

Plant & Food
RESEARCH

RANGAHAU AHUMĀRA KAI



Statement of Corporate Intent

2014/15 – 2018/19

G.42



CONTENTS

INTRODUCTION.....	1
EXECUTIVE SUMMARY.....	2
Our Purpose	2
Operating Environment.....	2
Our Vision and Strategy.....	2
Investing for Impact	2
Partnering For Success	3
Science and Operational Excellence	3
Resources.....	4
Financial Performance.....	4
1. ROLE AND PURPOSE	5
Purpose	5
Outcomes	5
Scope of Operation.....	5
2. OPERATING ENVIRONMENT	6
The Shareholder's Expectations Are Clear.....	6
Size and Significance of Our Sectors	6
Operating Environment.....	6
3. VISION AND STRATEGY.....	8
4. INVESTING IN RESEARCH FOR IMPACT	10
Investment and Portfolio Management.....	10
5. SCIENCE STRATEGY, IMPACT TARGETS AND ASSESSMENT	13
Science Strategies.....	13
Alignment of Our Science KPIs With Industry Impacts and Outcomes	13
Alignment of Sector Impact Targets with Statement of Core Purpose Outcome Areas	15
6. PARTNERING FOR SUCCESS.....	22
Engagement with Sectors and Customers	22
Te Rārangā Ahumāra	23
Technology Transfer.....	24
Research Collaboration	24
The International Dimension of Plant & Food Research.....	25
7. SCIENCE AND OPERATIONAL EXCELLENCE	27
Science Excellence.....	27
Encouraging Innovation and Relevance	27
New Capability Development.....	27
Productivity Enhancement.....	28

8. OUR RESOURCES	29
People, Leadership and Culture	29
Land, Buildings and Research Facilities	29
Mt Albert Redevelopment	30
Information Resources, Databases and Collections	31
9. FINANCIAL PERFORMANCE	33
APPENDIX 1: NON-FINANCIAL AND FINANCIAL MONITORING INDICATORS	34
APPENDIX 2: POLICY AND PROCEDURE STATEMENTS	36
APPENDIX 3 MATTERS REQUIRED BY THE CROWN RESEARCH INSTITUTES ACT 1992	38

INTRODUCTION

Plant & Food Research is one of New Zealand's largest scientific research organisations, bringing together over 80 years of food, horticulture, arable and seafood research in a single institute to deliver knowledge and technology that serves 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 horticulture, arable, seafood, and food and beverage industry sectors. Furthermore, as a Crown-owned company, it is expected that Plant & Food Research will operate as a sustainable business.

The impact of Plant & Food Research's science will be measured through the industry sectors that our work underpins. These industries make a significant contribution to our national wealth and well-being. Combined annual turnover in the horticulture, wine, arable and seafood industries is over \$11 billion. The wider food and beverages sector accounts for about 10% of New Zealand's GDP and nearly half of total exports.

Our research is helping to increase this contribution, particularly from growth in exports. Exports of fresh and processed horticultural products grew to reach a total of \$3.648 billion in the year ending June 2013, 8% of total merchandise exports. On top of this, exports of honey increased 13.5% to \$145 million and exports of horticultural machinery were \$79 million. Seafood exports of \$1.5 billion annually are continuing to increase in value.

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 aims 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 pursuit of impact and competitive advantage for New Zealand. There will be challenges for both Plant & Food Research and its industry stakeholders in achieving this potential. Success will be achieved with a strong focus on:

- Investing in research for impact
- Partnering effectively
- Science and operational excellence
- Our resources – people, leadership, infrastructure and assets.

EXECUTIVE SUMMARY

Our 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”.

From Plant & Food Research’s Statement of Core Purpose

Operating Environment

Our Shareholder, the Crown, expects 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 annual turnover in the horticulture, wine, arable and seafood industries is over \$11 billion. The wider food and beverages sector accounts for about 10% of GDP and nearly half of New Zealand’s exports. Exports from the primary sector need to double to achieve the Business Growth Agenda’s target for exports to increase from 30% to 40% of GDP.

Our Vision and Strategy

Our strategy is focused on growth and performance – both for New Zealand and Plant & Food Research. Key themes include:

- Innovation to achieve impact and competitive advantage for New Zealand
- Making choices, and taking a proactive leadership role
- Focusing on market-led as well as production-led opportunities
- Growing our international presence
- Increasing our organisation’s agility and flexibility
- Financial success for Plant & Food Research.

Investing for Impact

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 and the probability of success, across all sources of funding – Core Funding, Government contestable funding and commercial funding.

The allocation of resources for research in the coming period will be similar to that in the current period.

Our main research portfolio is predominantly sector-aligned and is focused on five key outcome areas:

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.

Across these areas we focus on the sectors defined in our Statement of Core Purpose, as well as pan-sector programmes.

To ensure we have sufficient early stage, highly innovative science, we have a separate “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.

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 end-users and research collaborators to deliver research and technology transfer effectively, and subsequently assess the uptake and impact of the research.

Te Rāanga Ahumāra is our partnering approach with Māori to deliver on Vision Mātauranga. There are opportunities in the Māori economy right across our key outcome areas and sector focus, as well as activities specific to Māori. In the coming period we will be increasing our investment in capability building and research.

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 expect to see further growth in our international activities in the coming period, focusing on New Zealand’s key export markets and relevant international science collaborations.

Science and Operational Excellence

We will regularly review our science through our established annual programme of science reviews, and through the work of our Science Advisory Panel.

Non-financial monitoring indicators that we will apply to measure our progress towards pursuing excellence in all our science activities are identified in Appendix 1.

We will continue to strengthen systems and culture that recognise and support the pursuit of robust, innovative and creative science.

Projected growth in revenue over the next five years will be achieved without increasing overall staff numbers, with increases in high priority areas being offset by reductions in lower priority areas.

Resources

During this period we will be undertaking significant capital expenditure to upgrade or replace aging laboratories, containment facilities and buildings, including at our Mt Albert, Te Puke and Nelson sites. 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.

Financial Performance

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 incursion, and continued cost containment and productivity measures. Overall profitability will continue to increase over the five-year period.

1. ROLE AND PURPOSE

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 <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 of Operation

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.

2. OPERATING ENVIRONMENT

The Shareholder's Expectations Are Clear

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

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 wider food and beverages sector contributes about 10% of New Zealand's GDP, and (at \$23 billion p.a.) nearly half of New Zealand's total exports
- Horticulture – industry turnover of \$6.6 billion p.a. with a strategy to grow to \$10 billion by 2020. Exports increased by 5.5% to reach a total of \$3.6 billion in the year ending June 2012
- Wine – a turnover of \$1.91 billion p.a., of which exports were \$1.17 billion
- Arable Crops – with a farm gate value of \$1.5 billion p.a., 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 \$1.5 billion p.a., with the aim to double that through growth in aquaculture and to increase 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 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.

Global consumer and market trends (Figure 1) will influence the value and volume of New Zealand food and beverage exports and are illustrated in the following diagram:

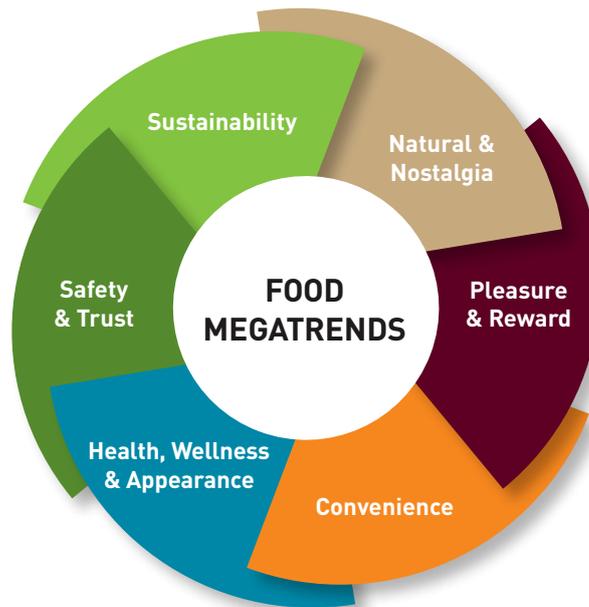


Figure 1: Global megatrends will influence New Zealand exports

The Government’s Business Growth Agenda has the goal of lifting the ratio of exports to gross domestic product to 40% by 2025. Exports of foodstuffs need to grow for this target to be met. Plant & Food Research has a role to play and this will continue to be a major driver for 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.

During the past year we have developed plans for the next phase of our engagement with iwi, hapu, tribal incorporations and other organisations to support their aspirations with relevant science, technology and commercial knowledge. We have increased our resourcing in this area and in the coming period we will continue full implementation of these plans.

As well as supporting growth opportunities, we will maintain a strong focus on the resilience of our industries through our bioprotection and sustainable production research. 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 increasing confidence in the recovery from the Psa incursion, backed by new orchard management practices and new cultivars that are less susceptible to Psa.

Internationally, while the research investment space is competitive, there are encouraging signs that Plant & Food Research can increase its activities in ways that directly support our New Zealand stakeholders. We will continue our traditionally 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, including Australia, China and Southeast Asia.

3. VISION AND STRATEGY

Figure 2, on the following page, brings together the key elements of our mission, vision and strategy.

Our Statement of Core Purpose is the starting point and defines our mission. From there our vision and strategy aim to take us to the next level of performance and impact.

Our focus for the next five years is on growth and performance – for New Zealand and for Plant & Food Research.

We have defined four key measures of success:

- **Impact:** achieving the outcomes and impact necessary for us to achieve our mission
- **Return on Equity:** operating in a financially sustainable manner
- **Partnerships:** the high quality relationships with end-users, research collaborators and funders that are necessary for us to achieve ongoing impact
- **Excellence:** in our science, operations and facilities.

Our high level goals are five outcomes for industry that drive our science strategies, resource allocation and performance assessment. These are:

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
-----------------------------	--	--	--	--

Under these we have mapped our key initiatives and the actions through which we will implement this strategy.

The subsequent sections contain details of the resource allocation, impact indicators, and science strategies to deliver these outcomes.

OUR MISSION



A SUSTAINABLE BUSINESS DELIVERING SCIENCE THAT MAXIMISES OPPORTUNITIES TO ENHANCE NEW ZEALAND'S ECONOMIC, ENVIRONMENTAL AND SOCIAL PROSPERITY

OUR VISION

→ Valued by our stakeholders and admired by our peers for the quality and impact of our science

OUR SUCCESS WILL BE MEASURED BY

→ Impact : → Return on equity : → Partnership : → Excellence

OUR STRATEGIC FOCUS

SCIENCE AND COMMERCIALISATION

- Better Cultivars Faster
- Residue-Free Pest & Disease Control
- More Sustainable & Profitable Production Systems
- Proprietary Foods with Price Premiums
- Sustainable Premium Seafood and Marine Products

ENABLERS

- Innovation through people
- Building operational excellence
- Investing for impact
- Partnering for success
- Growing international opportunities
- Building world-class infrastructure

OUR STRATEGIC PRIORITIES

→ Specific key initiatives and actions

Figure 2: Our mission, vision and strategy

4. INVESTING IN RESEARCH FOR IMPACT

Investment and Portfolio Management

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, right across the outcome areas on which we focus and the sectors with which we work.

The goal of this framework is to optimise the allocation of the resources available to us, 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 approach follows six key principles:

- Impact/Outcome Orientation – investment decisions will be aligned and sized to strategic targets and be driven by the expected impact for the horticulture, arable and seafood industries in line with the agreed outcomes to which Plant & Food Research contributes
- Transparent – research areas will be evaluated on a set of criteria that will be communicated to the relevant stakeholders effectively
- Flexible – Plant & Food Research will be able to adapt and respond to changing conditions and priorities
- Transactional efficiency
- Encouraging collaboration – between research and industry and between researchers
- 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 around the delivery of impacts and outcomes.

There are two main categories in our research portfolio:

→ **Sector-aligned research**

This is the largest category and is based on joint investment and dialogue with the sectors and key stakeholders defined in our Statement of Core Purpose, for agreed outcomes and impacts. Over 80% of our research, from all sources of funding, is in this category. 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.

While principally sector-aligned, there is also a pan-sector component for research directed towards opportunities and needs that span multiple sectors.

Investment in research that will benefit the Māori economy also spans our five outcome-oriented research portfolios and delivers value to a range of Māori interests. Our Te Rāanga Ahumāra strategy for contributing to the economic, social and environmental aspirations of Māori is outlined further on in this document.

→ **Future Science**

This is a smaller category that is directed at higher risk-higher reward initiatives in new science, long-term fundamental research, over-the-horizon future-oriented initiatives, and the development and future-proofing of capability.

The projected total investment and resource allocation across the different sectors and categories is outlined below. This includes the investment of Core Funding and other internal sources of funds approved in 2013/14 for the 2014/15 year.

- Table 1 below shows the projected total research investment in sector-aligned research, including Core Funding plus other internal investment (reinvestment of royalty income), industry investment, and other Government sources of funding
- Table 2 shows total investment in Future Science research portfolio
- Table 3 shows Core Funding totals by Government Budget Output Expense categories.

Table 1: Total Investment in Sector Aligned Research

Sector Investment Summary

\$'000	Current*	Change in Total Investment*	Core Change	Total Core & Internal	Total Investment 2014/15*
Total Change (Absolute)	94.1M	15.2M	2.4M	40.76M	100.9M

*Note: *All sources of funding*

We have defined detailed sector impact targets for the research investments summarised above. These targets are discussed in Section 5.

Table 2: Total Investment in Future Science Research

Future Science Investment Summary

\$'000	Current*	Change in Total Investment*	Core Change	Total Core	Total Investment 2014/15*
Future Science	10,533	560	0	10,533	11,093
Total Change (Net)		560	0		
Total Change (Absolute)		560	0	10.53M	

Table 3: Core Funding Investment by Government Budget Output Expense categories

Allocation of Core Funding by Budget Output Expense Categories

The Core Funding currently allocated to Plant & Food Research corresponds to the following Government Budget Output Expense categories:

Plant & Food Research Core Funding by Output Expense Category	\$ Excl GST
Biological Industries	
Primary industry productivity and sustainability	26,120,293
High value food and biological products and processes	2,844,444
Environmental Research	
Terrestrial ecosystems	1,504,889
Land and freshwater resources	2,222,222
Backbone	378,008
Capability Maintenance and Development	10,033,122
Total (excl GST)	43,102,978

There has been movement within these categories as projects are completed, terminated and commenced but this has not resulted in a change in the totals above for each Budget Output Expense category.

5. SCIENCE STRATEGY, IMPACT TARGETS AND ASSESSMENT

Science Strategies

Our research on New Zealand's plant-and seafood-based food resources is targeted at five outcomes for industry:

Food from horticulture and cropping sectors

1. Better Cultivars Faster™. Accelerated breeding of new and improved food plants that possess attributes which attract price premiums and deliver competitive advantage
2. Residue-Free Pest and Disease Control. Control of plant pests and diseases, increasingly using biological and environmentally based control methods
3. More Sustainable and Profitable Systems. Increasing yield and efficiency in plant production, harvesting, processing and supply chains, with an emphasis on economic and environment sustainability
4. Proprietary Foods with Price Premiums. New whole foods, beverages and nutraceuticals from proprietary cultivars, with proven functionality in wellness

Seafood sector

5. Sustainable Premium Seafood and Marine Products.

These five outcome areas represent the principal levers for value enhancement. Our capability across the full food value chain is a point of difference for Plant & Food Research compared with peer research organisations overseas, which typically focus only on part of the value chain. For example, a new cultivar may deliver a consumer benefit or pest resistance, but production techniques may need to be modified to achieve commercially viable productivity.

In the past year we have developed detailed road maps of sector impact targets against which we will monitor and measure our progress. 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. The following section sets out these sector impact targets for each of the high-level outcome areas in our Statement of Core Purpose.

Alignment of Our Science KPIs with Industry Impacts and Outcomes

We have increased our investment in assessing the impact of our research, to confirm delivery on our Core Purpose, to demonstrate the return on research investment for New Zealand, and to support sound research investment decisions.

In 2013/14 we enhanced our monitoring and evaluation framework to align science outputs, science KPI milestones, impacts and outcome areas more closely with the Statement of Core Purpose outcomes by developing impact agendas with associated timelines for each of our five outcome areas. These impact agendas are targets and timeframes aligned with the strategies and priorities of key sector stakeholders.

Progress against these impact agendas will be reported on our Growing Futures website and in our 2013/14 Annual Report. Evaluation of our performance against these targets will guide research investment decision making, ensure consistency of activity across the Core, contestable and commercial funding spectrum with Statement of Core Purpose outcomes.

The tables in the following section set out these impact targets. These targets are currently being confirmed as part of our strategy refresh and therefore they should be regarded as provisional.

Alignment of Sector Impact Targets with Statement of Core Purpose Outcome Areas

2014/15 Science Deliverables Aligned with Impacts

SCP 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

Outcome Area	Sector Impact Targets	Plant & Food Research Themes	Science Deliverables 2014/15
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	By 2025 novel berryfruit cultivars differentiated by increased production efficiency, superior sustainability and unique traits are contributing to increased returns of more than \$11M p.a. and reducing pest and disease management costs by more than \$5M p.a. By 2020 new wheat cultivars will be yielding 20 t/ha; the New Zealand dairy, poultry and pork industries are 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.	Cultivar development, including wide hybridisation and marker assisted selection Optimising plant and fruit physiology to maximise yield and harvest recovery Sustainable pest and disease management Understanding pest/pathogen – host interactions 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 Breeding for improved milling quality in bread and biscuit wheat cultivars and high yielding, intensely coloured purple wheat for kibbling 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 New cultivar development Neutralising the impact of Psa Protecting against and managing pests and diseases Optimising production systems and supply chain Consumer and health research	An evolving platform of breeding tools delivering cultivars, against jointly agreed development targets Evidence that genomic selection technologies can be used to support breeding in New Zealand plant-based food crops
	By 2022 new and novel ornamental cultivars will be contributing to the ornamental sector's target of up to \$400M p.a. by 2025 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	Developing rapid clonal propagation and production systems for faster delivery of elite clones Conventional and fast breeding of new apple and pear cultivars Breeding tools and germplasm: germplasm maintenance, characterisation and development, and genotyping by sequencing Genetics and breeding for improved consumer appeal: carotenogenesis, anthocyanin accumulation and flavour discovery Genetics and breeding for improved productivity through pest and disease management, new rootstocks, and durable resistance	New genomic and breeding tools Developing rapid clonal propagation and production systems for faster delivery of elite clones Conventional and fast breeding of new apple and pear cultivars Breeding tools and germplasm: germplasm maintenance, characterisation and development, and genotyping by sequencing Genetics and breeding for improved consumer appeal: carotenogenesis, anthocyanin accumulation and flavour discovery Genetics and breeding for improved productivity through pest and disease management, new rootstocks, and durable resistance
	By 2018 Plant & 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	Potato breeding targeting productivity, pest and disease resistances and value-adding processing attributes for food and non-food products Applying molecular and genome breeding tools and population-based understanding of genetic and environmental variances to integrate key traits	

SCP 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		
Outcome Area	Sector Impact Targets	Plant & Food Research Themes
		Science Deliverables 2014/15
	<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</p> <p>Identifying, collecting and conserving tāewa potato lines in tissue culture and disease-free</p> <p>Maintaining and evaluating germplasm</p>	
	<p>By 2020 plantings of at least three new apricot cultivars for Asian markets will have reached 280 ha and be contributing up to \$10M p.a. in new industry revenue</p> <p>By 2018 new storage protocols enabling premium product 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</p>	<p>Inventory management – operating procedures for inventory management</p> <p>Export shipping systems</p>
Proprietary Foods with Premium Prices	<p>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</p> <p>By 2017 at least two New Zealand companies within the consumer and health sector will be each exporting one food product and/or food ingredient with functional benefits that contribute to health</p> <p>By 2018 berry-based, functional food products with scientific evidence of efficacy will be generating additional export revenue of up to \$25M p.a.</p> <p>By 2016 robust data to support health and well-being claims along with related consumption decisions will inform kiwifruit industry investment in market development and research</p> <p>By 2020 new supply chain systems for new 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 revenue by up to \$175M p.a.</p> <p>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> <p>By 2018 Plant & Food Research potato cultivars with enhanced processing and consumer traits, and new potato food and end-use products, including secondary metabolite-derived products, will account for 10% of the processing sector (\$73M p.a.) and stimulate the development of a new specialty market worth \$3M p.a.</p>	<p>Quality management for late-season fruit</p> <p>Understanding the different gluten intolerance-related epitopes in Plant & Food Research proprietary wheat lines</p> <p>Understanding the effects of crop management and baking technology on gluten intolerance</p> <p>Consumer and health research</p> <p>Knowledge of the contribution of whole berry/fruits and ingredients to health and well-being, e.g. in inflammation, sports recovery, mental acuity, immunity, safety and digestive health</p> <p>New cultivar development</p> <p>Consumer and health research</p> <p>New cultivar development</p> <p>Protecting against and managing pests and diseases</p> <p>Optimising production systems and supply chain</p> <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> <p>Understanding consumer preference for flavour</p> <p>Managing the impact of processing on nutritional and textural quality of potato products</p>
<p>Adoption Indicators</p> <p>→ Food industries in New Zealand and offshore use proprietary Plant & Food Research cultivars and processes to generate processed foods and ingredients</p> <p>→ Food companies and brands use Plant & Food Research science to provide wellness-based claims and food solutions</p> <p>Impact Indicators</p> <p>→ Growth in export value of whole foods and ingredients based on fruits, vegetables, and grains</p> <p>→ Increased market share of high margin export food products and ingredients based on Plant & Food Research cultivars, processes and knowledge that capture wellness benefits</p>		

SCP 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		
Outcome Area	Sector Impact Targets	Plant & Food Research Themes
		Developing and commercialising new convenience foods with enhanced nutritional value
	By 2022 new technologies enabling sea freight of truss tomatoes and capsicum will have been implemented by at least one exporter to open new markets in Asia, increasing export returns by up to \$50M p.a.	Understanding secondary metabolite development
	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	Systems to enable export by sea freight for high-value covered crops to new markets
		Establishing the roles of terroir, seasonality, viticultural practices and harvest technologies on wine style
		Viticultural and winemaking tools to develop new wine styles
		Identifying key components of aroma, flavour and mouthfeel that define sensory quality for target markets
		Establishing a <i>Vitis</i> genetic resource for genetic studies and undertaking trait inheritance research
	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.	Improved culture and husbandry technologies for new and existing species
		New selective harvest technologies
		New production systems, including wild fisheries enhancement and aquaculture
	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.	Understanding and responding to consumer preferences for seafood and seafood-based products
		Understanding properties of seafood products
		Understanding and managing risks to food safety
	By 2025 optimised extraction technologies for unique marine extracts with proven applications as ingredients and biomaterials will support export growth of \$80M p.a.	Understanding and control of raw materials including composition and molecular structure
		Development of new processes to optimise extraction of target compounds
		Understanding function and format and their impact on product quality and efficacy
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.		Progress towards new harvest and postharvest technologies to support higher value seafood products
Impact indicators		Steps towards the development of new technologies to support extended shelf-life and food safety
→ Growth in export volume and value of premium seafood and marine products		Understanding and responding to consumer preferences for seafood and seafood-based products
		Progress towards the development of extraction technologies with maximum value capture and minimised wastage to produce novel high-value products

SCP 2: Protect and enhance market access in New Zealand's horticultural and arable sectors			
Outcome Area	Sector Impact Targets	Plant & Food Research Themes	Science Deliverables 2014/15
<p>Residue-free pest and disease control</p> <p>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</p> <p>→ Industries adopt a range of biological and ecologically based methods that provide highly effective pest and disease management solutions which balance phytosanitary and agrochemical residue requirements of markets</p> <p>Impact indicators → Enhanced international competitiveness of export sectors through pest and disease management solutions to maintain and/or increase market access</p> <p>→ NZ's environmental quality enhanced by minimising pest and disease incursions, managing pests and diseases and reducing risks associated with pest management technologies</p>	<p>By 2020 disease management on orchard and/or postharvest will be reducing pesticide use in orchards, maintaining fruit quality, and retaining or increasing market access, contributing up to \$5M p.a. additional revenue to the avocado sector</p> <p>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> <p>By 2018 ecological understanding and new integrated control options for pests and diseases, leaving nil or low pesticide residues, will maintain market access for new and existing kiwifruit cultivars and enable the industry to respond in the event of new biosecurity incursions, protecting \$1.56B p.a. of exports</p> <p>By 2022 enhanced market access through new sustainable pest and disease management technologies and systems will contribute up to \$200M of new revenue towards the pipfruit sector's goal of \$1B by 2022</p> <p>By 2018 barriers to import/export of ornamental plants to/from New Zealand will have reduced, contributing to the ornamental sector's target of up to \$400M p.a. by 2025</p> <p>By 2025 IPM programmes for potato pests and diseases, including tomato potato psyllid/<i>Candidatus Liberibacter solanacearum</i> (TPP/CLso), will be saving up to \$25M p.a. on pesticides and production opportunity costs</p> <p>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</p>	<p>Integrated pest and disease management systems</p> <p>Enhancing market access through new pest and disease technologies</p> <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>New cultivar development</p> <p>Neutralising the impact of Psa</p> <p>Protecting against and managing pests and diseases</p> <p>Controlling apple diseases</p> <p>Understanding durable disease resistance</p> <p>Enhancing biocontrol of market access pests</p> <p>Developing semiochemicals and deeper understanding of ecological interactions for new biological control agents</p> <p>Enhancing market access through new pest and disease technologies</p> <p>Systems-based approaches to pest risk management</p> <p>Developing protocols for eliminating viruses from elite genotypes</p> <p>Establishing an <i>in vitro</i> repository for quality control and IP verification of high health germplasm</p> <p>Developing and maintaining CLso-infected and non-infected TPP</p> <p>Designing tools for managing TPP/CLso</p> <p>Developing and supporting the adoption of management options for controlling TPP/CLso</p> <p>Developing and refining tools for managing other critical pests and diseases</p> <p>Developing and supporting the adoption of a regionally based Integrated Pest Management (IPM) approach</p> <p>Enhancing market access through new pest and disease technologies</p> <p>Monitoring and managing pest and disease populations</p>	<p>Progress towards the development of new tools and systems for biologically based pest and disease control</p> <p>Steps towards new cultivars stacked with targeted pest and disease resistance</p> <p>Progress towards the development of new 'safe' disinfection technologies</p> <p>Improved biosecurity risk assessments, detection technologies, optimised surveillance approaches and new tools for response and eradication</p>

SCP 2: Protect and enhance market access in New Zealand's horticultural and arable sectors			Science Deliverables 2014/15
Outcome Area	Sector Impact Targets	Plant & Food Research Themes	
	By 2020 at least one alternative management strategy for a pest or disease in glasshouse crops will be enhancing market access and increasing export returns by up to \$5M p.a. while practices that reduce chemical use in at least one process vegetable crop will be saving growers of that crop at least \$1M p.a.	Developing integrated pest and disease management systems for an export-focused process vegetable crop and/or covered crop, and ensuring the sustainability and resilience of IPM systems for vegetables in the face of invasive pests and diseases with the potential to affect multiple crops	
	By 2021 grape growers will be using web-based decision tools to better manage bunch rot diseases, reducing mitigation costs by up to \$1.6–5.6M p.a. and maintaining residue-free status	Novel pest management tools for covered tomato and capsicum crops Novel disinfections technologies for covered tomato and capsicum crops Developing enhanced and new bunch rot disease control tools and practices from new knowledge of vineyard pathogen biology, ecology, host genetics and vineyard microbiology	
	From 2016 new tools to increase the average lifespan of vineyards from 25 to 35 years will be implemented and preparedness plans to protect the national vineyard from imminent pest and disease threats will be in place	Understanding the life cycle and epidemiology of second-tier fungal diseases and developing growing practices to manage their effects 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	

SCP 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			
Outcome Area	Sector Impact Targets	Plant & Food Research Themes	Science Deliverables 2014/15
<p>More sustainable and profitable systems</p> <p>Adoption indicators → New Zealand agricultural and horticultural industries adopt Plant & Food Research-developed production, harvesting, postharvest, packaging, handling and storage systems</p> <p>→ Central and local government agencies use knowledge and tools from Plant & Food Research science to inform policy development and systems design</p> <p>Impact indicators → Maintained and/or increased crop volumes, value and profitability</p> <p>→ New Zealand's productive environments sustained or enhanced, generating products with verifiable reduced footprints, to maintain and/or increase market access</p>	<p>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> <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>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>By 2022 integrated research programmes will increase the amount of Class 1 onions exported by 10%, increasing returns by \$6M</p> <p>By 2020 improved orchard productivity and profitability will contribute up to \$150M new revenue towards the pipfruit sector's goal of \$1B by 2022</p> <p>By 2025 best management practices, including cultivar choice and management of seed quality, will enable the production potential of Plant & 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>By 2020 increased orchard profitability and higher productivity of premium priced quality summerfruit will be generating up to \$15M p.a. in new industry revenue</p>	<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> <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>New cultivar development</p> <p>Neutralising the impact of Psa</p> <p>Optimising production systems and supply chains</p> <p>Maintain germplasm for yield and disease research</p> <p>Minimising yield of Class 1 onions</p> <p>Sustainable pest and disease management for increasing Class 1 onions</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>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>Harnessing architectural diversity and plasticity to create a new intensive planting system for cherries and apricots</p> <p>Developing orchard technologies to manipulate growth allocation and dry matter utilisation to enhance yield and fruit quality in cherries and apricots</p> <p>Improved pollination systems</p>	<p>Progress towards the development of tools and technologies to guide sustainable farming practices</p> <p>Extending and refining pan-sector modelling platforms (e.g. Overseer and APSIM)</p> <p>New scientific understanding underpinning farming within limits, including productivity, profitability, environmental constraints and regulatory/compliance frameworks</p>

SCP 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		
Outcome Area	Sector Impact Targets	Plant & Food Research Themes
	<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>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>Enhancing crop productivity and quality in export field vegetables</p> <p>Tools for efficient nutrient use in export field vegetables</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>
		Science Deliverables 2014/15

6. PARTNERING FOR SUCCESS

Strong and effective relationships are critical for our success – partnerships with clients and other end-users, Government stakeholders and research collaborators, in New Zealand and internationally.

Engagement with Sectors and Customers

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

For our existing relationships, we will:

- Develop and implement jointly with key stakeholders, research plans which link science outputs and targeted sector outcomes
- Develop partner plans to guide interactions with our most important partners in a coordinated manner
- Use sector plans to inform and challenge both our long-term science plans and also our resource allocation and portfolio management processes
- Seek feedback on customer satisfaction, and work to optimise our business processes to maximise impact
- Secure and manage intellectual property to create competitive advantage for New Zealand, and for our partners and Plant & Food Research to share in the value of the intellectual property.

For new relationships, we will:

- Identify high potential and high impact industry sectors and customers to which we believe we can contribute within the scope of our Statement of Core Purpose
- Develop and implement engagement plans for the identified sectors and customers.

*He kai kei aku ringa
He kai mo te ora
He kai mo te ao¹*

In the past year we refreshed our strategy for engagement with Māori, to grow the Māori economy with Māori-relevant science and innovation.

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

- Introduce new technologies to business-ready Māori enterprises to grow the value and productivity of Māori 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 by Māori customers and embed understanding of Māori throughout Plant & Food Research.

To achieve these goals we have a target of growing our science involving Māori to \$10 million p.a. by 2018. The growth will be achieved through three approaches:

- Growing new contract R&D with business-ready Māori organisations, Government and other funders
- Increasing the connection of our existing sector-based activity with business-ready Māori organisations and enterprises so they have greater direct impact on the Māori economy
- Increasing Māori participation in science through fellowships and studentships.

New initiatives will be taken to make this happen, including:

- Establishing a Māori Advisory Group
- Appointing a new Business Manager and Customer Account Managers
- Expanding membership of our Te Rārangā Ahumāra oversight team
- Investing Core Funding in taonga Māori initiatives
- Increasing Māori scholarships and internships to grow the number of young Māori in Plant & Food Research.

We are developing improved reporting capability of our research portfolio database to provide better visibility of all research activities that benefit Māori directly, and this will be in place in 2014/15.

¹ "Food from our hands, food for health, food for the world"

Technology Transfer

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 mechanism 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.

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.

Appendix 1 identifies non-financial monitoring indicators that we will apply to measure our progress towards developing strong, long-term partnerships with industry, government and Māori; setting research priorities that are well linked to the needs and potential of our end-users; and transferring technology and knowledge from domestic and international sources to New Zealand industry, government and Māori.

Research Collaboration

We will continue to develop, lead and participate in research alliances that enhance our capability, science quality and research delivery. To deliver on our core purpose, we need top quality research teams with the required capabilities and expertise. Plant & Food Research has clear strengths in some areas and will work actively with other organisations for additional and complementary capability through long-term partnerships and project-specific research collaborations.

New Zealand's National Science Challenges will be an important focus for us during and beyond the period of this Statement of Corporate Intent. We will participate actively in the Challenges and will coordinate and align relevant resources and activities within the scope of our Statement of Core Purpose. Plant & Food Research has contributed to the development of proposals for most of the Challenges. We expect to play a leading role in three of the ten Challenges (High Value Nutrition, New Zealand's Biological Heritage, and Our Land and Water) and we expect to be a participant in most of the other Challenges (including Aging Well, A Better Start, Healthier Lives, Sustainable Seas and Science for Technological Innovation).

We will continue to work with and support the work of 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 expect to contribute to several of the National Technology Networks 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 investment in common or

complementary infrastructure and facilities will commence. FoodHQ™ is already established and in its first two years has achieved good results, with new industry clients and new members joining. Planning for the proposed Lincoln Hub is well advanced and we expect implementation will commence soon.

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.

Collaboration is a measure of Plant & Food Research's national and international connectedness and reputation, and therefore our science quality. Non-financial monitoring indicators for this are listed in Appendix 1.

The International Dimension of Plant & Food Research

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. So 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:

1. Providing in-market and behind-borders support for New Zealand companies, industries and licensees
2. Providing access to world-leading science capabilities
3. 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
4. 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:

Australia

Australia is an important territory for many of our New Zealand clients. 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.

North America and Europe

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 North American activity tends to be applied in focus; in contrast, a particular strength of our European activity is our collaborations with leading research institutes and collaboration networks. Variety and technology licensing is an important activity in both regions. Our focus will be on expanding and deepening these collaborations with selected research organisations, clients and licensees.

Asia

With its proximity, strong growth (economically 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 will give China greater emphasis in the coming period. We will continue implementation of several initiatives that build on our long-standing research relationships with institutes in China. 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.

7. SCIENCE AND OPERATIONAL EXCELLENCE

Science Excellence

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 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.

The Panel will continue to provide advice and foresight to the Board on Plant & Food Research's science quality, strategy, and involvement in and uptake of new international developments.

Non-financial monitoring indicators that we will apply to measure our progress towards pursuing excellence in all our science activities are identified in Appendix 1.

We will continue to strengthen systems and culture that recognise and support the pursuit of robust, innovative and creative science.

Encouraging Innovation and Relevance

Our science teams are encouraged to be innovative through our Core-funded Blue Skies Programme. This programme supports small projects that take innovative ideas to proof of concept. At the same time as encouraging the development of new ideas, the programme also provides feedback on the relevance and alignment of ideas to Plant & Food Research strategy and future industry needs.

New Capability Development

With revenue from the Crown expected to remain more or less constant over the next five years, the development of new areas will be achieved through a combination of redirecting of 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 at an optimal level. This goal is supported by ongoing programmes targeted at promising science students.

Productivity Enhancement

The projected growth in revenue over the next five years will be achieved without increasing overall staff numbers, with increases in high priority areas being offset by reductions in lower priority areas. To enhance the productivity of our science teams further, we will continue to increase the ratio of technicians to scientists. This ratio has reduced from approximately 1.4:1 technicians per scientist in 2009/10 to 1.15:1. Together, these measures are expected to lift revenue per science FTE from the current \$191,000 per FTE to \$249,000 per FTE by 2017/18 in our five-year Business Plan.

8. OUR RESOURCES

People, Leadership and Culture

We will continue to make significant investments in our people. While these will largely be directed at building scientific and technical knowledge and skills, we will also continue to invest in the development of leadership capability at all levels of the organisation through our highly regarded leadership programme. The programme forms a major element in a range of integrated initiatives for identifying and developing our next generation of leaders.

The challenging environment in which we are currently operating has the potential to affect staff engagement and retention levels as people experience and adapt to change and extra pressures. In these circumstances it is vital that they can have confidence in the future. To this end we will 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.

Land, Buildings and Research Facilities

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 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, 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.

At the largest site at Mt Albert, Auckland, a master plan outlines the site's long-term development and progressive renewal in the years ahead. During the past year we received Shareholder approval for a \$43 million capital investment programme to be completed in the next three years. We expect to commence the first major stage of refurbishment in 2014/15. This renewal programme represents a major, high priority investment for the Institute.

In 2013/14 we completed a new facility in Nelson to support delivery of the research for the PGP-funded Precision Seafood Harvesting programme. We also completed a master plan for the future location of our site in Nelson. This will be implemented during the coming five-year period.

We will continue to develop long-term Master Plans for our other larger sites, including Palmerston North and Lincoln, in conjunction with the other members of these key research and technology hubs.

In parallel we will continue to assess and review our property holdings and ownership arrangements in light of our evolving research requirements.

Mt Albert Redevelopment

During this planning period we expect to complete the redevelopment of our Mt Albert Campus, at a total cost of \$43.5 million.

The underlying national asset strategy and strategic case for investment started with a long-term site master plan supporting Plant & Food Research's overall strategy. The Mt Albert campus redevelopment will achieve three key strategic objectives:

1. The replacement of end-of-life facilities at our largest site that are critical to delivering on our core purpose and achieving our strategy
2. The creation of options for an important aspect of our national asset strategy: the establishment of an Auckland Biological and Environmental Sciences Research innovation hub, complementing the collaborative hub initiatives in Lincoln and Palmerston North
3. The underpinning of our organizational strategic objective to be a world-leading plant and food research centre.

This investment will be staged over the next 4–5 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	May 2014	In progress
Detailed design	June 2014	Not started
Award main contractor contract	September 2014	Not started
Construction complete	December 2016	Not started

This investment not only ensures business continuity at our most significant research facility, but also creates the capacity and productivity options required to deliver on our Business Plan. Together, these benefits will better position Plant & Food Research and its collaborators to support the sectors we service for the long term.

Information Resources, Databases and Collections

In the coming period we will be making significant investments in our IT infrastructure to improve the security and accessibility of data held in our Institute.

Advances in information technology provide both the opportunity and a responsibility to better structure the way the Institute collects and manages data and knowledge. While peer-reviewed publications represent a readily accessible record of the research undertaken on any topic, there is typically a far larger body of data and other information which, for one reason or another, is not published and which, as a consequence, is far less readily accessible.

Information management technologies provide a mechanism for collecting, storing and organising data and other knowledge so that they can be appropriately accessed and utilised at any future point. Our aim is to facilitate improvements in the sharing of information for collaboration purposes, effective succession management, and the creation and protection of valuable intellectual property. The key steps are to invest in:

- Improved system security and resilience, including replicated server sites and increased data storage capacity. This will be done in 2014/15 in conjunction with the Mt Albert Research Centre redevelopment
- Improved accessibility and utilisation of data sets within Plant & Food Research
- Improved and secure access by external parties to Plant & Food Research data.

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. Our significant investment in the development of new and improved systems for information management acknowledges this responsibility. This investment is also enabling us to meet our obligations under the Public Records Act.

At the same time there is increased awareness of the importance of data security and increases in cyber security incidents and risks.

We also need to protect valuable intellectual property, to best deliver on our Core Purpose, and to create opportunities and competitive advantage for New Zealand.

Policy for Management of Intellectual Assets

During the past year we reviewed our policy for management of intellectual assets and published this on our website (<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.
- 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.

- 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 utilization.
- 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.

Databases and Collections

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.

Policies for the databases and reference collections in which Plant & Food Research has an interest are contained in Appendix 2.

9. FINANCIAL PERFORMANCE

In the early years of this planning period, our financial performance is affected by the impact of the Psa incursion in the kiwifruit industry. During this period we will maintain research levels to continue to support the sectors and responsibilities within our Statement of Core Purpose. This will result in a lower Return on Equity (ROE) in the early years of this period, but thereafter recovering to the ROE recommended for Plant & Food Research in the 2012 Balance Sheet Review.

The following table contains our financial targets and expected performance over a five-year period.

Summary of Financial Performance					
Financial Year	2014/15	2015/16	2016/17	2017/18	2018/19
\$(M)					
Total Revenue	126.0	135.2	143.9	150.1	155.3
Total Costs	-115.8	-119.8	-123.3	-126.4	-129.4
Earnings before depreciation, interest & tax	10.2	15.4	20.6	23.7	25.9
Depreciation	-9.4	-10.8	-12.4	-14.0	-14.5
Earnings before interest & tax	0.8	4.6	8.1	9.7	11.4
Net Interest and gain on sale	3.3	0.1	5.6	-0.5	-0.4
Net profit before tax	4.1	4.7	13.7	9.2	10.9
Notional tax	-0.4	-1.3	-2.2	-2.6	-3.1
Net profit after tax	3.7	3.4	11.5	6.6	7.9
% Revenue	3%	3%	8%	4%	5%
ROE %	5%	4%	12%	7%	8%

APPENDIX 1: NON-FINANCIAL AND FINANCIAL MONITORING INDICATORS

MBIE Generic Indicators

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

		2011/2012	2012/2013	Target 2014/2015
End-user collaboration	(in \$000s)	31.5	31.9	35–40
Research collaboration	(% International/ New Zealand and CRI)	40%	37%	37–40%
Technology and knowledge transfer		0.71	0.75	0.71–0.75
Science quality		2.81	2.82	2.81–2.82
Financial indicator	(in 000s)	152	150	154–158

As our revenue increases against staff numbers remaining constant, both end-user collaboration and the financial indicator of revenue/FTE are forecast to increase. We are targeting stasis for the proportion of collaboration, technology and knowledge transfer, and science quality for the 2014/15 year.

At the time of writing, the figure for *end-user collaboration* is for total non-government revenue, and the figure for *research collaboration* is the proportion of international co-authored publications with all others.

Specific Indicators for Plant & Food Research

During 2014/15 as we complete the strategy refresh we currently have underway, we will develop new indicators specific to Plant & Food Research, to take effect from 2015/16. This year we will continue to monitor and report on the previous MBIE-defined generic indicators, which are as follows:

END-USER COLLABORATION: CRIs are expected to develop strong, long-term partnerships with industry, government and Māori, and to work with them to set research priorities that are well linked to the needs and potential of their end-users (generic operating principle in the Statement of Core Purpose).
Percentage and number of relevant funding partners and other end-users that have a high degree of confidence in the CRI's ability to set research priorities, and the effectiveness of the collaboration or partnership (survey data). Annually
Total dollar value of revenue (in cash and in-kind), and dollar value subcontracted out to other organisations from each 'source category' per annum from rolling five years (administrative data). Quarterly
RESEARCH COLLABORATION: CRIs are expected to develop collaborative relationships with other CRIs, universities and other research institutions within New Zealand and internationally to form the best teams to deliver the CRI's core purpose (generic operating principle in the Statement of Core Purpose).
Percentage of relevant national and international research providers that have a high degree of confidence in the CRI's ability to form the best teams to deliver on the CRI's outcomes (survey data). Annually
Number and percentage of joint scientific peer-reviewed publications and IP outputs with other New Zealand or international research institutions per annum (administrative data). Quarterly
TECHNOLOGY & KNOWLEDGE TRANSFER (SCIENCE RELEVANCE): CRIs are expected to transfer technology and knowledge from domestic and international sources to New Zealand industry, government and Māori (generic operating principle in the Statement of Core Purpose).
Total number and percentage of licensing deals of CRI-derived IP (including technologies, products and services) with New Zealand and international partners per annum (administrative data). Quarterly
Percentage of relevant end-users who have adopted knowledge and/or technology from CRIs (survey data). Annually
Percentage change in the number of requests and enquiries for the CRI's publicly available collections (administrative data). Quarterly
SCIENCE QUALITY: CRIs are expected to pursue excellence in all their activities (CRI Act).
Total number of international awards, invitations to participate on international committees, and editorial boards for the CRI's published papers, per annum. Annually
Average number of citations per CRI published paper. Quarterly
Proportion of published papers in the top 25 international journals relevant to the scope of the CRI (as outlined in the Statement of Core Purpose) per annum. Annually
CORE FINANCIAL INDICATORS: CRIs are expected to focus on financial viability
Projected cashflow – the measure of forward looking. Quarterly
Operating margin – the profitability of the company per dollar of revenue. Quarterly
Profit per FTE – the ability of the company to generate a return from its staff. Quarterly
Revenue growth – the measure of whether the company is growing revenue. Quarterly

APPENDIX 2: 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 and 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 in the workplace. There is a strong focus on employee involvement through the National Health and Safety committee and local committees of each of our ten sites.

Accounting Policies

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

<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 the Shareholders
- 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 Shareholder starting from 2016/17. Before making a decision on payment of a dividend, the Board will consider the above factors and consult with the Shareholder.

Significant Transactions Policy

The Board will obtain 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 a 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 3 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	2015	2016	2017
Equity ratio	0.77:1	0.76:1	0.73:1

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 recently 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 Shareholder for the commercial value estimate. This estimate produced a valuation range of \$50 to \$90 million. The Company's current net asset position (\$77 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.

Discover. Innovate. Grow.™

FOLLOW PLANT & FOOD RESEARCH ONLINE:



www.plantandfood.co.nz