	Critical Steps 2016/17
By 2025 novel berryfruit cultivars differentiated by increased production efficiency, superior sustainability and unique traits will be contributing to increased returns of more than \$11M p.a. and reducing pest and disease management costs by more than \$5M p.a.	<p>Cultivar development, including wide hybridisation and marker assisted selection</p> <p>Optimising plant and fruit physiology to maximise yield and harvest recovery</p> <p>Sustainable pest and disease management</p> <p>Understanding pest/pathogen – host interactions</p>	<p>A promising advanced blackcurrant selection, with target flavours and suitable for machine harvesting, has been released for commercial production to the NZ industry</p> <p>Novel blueberry genetic material based on wide-hybridisation of <i>Vaccinium virgatum</i> and <i>V. corymbosum</i> species has been introduced into the NZ blueberry breeding programme, enhancing prospects for the production of cultivars with smooth (non-gritty) texture</p> <p>An early-maturing machine harvest raspberry cultivar, with improved agronomic performance and disease resistance to complement 'Wakefield' has been released for commercial production in the Pacific North West, USA</p>

Sector Impact Targets	Research Themes	Critical Steps 2016/17
By 2020 new wheat cultivars will be yielding 20 t/ha; the New Zealand dairy, poultry and pork industries will be using only New Zealand-grown grain and increasing metabolisable energy production by 20% using supplementary feed from annual crops; and exports of high value seeds will have increased by 50% to \$250M p.a.	<p>Breeding tools and germplasm maintenance, characterisation and development, and genotyping by sequencing peas and cereals; further incorporation of advanced breeding technologies into brassicas to achieve herbicide-tolerant cultivars and disease resistance</p> <p>Breeding for improved milling quality in bread and biscuit wheat cultivars and high yielding, intensely coloured purple wheat for kibbling</p> <p>Breeding for high yielding feed grains, high dry matter forage cereals and brassicas, and peas with higher yields and a wider window of opportunity for vining</p>	<p>A set of forage cereal lines has been made available for evaluation in NZ and international markets with higher forage quality, early production, and environmental adaptability</p> <p>Research on whole genome selection (WGS) and/or pea tilling populations has influenced the selection of parental lines for traits that are intractable, leading to the development of a breeding strategy for these traits in commercially relevant material</p>
By 2030 proprietary green, gold, red, kiwiberry and/or human health-based kiwifruit cultivars from this programme will deliver \$3B in annual sales	<p>New cultivar development</p> <p>Neutralising the impact of Psa disease</p> <p>Protecting against and managing pests and diseases</p> <p>Optimising production systems and supply chain</p> <p>Consumer and health research</p>	<p>Data on performance of one green and one red candidate cultivar have been approved by Zespri at Stage 3 (pre-commercialisation), grafted on to rootstocks in pre-commercial trial orchards and included in Zespri's business cases for commercial release of these cultivars</p> <p>Information collected and analysed via the kiwifruit data management system has been used across all kiwifruit breeding programmes and stages, resulting in higher quality data being applied to support timely breeding decisions and automated reporting to Zespri</p>
By 2022 new and novel ornamental cultivars will be contributing to the ornamental sector's target of up to \$400M p.a. by 2025	<p>New genomic and breeding tools</p> <p>Developing rapid clonal propagation and production systems for faster delivery of elite clones</p>	<p>A new mutagenesis protocol has been evaluated for generating genetic diversity in conjunction with breeders from at least one sector serviced by PFR, and shown to generate valued new genotypes sought for use in research or breeding programmes</p> <p>Increased fundamental knowledge of factors limiting application of cryo technologies has been developed in conjunction with at least two PFR sectors and is being applied to delivery of both high health plants and germplasm conservation in these two sectors</p>

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Sector Impact Targets	Research Themes	Critical Steps 2016/17
<p>By 2022 new premium pipfruit cultivars delivering differentiated and diverse products will contribute up to \$60M new revenue towards the pipfruit sector's goal of \$1B by 2022</p>	<p>Conventional and fast breeding of new apple and pear cultivars</p> <p>Breeding tools and germplasm: germplasm maintenance, characterisation and development, and genotyping by sequencing</p> <p>Genetics and breeding for improved consumer appeal: carotenogenesis, anthocyanin accumulation and flavour discovery</p> <p>Genetics and breeding for improved productivity through pest and disease management, new rootstocks, and durable resistance</p>	<p>Functional analysis of candidate <i>Venturia</i> effectors will be completed, informing the breeding programme on selection of resistance genes to be pyramided for durability</p>
<p>By 2018 Plant &amp; Food Research potato cultivars will account for 10% and 25% of the New Zealand processing and fresh markets, worth \$73M p.a. and \$36M p.a. respectively, with a new specialty market generating up to \$3M p.a. in new export revenue</p>	<p>Potato breeding fit-for-purpose cultivars targeting productivity, pest and disease resistances and value-adding processing attributes for food and non-food products</p> <p>Applying molecular and genome breeding tools and population-based understanding of genetic and environmental variances to integrate key traits</p> <p>Accessing and utilising the potato resources of the International Potato Centre to extend germplasm diversity</p> <p>Providing a secure and pathogen-free pipeline of potato materials for evaluation in domestic and global markets, including germplasm conservation</p> <p>Identifying, collecting and conserving disease-free tāewa potato lines in tissue culture</p>	<p>Knowledge gained from molecular characterisation of potato lines via DNA-based genotyping has been incorporated into the breeding process, supporting parental choices for crossing and our cultivar IP</p>

## STRATEGIC FOCUS AREA: PROPRIETARY FOODS WITH PREMIUM PRICES

### ADOPTION INDICATORS

- Food industries in New Zealand and offshore use proprietary Plant & Food Research cultivars and processes to generate processed foods and ingredients
- Food companies and brands use Plant & Food Research science to provide wellness-based claims and food solutions.

### IMPACT INDICATORS

- Growth in export value of whole foods and ingredients based on fruits, vegetables, and grains
- Increased market share of high margin export food products and ingredients based on Plant & Food Research cultivars, processes and knowledge that capture wellness benefits.

## OUTCOME AREA 1

### Strategic Focus Area: Proprietary Foods with Premium Prices

Sector Impact Targets	Research Themes	Critical Steps 2016/17
By 2018 new storage protocols enabling premium products to reach distant markets will be contributing up to \$20M p.a. towards the avocado sector's target of \$184M p.a. export value by 2020	Inventory management – operating procedures for inventory management Export shipping systems Quality management for late-season fruit	Physiological markers of late-season fruit quality have been communicated to NZ Avocado for incorporation into industry guidelines for fruit quality management
By 2025, new understanding of the effects of production systems and genetics on key consumer-driven traits will result in 95% of New Zealand's bread being made with New Zealand-sourced grains, and wheat exports to Asia exceeding 200,000 t	Understanding the different gluten intolerance-related epitopes in Plant & Food Research proprietary wheat lines Understanding the effects of crop management and baking technology on gluten intolerance	FODMAPs data (specifically fructans) have been used to compare PFR wheats that have been tested for coeliac peptide concentrations, increasing understanding of other causes of human responses related to wheat products, and informing plant breeding
By 2017 at least two New Zealand companies within the consumer and health sector will each be exporting one food product and/or food ingredient with functional benefits that contribute to health	Consumer and health research	An improved NZ Food Composition Database with enhanced functionality (valid nutrition and health links) has been accessed by the food industry, helping companies to market high value nutrition products
By 2018 berry-based, functional food products with scientific evidence of efficacy will be generating additional export revenue of up to \$25M p.a.	Knowledge of the contribution of whole berryfruits and ingredients to health and well-being, e.g. in inflammation, sports recovery, mental acuity, immunity, satiety and digestive health	One berryfruit (and/or ingredient) with demonstrated efficacy for inflammation prevention and management has been explored by the industry, informing product development activities

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Sector Impact Targets	Research Themes	Critical Steps 2016/17
By 2020 new supply chain systems for new future and existing cultivars will be predicting supply chain performance, reducing quality variation and extending supplies of premium quality kiwifruit, maintaining and increasing market access and increasing export returns	<p>New cultivar development</p> <p>Protecting against and managing pests and diseases</p> <p>Optimising production systems and supply chain</p>	New knowledge on the maturation biology of kiwifruit has been determined and communicated to industry, resulting in a preliminary list of new indicators of optimal harvest timing for early and late supply programmes
By 2022 quality systems and supply chain management will be delivering premium products with enhanced flavour and texture that contribute up to \$40M towards the pipfruit sector's goal of \$1B by 2022	<p>Understanding flavour and texture traits for target markets</p> <p>Enhanced taste: new taste and texture standards, and technologies, for supplying fruits to Asia with enhanced eating quality</p> <p>Developing supply chains for target markets</p>	Harvest and storage guidelines have been determined for at least one new Piqa® pear cultivar to support the first year of fruit being exported for sale, and results have been communicated to key growers, PREVAR and the governance group responsible for exporting the cultivar, as well as being incorporated into grower handling guidelines
By 2022 potato germplasm or a premium potato product with consumer desired trait(s) will be in commercial production, contributing to industry goals of doubling the value of fresh and processed NZ exports by 2025 and enhancing the value of the domestic market by 50% by 2025	<p>Understanding consumer preference for flavour and the metabolic contribution to flavour perception</p> <p>Understanding the influence of germplasm on nutritional and textural quality of potato products</p> <p>Developing new convenience foods with enhanced nutritional value</p> <p>Understanding secondary metabolite development</p>	Germplasm with consumer desired high-value traits, such as low GI, has been identified and communicated to industry and PFR's potato breeders, supporting the selection of new, premium potato cultivars
By 2023 sales of wine will have increased to up to \$2.34B p.a. by maintaining the freshness of existing New Zealand-branded styles and developing new and innovative styles of wine for new consumers	<p>Establishing the roles of terroir, seasonality, viticultural practices and harvest technologies on wine style</p> <p>Viticultural and winemaking tools to develop new wine styles</p> <p>Identifying key components of aroma, flavour and mouthfeel that define sensory quality for target markets</p> <p>Establishing a <i>Vitis</i> genetic resource for genetic studies and undertaking trait inheritance research</p>	Industry-relevant and achievable grape harvesting and processing methods for manipulating key juice metabolites have been developed and communicated to industry partners, supporting the internationally recognised wine style that is Marlborough Sauvignon blanc under varied seasonal/environmental influences

## STRATEGIC FOCUS AREA: SUSTAINABLE, PREMIUM SEAFOOD AND MARINE PRODUCTS

### ADOPTION INDICATORS

→ Seafood- and marine-based industries in New Zealand and offshore use Plant & Food Research science and technologies to generate premium seafood and/or marine products.

### IMPACT INDICATORS

→ Growth in export volume and value of premium seafood and marine products.

## OUTCOME AREA 1

### Strategic Focus Area: Sustainable, Premium Seafood and Marine Products

Sector Impact Targets	Research themes	Critical Steps 2016/17
By 2030 new production, harvest on-board handling technologies will be adopted for use by the New Zealand seafood industry, increasing the value of sustainably produced premium seafood products by at least \$500M p.a.	<p>Improved culture and husbandry technologies for new and existing species</p> <p>New selective harvest technologies</p> <p>New production systems, including wild fisheries enhancement and aquaculture</p>	Innovative selective harvest technologies have been developed and adopted for use by industry, contributing to improvements in the quality of landed catch and increases in the value of seafood exports
By 2025 an understanding of consumer, sensory and nutritional aspects of selected seafood species will lead to new exports of safe, premium seafood products, contributing to the industry's target of new exports of \$1.5B p.a.	<p>Understanding and responding to consumer preferences for seafood and seafood-based products</p> <p>Understanding properties of seafood products</p> <p>Understanding and managing risks to food safety</p>	<p>A freezing and frozen storage regime for controlling <i>Vibrio vulnificus</i> and <i>V. parahaemolyticus</i> in New Zealand Pacific oysters has been validated as a postharvest control accepted by MPI</p> <p>Consumer and sensory methods for determining the Greenshell™ Mussel attributes most likely to influence consumer acceptance have been developed for assessing families within the Cawthron breeding programme</p>
By 2025 optimised extraction technologies for unique marine extracts with proven applications as ingredients and biomaterials will support export growth of \$80M p.a.	<p>Understanding and control of raw materials, including composition and molecular structure</p> <p>Development of new processes to optimise extraction of target compounds</p> <p>Understanding function and format and their impacts on product quality and efficacy</p>	At least one new or modified process for a marine biological extract has been tested at factory scale (in industry, in collaboration with a commercial partner) and a prototype product produced

## OUTCOME AREA 2

# PROTECT AND ENHANCE MARKET ACCESS IN NEW ZEALAND'S HORTICULTURAL AND ARABLE SECTORS

## STRATEGIC FOCUS AREA: RESIDUE-FREE PEST AND DISEASE CONTROL

### ADOPTION INDICATORS

- New Zealand industry and central Government uses knowledge and tools from Plant & Food Research science to inform a biosecurity system that minimises the frequency and impact of pest and disease incursions
- Industries adopt a range of biologically and ecologically based methods that provide highly effective pest and disease management solutions which balance phytosanitary and agrichemical residue requirements of markets.

### IMPACT INDICATORS

- Enhanced international competitiveness of export sectors through pest and disease management solutions to maintain and/or increase market access
- New Zealand's environmental quality enhanced by minimising pest and disease incursions, managing pests and diseases, and reducing risks associated with pest management technologies.

## OUTCOME AREA 2

### Strategic Focus Area: Residue-free pest and disease control

Sector Impact Targets	Research themes	Critical Steps 2016/17
By 2020 integrated pest and disease technologies will contribute to wheat yields of 20 t/ha and exports of high value seeds to increase by 50% to \$250M p.a.	<p>Molecular tools for improving club root resistance in brassicas and peas</p> <p>Introduction of multiple disease resistance in cereals</p> <p>Maintaining a disease- and pest-free rotation, understanding the role of weeds in the system</p> <p>Aphid detection and forecasting in cereals</p>	<p>The identification of resistance genes and cultivars toward key cereal disease (e.g. <i>Ramularia</i> and rust), the characterisation of NZ populations of key cereal rusts and resistance genes of 5 key NZ cereal cultivars for rust diseases, and the determination of the resistance status of the wheat pathogen <i>Zymoseptoria tritici</i> to fungicides currently used in NZ has informed the design of sustainable management for cereal crops, with results communicated to industry</p> <p>Knowledge of methods for augmenting activities of key natural enemies to farming industries, including arable cropping systems within a region, has been generated, evaluated and communicated to industry to enable area-wide pest suppression</p>

Sector Impact Targets	Research themes	Critical Steps 2016/17
By 2020 improved pre-and postharvest integrated kiwifruit management options will deliver effective pest and disease control, minimal pesticide residues, compliance with food safety and market access requirements and also enable the industry to maintain pest and disease management standards on existing and future varieties and respond to new biosecurity incursions, safeguarding current exports and underpinning future industry growth to \$3B by 2029	New cultivar development Neutralising the impact of Psa disease Protecting against and managing pests and diseases	Advanced understanding of the molecular basis of signalling associated with elicitors have been used to produce new tools for growers, optimising, improving or adapting new elicitation protocol(s) on-orchard
By 2025 disease management on orchard and/or postharvest will be reducing pesticide use in orchards, maintaining summerfruit quality and retaining or increasing market access, contributing up to \$30M p.a. in new industry revenue	Enhancing market access through new pest and disease technologies Monitoring and managing pest and disease populations	A new fumigant or alternative treatment technology has been commercialised that will enable the industry to meet market access requirements for global trade in summerfruit
By 2020 new data and tools will be widely used to increase the average lifespan of vineyards from 25 to 35 years, and preparedness plans to protect the national vineyard from imminent pest and disease threats will be in place	Control systems for existing terminal disease vectors and new surveillance systems for potential pest incursions Cost-effective management practices for terminal diseases such as grapevine leafroll and trunk disease Producing rootstocks with attributes that reduce the cost of grape production and contribute to vine longevity	RNA viruses present in NZ grapevines have been described, resulting in the industry and MPI being able to make better informed decisions in relation to the biosecurity status of newly detected viruses A model using regional climatological data has been applied to assess the risk that spotted wing <i>Drosophila</i> will become established in particular regions, enabling management options to prevent significant bunch damage and fruit rots to be identified and communicated to industry
By 2017 improved methodologies for identifying hazards, assessing risk, predicting impacts and ascertaining where in the system mitigation measures are best targeted will be implemented by biosecurity stakeholders	Development of systems approaches for risk assessment, and improved prediction of the potential impacts of new organism introductions	A new Import Risk Bayesian Network Model and knowledge of the non-target effects of biological control agents (BCAs) have informed biosecurity stakeholders, increasing the effectiveness of mitigation measures
By 2017 'Fit for purpose' tools and methodologies for reducing risks along importation pathways will be implemented by biosecurity stakeholders	New interventions and strategies for reducing risk within a systems context	An article on the management of biosecurity threats in a systems context has been submitted for publication to underpin MPI's confidence in this approach through scientific review
By 2017 fast, cost-effective, robust and accurate diagnostic methods and tools will be informing biosecurity decisions	Tests that expedite the identification of multiple organisms within a sample New methods to distinguish rapidly between pathogenic and non-pathogenic organisms	Verified protocols for multi-taxa identification and pathogenicity testing have been communicated to MPI, enabling them to make informed biosecurity decisions

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Sector Impact Targets	Research themes	Critical Steps 2016/17
By 2017 knowledge, strategies and tools for determining presence or absence of invasive pests of plants will be implemented by biosecurity stakeholders	Timely, cost-effective surveillance methods and improvements in surveillance sensitivity  New knowledge to improve pathogen surveillance	Research on Queensland Fruit Fly tools has been enhanced through a PFR/Macquarie University collaboration, and knowledge of plant pathogen surveillance tools has been published to improve surveillance and implementation of new tools by MPI
By 2017 knowledge, strategies and tools to support robust decision making will be increasing the preparedness for responses of biosecurity stakeholders	Development of tools that maximise the likelihood of eradication  Development of knowledge, strategies and tools to enable rapid and robust decision making	Use of the Sterile Insect Technique for Brown Marmorated Stink Bug eradication has been assessed, principles of successful plant pathogen have been summarised and published, and the user interface of GERDA has been enhanced to support robust decision-making and preparedness for responses

## OUTCOME AREA 3

# SUSTAIN GROWTH IN THE HORTICULTURAL, ARABLE, SEAFOOD AND FOOD AND BEVERAGE SECTORS, DRIVING ONGOING EFFICIENCY GAINS WITH THE DEVELOPMENT OF ENVIRONMENTALLY RESILIENT PRODUCTION SYSTEMS

## STRATEGIC FOCUS AREA: MORE SUSTAINABLE AND PROFITABLE SYSTEMS

### ADOPTION INDICATORS

- New Zealand agricultural and horticultural industries adopt Plant & Food Research-developed production, harvesting, postharvest, packaging, handling and storage systems
- Central and local government agencies use knowledge and tools from Plant & Food Research science to inform policy development and systems design.

### IMPACT INDICATORS

- Maintained and/or increased crop volumes, value and profitability
- New Zealand's productive environments sustained or enhanced, generating products with verifiable reduced footprints, to maintain and/or increase market access.

## OUTCOME AREA 3

### Strategic Focus Area: More sustainable and profitable systems

Sector Impact Targets	Research Themes	Critical Steps 2016/17
By 2018 new production systems to address irregular bearing and poor pollination in avocado crops will be contributing up to \$116M p.a. of value to the sector	<p>Understanding environmental, nutritional and genetic effects on irregular bearing, floral development and return bloom</p> <p>Enhancing pollination through knowledge of pollination systems and the role of pollinators and pollenisers</p> <p>Sustainable production systems to optimise yields and increase orchard profits</p>	The relationship between crop load, shoot type and return bloom has been described and implications for crop management have been explored through industry workshops and field events, increasing the capacity of the industry to better manage yields

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Sector Impact Targets	Research Themes	Critical Steps 2016/17
<p>By 2025 more efficient and profitable production systems will enable wheat yields of 20 t/ha; the New Zealand dairy, poultry and pork industries will be using only New Zealand-grown grain; and exports of high value seeds will increase by 50% to \$250M p.a.</p>	<p>Understanding aspects of crop physiology, leading to higher grain and dry matter yields in grain and forage crops</p> <p>Efficient use of water and nutrients, leading to improved crop performance while minimising environmental impacts</p> <p>Improving the interactions between arable and dairy production systems, to optimise the use of nutrients</p>	<p>Good management practices to produce high nutritive value, low nitrogen (N) forage and conserved feed crops have been identified based on meta-analysis and field trials and delivered to forage cropping farmers and industry representatives via industry conferences, field days and publications, leading to improved N use efficiency and a reduced risk of N losses from forage cropping systems.</p>
<p>By 2020 new environmental models and technologies for kiwifruit production will increase productivity towards \$130K/ha, based on 30,000 trays per ha, with optimised fruit dry matter</p>	<p>New cultivar development</p> <p>Neutralising the impact of Psa disease</p> <p>Optimising production systems and supply chains</p>	<p>Vine production has been increasingly optimised based on new knowledge of growth distribution in response to improvements in vine management and its relationship to vine growth stages and carbohydrate allocation; and 'Zesy002' (Gold3) fruit flavour has been optimised through new knowledge of additional vine management techniques specific to altering carbon allocation to fruit development, with recommendations made to Zespri on rootstock and girdling effects on vine production</p>
<p>By 2022 integrated research programmes will increase the volume of Class 1 onions exported by 10%, increasing returns by \$6M</p>	<p>Maintain germplasm for yield and disease research</p> <p>Maximising yield of Class 1 onions</p> <p>Sustainable pest and disease management for increasing Class 1 onions</p>	<p>Criteria and assessment methods for defining Class 1 onions and simple measurements for determining Class 1 onions have been delivered to and adopted by the industry, increasing the proportion of export quality onions</p>
<p>By 2022 improved orchard productivity and profitability will contribute up to \$150M new revenue towards the pipfruit sector's goal of \$1B by 2022</p>	<p>Understanding water and carbon dynamics in the root zone</p> <p>Optimising rootstock resilience and vigour</p> <p>Developing technologies to manipulate growth allocation and dry matter utilisation to enhance yield and fruit quality of apples and pears</p> <p>Increasing orchard profitability through increased interception and utilisation of sunlight energy</p> <p>Developing customised production technologies for NZ-bred, new cultivars</p>	<p>Initial data on productivity of young orchard plots of new prototype Planar Cordon planting systems have demonstrated potential benefits beyond contemporary intensive orchard systems to industry early-adopters, technical advisors and supply group managers within the NZ pipfruit sector, from studies using both apples and interspecific pears</p>

Sector Impact Targets	Research Themes	Critical Steps 2016/17
<p>By 2025 best management practices, including cultivar choice and management of seed quality, will enable the production potential of Plant &amp; Food Research cultivars to be realised, contributing to the potato sector's target of increasing grower profitability by \$1500/ha (12% increase on 2013 profitability)</p>	<p>Understanding and quantifying yield-limiting factors, and refining tools for their mitigation</p> <p>Developing and supporting the adoption of regionally based management options to minimise primary yield-limiting factors</p>	<p>Soil- and seed-borne diseases and soil physical constraints have been confirmed as contributing factors in the potato yield gap, and new opportunities to reduce this gap have been investigated, with results communicated to industry</p>
<p>By 2020 increased orchard profitability and higher productivity of premium priced, high quality summerfruit will be generating up to \$15M p.a. in new industry revenue</p>	<p>Harnessing architectural diversity and plasticity to create a new intensive planting system for cherry and apricot</p> <p>Developing orchard technologies to manipulate growth allocation and dry matter utilisation to enhance yield and fruit quality in cherry and apricot</p> <p>Improved pollination systems</p>	<p>New nursery tree design and propagation systems that accelerate young tree growth, canopy development and dry matter accumulation have been quantified and demonstrated to the sector, providing technologies for the establishment phase of new cherry and apricot orchard systems</p>
<p>By 2020 new management practices and tools will have enabled productivity and efficiency gains in at least two field-grown vegetable crops, increasing export returns by \$10M p.a.</p>	<p>Enhancing crop productivity and quality in export field vegetables</p> <p>Tools for efficient nutrient use in export field vegetables</p>	<p>New understanding of biotic factors affecting emergence and variability of at least one field export crop have been quantified and discussed with industry to develop new and alternative management strategies that will help to deliver improved yields</p>
<p>From 2018 the wine industry will be using predictive models to produce more reliable and consistent harvests, maintaining New Zealand wine's price premium by actively managing supply/demand, and saving up to \$1M-2M p.a. in yield management costs</p>	<p>Predicting yield potential at regional and sub-regional levels to guide timely and cost-effective management</p> <p>Predicting the timing of key phenological stages to forecast potential crop loss risks from climatic and environmental events, and developing mitigation strategies that maintain wine quality</p>	<p>Full season temperature-based grapevine phenological models have been developed for four key grape varieties across the major growing regions and communicated to the industry, informing management practices</p> <p>Effects of winter and early-season temperatures on flower number per inflorescence have been quantified and modelled for Sauvignon blanc in Marlborough and the implications for vine management have been explored through industry workshops and field events, facilitating the application of mitigation practices</p> <p>Effects of flowering temperatures on percentage fruit set and final cluster weight have been quantified and modelled for Sauvignon blanc in Marlborough and information has been delivered to the industry, improving crop management</p>

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Sector Impact Targets	Research Themes	Critical Steps 2016/17
<p>Knowledge of land use, land use change and management effects on soil health, ecosystem services, productivity and profitability of farming enterprises will be informing land use management and policy</p>	<p>Developing management practices to improve productivity and efficiency of resource use within environmental limits</p> <p>Developing practices to inform policy and management to improve soil quality and integrity and ensure delivery of ecosystem services from natural capital</p> <p>Quantification of natural capital stocks and valuation of ecosystem services</p> <p>Footprinting of plant-based production, storage, transport, and processing systems, including waste stream reduction and re-use</p>	<p>A framework for classifying land use suitability based on improved understanding of the impacts, risks and trade-offs of land use and management decisions has been co-developed with science, industry and policy stakeholders, leading to an improved ability of primary industries to respond to changes in community defined limits, climate, resource allocation (e.g. water) and market values</p> <p>New break crop management systems have been developed that sustain high rates of forage crop production and recover residual N following livestock grazing, and delivered to industry via industry workshops, conferences and publications, providing forage cropping farmers with high production, low N-loss options for forage crop production</p>
<p>By 2025 knowledge of integrated pest and disease management, optimised stocking rates and hive efficiency for honey production and pollination, unique characteristics of NZ honeys and an enhanced honey production pipeline will be increasing honey exports to \$400M</p>	<p>Identifying the impact of pests and diseases on honey production</p> <p>Understanding the role of nutrition on bee health</p> <p>Developing tools to manage and monitor hives to ensure colonies are at optimum status to maximise pollination of target crops</p>	<p>An integrated honey and hive research strategy has been developed in consultation with industry, guiding research priorities and identifying sources of research funding</p>

## APPENDIX 2: MBIE GENERIC INDICATORS

INDICATORS	
End-user collaboration	Revenue per FTE from commercial sources. <b>Quarterly.</b>
Research collaboration	Publications with collaborators. <b>Quarterly.</b>
Technology and knowledge transfer	Commercial reports per scientist FTE. <b>Quarterly.</b>
Science quality	Impact of scientific publications. <b>Annually.</b>
Financial indicator	Revenue per FTE. <b>Quarterly.</b>

TARGETS FOR 2016/17						
		2011/12	2012/13	2013/14	2014/15	Target 2016/17
End-user collaboration	Revenue per FTE from commercial sources (in \$000s)	36.9	37.3	39.9	49.1	50–54
Research collaboration	(% international/ New Zealand and CRI)	68%	68%	79%	74%	70–80%
Technology and knowledge transfer	Commercial reports per scientist FTE	0.71	0.75	0.73	0.68	0.71–0.75
Science quality	Impact of scientific publications	2.81	2.82	2.88	2.91	2.8–2.9
Financial indicator	Revenue per FTE (in \$000s)	148	150	150	160	153–162

## APPENDIX 3: PLANT & FOOD RESEARCH ADDITIONAL FINANCIAL INDICATORS

	2017	2018	2019	2020	2021
Operating Margin (EBITDAF/Revenue)	\$0.10	\$0.11	\$0.13	\$0.13	\$0.14
Profit per FTE (EBITDAF)	17.6	20.0	22.9	24.8	26.3
Quick ratio	1.1	1.1	1.3	1.3	1.4
Interest coverage (EDITDAF / Interest Expense)	131	31	26	29	29
Profit volatility	0.24	0.25	0.17	0.20	0.17
Forecasting risk	To be calculated annually				
Adjusted return on equity	3%	4%	8%	6%	6%
Revenue growth	4%	6%	4%	3%	3%
Capital renewal	250%	170%	144%	137%	142%

# APPENDIX 4: PLANT & FOOD RESEARCH POLICY AND PROCEDURE STATEMENTS

## GOOD EMPLOYER POLICIES

Plant & Food Research recognises that its reputation as a good employer is fundamental to its ability to attract, motivate and retain the people required for the achievement of its business objectives.

There is a strong commitment to fostering a work environment in which staff can reach their maximum potential. This will be fulfilled by:

- Continuing investment in the development of the knowledge, skills and abilities of staff at all levels
- Involving staff in the development and implementation of the organisation's strategies, policies and procedures
- Reinforcing the role and responsibilities of the organisation's leaders in promoting a workplace culture in which all staff are treated with fairness and respect
- The development and implementation of innovative and flexible employment practices that recognise the diverse and evolving composition and aspirations of our workforce
- Ensuring the health, safety and wellbeing of our people at work.

Plant & Food Research's Equal Employment Opportunities (EEO) programme aims to create an innovative and successful organisation by attracting and retaining high calibre staff from all possible sections of society. This will enhance our ability to develop successful relationships with a wider range of clients and ensure we fulfil a key aspect of our responsibilities as a good employer. This is critical, given the increasingly diverse nature of the organisation's workforce and the society and markets within which it operates.

The focus is on the removal of barriers to EEO for both existing and potential employees, and the development of a culture where EEO principles are an integral part of the decision-making process. There are increasing proportions of both women and minority ethnic groups within the organisation. Further progress will be achieved by ensuring that policies, procedures and actions reflect the key EEO principles of:

- Tolerance and respect for others
- Merit-based assessment of potential and existing staff
- Providing appropriately targeted development opportunities to support staff in achieving their full potential.

The organisation has an active programme for ensuring the health and safety of employees and associates in the workplace. There is a strong focus on employee involvement through the National Health and Safety committee and local committees at each of our ten national sites.

## ACCOUNTING POLICIES

A summary of our accounting policies is included in our Annual Report. The current Annual Report can be found on our external website:

[www.plantandfood.co.nz/page/about-us/publications](http://www.plantandfood.co.nz/page/about-us/publications)

## DIVIDEND POLICY

The Board will notify the Shareholding Ministers, within three months of the end of each financial year:

- The amount of dividend (if any) recommended to be distributed to shareholding Ministers
- The percentage of tax-paid profits that the dividend represents
- The rationale and analysis used to determine the amount of the dividend.

In determining surplus funds for distribution, the Board each year will give consideration to:

- The organisation's medium- and long-term capital investment requirements
- The organisation's projected profitability and cashflows
- The ongoing financial viability of the company, including its ability to repay debt
- The ability of the organisation to react to revenue shocks outside its control, and still maintain and enhance the capability of its people and facilities
- The obligations of the Directors under the Companies Act 1993 and other statutory requirements.

With the projected increase in profitability and completion of the redevelopment of our Mt Albert campus in the course of this planning period, we are projecting the ability to pay dividends to the Shareholding Ministers starting from 2017/18. Before making a decision on payment of a dividend, the Board will consider the above factors and consult with the Shareholders.

## SIGNIFICANT TRANSACTIONS POLICY

The Board will obtain the prior written consent of Shareholding Ministers for any transaction or series of transactions involving full or partial acquisition, disposal or modification of property (buildings, land and capital equipment) and other assets with a value equivalent to or greater than \$10 million or 20% of the company's total assets (prior to the transaction), whichever is the lesser.

The Board will also obtain prior written consent of Shareholding Ministers for any transaction or series of transactions with a value equivalent to or greater than \$5 million or 30% of a company's total assets (prior to the transaction) involving:

- Acquisition, disposal or modification of an interest in a joint venture or partnership, or similar association
- Acquisition or disposal, in full or in part, of shares or interests in a subsidiary, external company or business unit
- Transactions that affect the company's ownership of a subsidiary or a subsidiary's ownership of another entity
- Other transactions that fall outside the scope of the definition of the company's core business or that may have a material effect on the company's science capabilities.

## NATIONAL DATABASE AND COLLECTIONS ACCESS POLICY

Shareholding Ministers will be advised of any disputes over access or use of any reference collection held by Plant & Food Research, and Ministers may appoint a person with relevant expertise to decide the matter. Any such decision will be binding on Plant & Food Research.

## APPENDIX 5: MATTERS REQUIRED BY THE CROWN RESEARCH INSTITUTES ACT 1992

### RATIO OF SHAREHOLDERS' FUNDS TO TOTAL ASSETS

Plant & Food Research's target ratio of shareholders' funds to total assets is as follows:

Year ended 30 June	2017	2018	2019
Equity ratio	0.74:1	0.72:1	0.74:1

Equity Ratio equals Shareholders' Funds divided by Total Assets.

### ACTIVITIES WHERE SHAREHOLDER COMPENSATION IS REQUIRED

Where the Government wishes Plant & Food Research to undertake activities or assume obligations that will result in a reduction of the organisation's profit, or net worth in terms of investment in research, the Board will seek compensation sufficient to allow the organisation's position to be restored.

No requests for compensation are currently under consideration.

### OTHER MATTERS SPECIFICALLY REQUESTED BY THE SHAREHOLDER

Section 16(3) of the Act requires Plant & Food Research to furnish an estimate of the current commercial value of the Crown's investment.

The Board has reviewed estimates of the commercial value of the Company using several valuation methodologies for two scenarios:

1. The value of the Company as a going concern whose purpose continues to be similar to the current Statement of Core Purpose
2. The break-up value of the Company's principal assets.

The Board considers the going concern scenario to be the most relevant to the Shareholders for the commercial value estimate. This estimate produced a valuation range of \$50 to \$90 million. The Company's current net asset position (\$89 million) lies within this range.

The Board therefore considers that the Company's net total asset position is a fair and reasonable estimate of the commercial value of the Group.





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# PLANT & FOOD RESEARCH STATEMENT OF WORK 2016/17-2021/22