

ANNUAL REPORT 2015



impact

noun |'impakt|

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.



Our science is **Growing Futures™**

OUR PURPOSE

To enhance the value and productivity
of the horticultural, arable, seafood
and food and beverage industries.



Developing new uses for by-products, such as electrospinning nanofibres from marine collagen, adds value to New Zealand's plant and marine-based food industries.



1

OUR MISSION

A sustainable business delivering science that maximises opportunities to enhance New Zealand's economic, environmental and social prosperity.

2

OUR VISION

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

3

OUR VALUES

The creative application of our knowledge; Relationships based on honesty, mutual respect and trust; Achievement through leadership.

This report presents Plant & Food Research's operating results for the financial year ending 30 June 2015. It meets our reporting requirements for the Acts of Parliament under which we are governed. Unless otherwise stated, all figures are in New Zealand Dollars (\$).

This report also demonstrates how we are supporting our Core Purpose industries in meeting their targets for economic and environmental sustainability. It provides easy-to-read information outlining our performance and strategy, as well as case studies that demonstrate a cross-section of our research and outreach activities. This information is presented for the interest of our key stakeholders, including shareholders, staff, commercial partners and research collaborators.

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



www.plantandfood.co.nz/growingfutures

More information can be found on our company website and via our social media channels.

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About us

OUR SECTORS



HORTICULTURE WINE SEAFOOD FOOD AND BEVERAGE CROPPING

2014 Export market value (\$B)

2.58 1.32 1.54 30.6 0.28

2014 Domestic market value (\$B)

2.51 0.75 0.35 17.6 1.5

Future target (\$B)

10 2 3 60 1.95
BY 2020 EXPORTS BY 2020 EXPORTS BY 2025 EXPORTS BY 2025 BY 2025

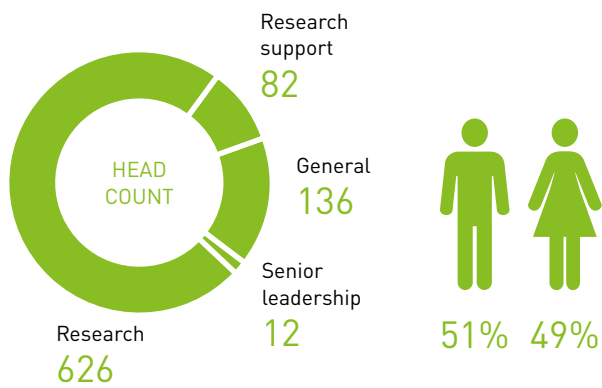
OUR HISTORY

- **1926** The Department of Scientific and Industrial Research (DSIR) formed.
- **1928** DSIR joined with the Department of Agriculture in establishing a Plant Research Station.
- **1936** Plant Research Station transferred entirely to the DSIR. The DSIR began doing its own research rather than coordinating that of other institutions.
- **1980** The Fish Research Unit established at DSIR.
- **1992** Ten Crown Research Institutes (CRIs) established out of former government departments.
- **2008** Plant & Food Research formed following the merger of former CRIs HortResearch and Crop & Food Research.

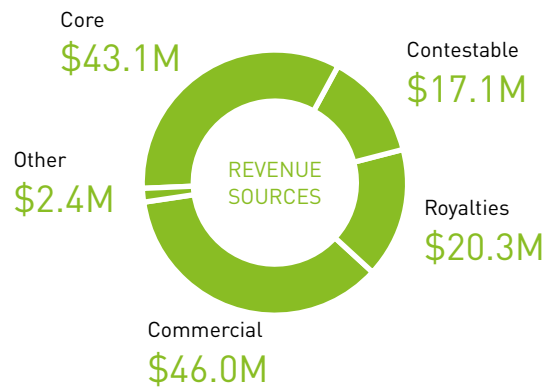
Plant & Food Research is a New Zealand-based company providing research and innovation to ensure the sustainable growth of the plant and marine-based food industries.

The Institute brings together more than 80 years of food, horticulture, arable and seafood research to deliver knowledge and technology to enhance New Zealand's economic, environmental and social prosperity.

OUR PEOPLE



OUR FUNDING



We have close to 850 staff based at 14 sites across New Zealand, as well as offices in Australia and the USA.

Our activities are funded through the New Zealand Government – our sole shareholder – in the form of Core Funding and contestable research funding, as well as through commercial revenues.

Meeting consumer demands for safe, sustainable and nutritious foods ensures New Zealand produce commands a premium in global markets.

Our locations















New Zealand












Australia



USA

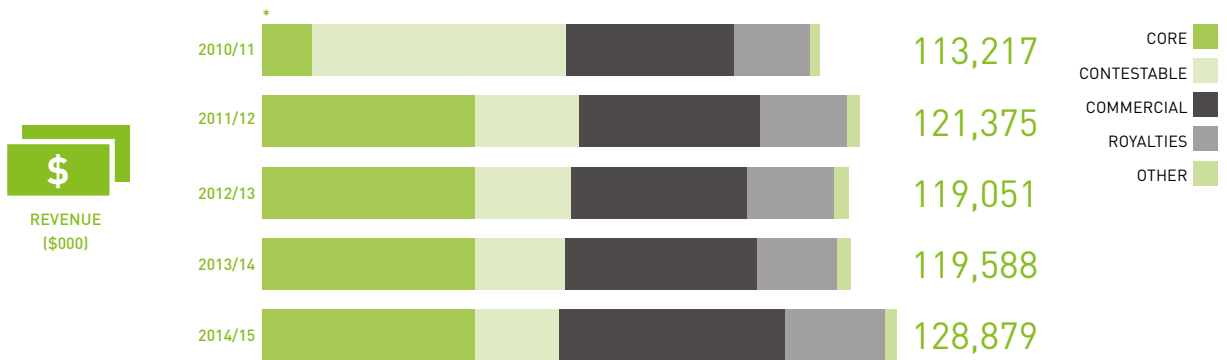
-  AVOCADO
-  BERRY
-  BRASSICA
-  CEREAL
-  CITRUS
-  HOP
-  KIWIFRUIT
-  PEA
-  PIPFRUIT
-  POTATO
-  ONION
-  SEAFOOD
-  SUMMERFRUIT
-  WINE GRAPE

1 KERIKERI	2 AUCKLAND	3 PUKEKOHE	4 RUAKURA
RESEARCH FARM (ha) 27 	RESEARCH FARM (ha) 0	RESEARCH FARM (ha) 4 	RESEARCH FARM (ha) 0
STAFF	STAFF	STAFF	STAFF
RESEARCH GENERAL TOTAL 13 1 14	RESEARCH GENERAL TOTAL 197 82 279	RESEARCH GENERAL TOTAL 6 - 6	RESEARCH GENERAL TOTAL 52 5 57
5 TE PUKE	6 HAWKE'S BAY	7 PALMERSTON NORTH	8 WELLINGTON
RESEARCH FARM (ha) 48 	RESEARCH FARM (ha) 40 	RESEARCH FARM (ha) 0	RESEARCH FARM (ha) 0
STAFF	STAFF	STAFF	STAFF
RESEARCH GENERAL TOTAL 37 4 41	RESEARCH GENERAL TOTAL 44 12 56	RESEARCH GENERAL TOTAL 104 13 117	RESEARCH GENERAL TOTAL - 1 1
9 NELSON	10 MOTUEKA	11 BLENHEIM	12 LINCOLN
TANKS (TOTAL 600,000L) 48 	RESEARCH FARM (ha) 31 	RESEARCH FARM (ha) 10* 	RESEARCH FARM (ha) 210 
STAFF	STAFF	STAFF	STAFF
RESEARCH GENERAL TOTAL 35 6 41	RESEARCH GENERAL TOTAL 27 3 30	RESEARCH GENERAL TOTAL 14 1 15	RESEARCH GENERAL TOTAL 163 20 183
13 CLYDE	14 DUNEDIN	15 16 17 AUSTRALIA	18 USA
RESEARCH FARM (ha) 56 	RESEARCH FARM (ha) 0	15. ADELAIDE 16. BRISBANE 17. ALBURY	18. DAVIS, CALIFORNIA
STAFF	STAFF	STAFF	STAFF
RESEARCH GENERAL TOTAL 8 1 9	RESEARCH GENERAL TOTAL 6 - 6	RESEARCH GENERAL TOTAL 4 2 6	RESEARCH GENERAL TOTAL - 1 1

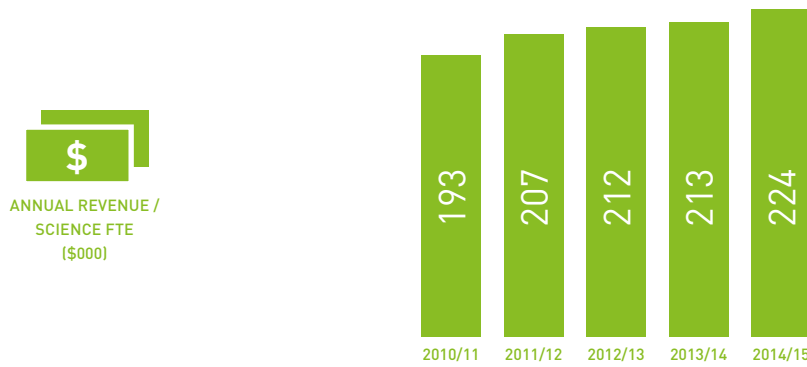
* VIA MARLBOROUGH RESEARCH CENTRE

Our performance

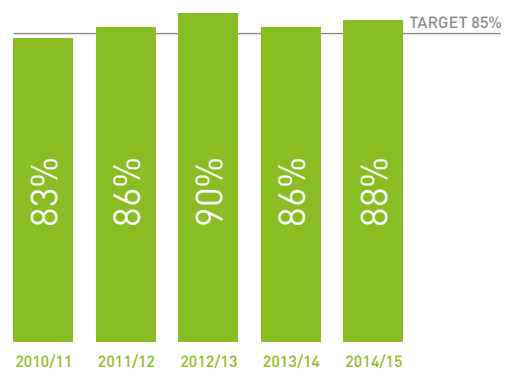
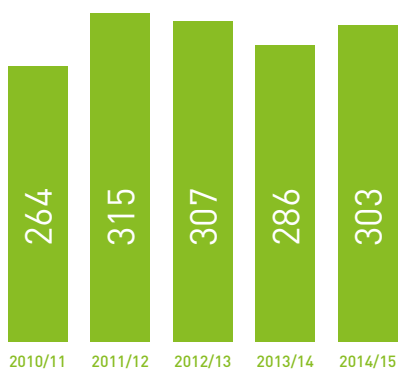
FINANCIAL PERFORMANCE



* Core Funding was allocated from 2011/12. Prior to this, Plant & Food Research received Capability Funding.



SCIENCE PERFORMANCE



Highlights 2015

- ➔ **RIGHT: Opening the 'Hop Lab' to evaluate the sensory characteristics of new hop cultivars.** The experimental brewery, in partnership with NZ Hops and Chris Little Engineering, will support the identification and commercialisation of new hops with characteristics desired by the craft brewing industry.
- ➔ **Supporting three new Sustainable Farming Fund projects to increase New Zealand horticultural exports.** The projects, led by Onions New Zealand, the Foundation for Arable Research with Potatoes New Zealand, and Pipfruit New Zealand, will develop new tools and technologies to enhance export crop production.



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- ➔ **LEFT: Initiating new research with the New Zealand Aid programme to increase the income of small-scale farmers in Cambodia.** The five-year programme will identify high-value vegetables and support training of farmers in crop production techniques and safe agrichemical use. [FOR MORE GO TO PAGE 39](#)
- ➔ **Supporting the Ministry for Primary Industries in the Queensland fruit fly biosecurity response in Auckland.** More than 50 staff worked with MPI to support the initial incursion and eradication response.
- ➔ **Launching the Joint Graduate School of Horticulture and Food Enterprise at Massey University.** The School will increase opportunities for students at the university to become involved with commercial research that benefits the food industry.
- ➔ **Partnering with Massey University, AgResearch, the Cawthron Institute, ESR and the universities of Auckland and Otago to secure funding for a new food safety research centre.** The \$5 million Food Safety Science & Research Centre will ensure that New Zealand remains an international leader in the food safety field.

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NEW ZEALAND-CHINA JOINT LABORATORY FOR KIWIFRUIT RESEARCH

RIGHT: Partnering with the Sichuan Provincial Academy of Natural Resource Sciences (SPANRS) to launch the New Zealand-China Joint Laboratory for Kiwifruit Research. The Joint Laboratory will further research into kiwifruit diseases and physiology, as well as conservation of the native kiwifruit germplasm found in China. [FOR MORE GO TO PAGE 55](#)





LAUNCHING A NEW FELLOWSHIP TO BUILD STRONGER RELATIONSHIPS WITH SCIENTISTS IN CHINA

The annual Fellowship, named for eminent Chinese scientist Li Lairong (above), will be awarded to a horticultural scientist from China to spend up to three months at one of Plant & Food Research's sites undertaking research of benefit to both countries.



→ **ABOVE: Publishing research that demonstrates New Zealand blackcurrant cultivar 'Blackadder' may have potential in managing neurodegenerative symptoms and mood disorders.** This research supports the potential development of new functional foods and ingredients that add value to the New Zealand blackcurrant sector.

→ **RIGHT: Initiating new agreements with Te Tumu Paeroa: the new Māori Trustee, and Wakatū Incorporation.** These agreements signify a long-term partnership with the organisations to develop R&D that supports new research that adds value to Māori-owned land and water assets.

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→ **Partnering with Massey University, AgResearch, the Riddet Institute and the universities of Auckland and Otago to secure \$16 million of MBIE funding for the development of new food engineering technologies.** The research will develop new and extend existing food processing technologies to enable manufacture of new added-value products and improve food manufacturing efficiency.

→ **Publishing initial results from the Precision Seafood Harvesting programme that demonstrate improved survival of young snapper.** The programme, funded through the Primary Growth Partnership in conjunction with Sealord Group, Aotearoa Fisheries Ltd and Sanford Ltd, is commercialising a new harvesting technology which improves the quality of the landed fish.

FOR MORE GO TO PAGE 31

→ **Demonstrating innovation expertise at the New Zealand Innovators Awards and the KiwiNet Awards.** Precision Seafood Harvesting was awarded the Supreme Innovator Award and won the Sustainability and Cleantech category at the New Zealand Innovators Awards. At the KiwiNet Awards, the business model to commercialise 'Wakefield' raspberry (top right) in the US, in partnership with Northwest Plant Company LLC, was awarded the Commercial Deal Award, while the Biopolymer Network, a collaboration with Scion and AgResearch to develop new biomaterials, was awarded the Commercialisation Collaboration Award.





Production systems that encourage the use of beneficial insects, such as ladybirds, to control insect pests to protect and enhance New Zealand's reputation as a premium food producer.

[FOR MORE GO TO PAGE 24](#)



OUR
STRATEGY

01

Chairman's commentary



The horticulture, viticulture, arable and seafood industries all face similar challenges – producing more and better food using fewer resources – and Plant & Food Research is committed to supporting them by delivering the R&D required to ensure they meet ambitious targets for export growth and environmental sustainability.

Our Core Purpose industries have recognised the need for research to deliver the knowledge and the products needed to excel on the global marketplace. Over the past decade, horticultural exports have doubled in value, with wine exports tripling over the same period. The seafood industry is now earning 15% more in export returns from 15% less volume. These trends are set to continue.

During recent years, we have supported our sectors in meeting some very real challenges. Kiwifruit export earnings are now back to the same level as prior to the discovery of the vine-killing disease Psa, a success underpinned by a collaborative research effort between Zespri, Plant & Food Research and Kiwifruit Vine Health. Similarly, our Institute was recently mobilised to address the threat presented by the Queensland fruit fly incursion in Auckland.

Science and innovation have a large part to play in New Zealand's economic future and meeting the targets of \$60 billion of food exports outlined in the Government's Business Growth Agenda. We are currently in a period of change in how the national science system is structured, with reviews of key policies affecting how science is funded, including a review of CRI Core Funding; the introduction of new mechanisms for ensuring maximum returns from government investment, such as National Science Challenges; and the development of innovation hubs and the Regional Research Institutes to build critical mass in key research and geographical areas.

Plant & Food Research is well positioned to contribute to these discussions. Our science supports the growth of the

New cultivars with high concentrations of compounds known to be good for health are supporting the development of new functional ingredients from New Zealand produce

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The Institute has delivered a strong financial performance this year, and the Board commends the Plant & Food Research team for all their efforts. Total revenue was \$128.9 million, \$3.0 million better than budget and \$9.3 million better than the previous year.

primary food industries, which currently contribute 60% of New Zealand's export earnings and 5% of GDP, with the wider food and beverage industry contributing an additional 8% of GDP. We have a strong presence across the country, working with industry partners in cities and in key production regions. It is to the benefit of our Core Purpose sectors and New Zealand as a whole to ensure all elements of the research ecosystem work together, and we look forward to working with the Government to ensure these changes deliver maximum impact.

Strong financial performance

The Institute has delivered a strong financial performance this year, and the Board commends the Plant & Food Research team for all their efforts. Total revenue was \$128.9 million, \$3.0 million better than budget and \$9.3 million better than the previous year. Tight control of costs and growth in research revenue, particularly through new commercial contracts, have ensured we are in a strong financial position for the future.

Changes to the Board


I'd like to welcome our new Board Director, Colin Dawson, who brings strong experience in science commercialisation and is

an active participant in the horticulture industry. I look forward to working with Colin and the other directors in ensuring the success of the Institute.

I also wish to recognise CEO Peter Landon-Lane, the Senior Management Team and the wider Plant & Food Research staff for their ongoing commitment to ensuring the Institute continues to deliver on its mission – the delivery of science to enhance New Zealand's economic, environmental and social prosperity.



MICHAEL AHIE
Chairman



Science and innovation
have a large part to play
in New Zealand's
economic future.

CEO's review



Partnering for success

Our goal is to enhance the value and productivity of the plant and marine-based food sectors. To achieve the link between desired impacts and research outcomes, we need strong partnerships with our industry sectors, and long-term co-developed research agendas based on a shared view of the market and the potential for R&D to support industry growth.

To this aim, we have updated our strategy roadmap (see page 16) to reflect our continued effort to align our science portfolio with the future needs of our Core Purpose sectors. Our Statement of Corporate Intent outlines how we will best deliver the science needed to support our industries in meeting their own goals and contributing to the Government's 'Export Double' growth targets. We have also recognised the need for our Institute to act as a sustainable business itself, and have identified key behaviours that will ensure we are able to deliver on our potential.

Along with our industry partners, we are part of a constantly evolving international landscape. Change is ongoing, marked by fluid global markets, rapid technological advances and dynamic

consumer trends. Our international programme ensures that we can keep up to date with these developments, supporting our partners behind borders and delivering research that supports the development of New Zealand products that engage and delight global consumers by exceeding expectations regarding quality, safety and environmental sustainability.

Closer to home, growing our connections with Māori organisations that have interests in the food sector is an important aspect of our partnership approach. There are opportunities for our research to deliver impact across the value chain, enabling Māori to pursue their economic, environmental, cultural and spiritual aspirations. We are building stronger relationships with a number of Māori organisations, as well as being active participants in industry initiatives that will enable us to better understand how we can contribute to Māori goals.

Meeting future need

Having the right facilities and internal capability helps us to effectively and efficiently deliver our science to our partners. Our Ways of Working programme is a set of principles and

Breeding new plant cultivars tailored for New Zealand conditions creates economic benefits for farmers and reduces the impact of production on the environment.

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Our Mission: A sustainable business delivering science that maximises opportunities to enhance New Zealand’s economic, environmental and social prosperity.

OUR STATEMENT OF CORPORATE INTENT IS AVAILABLE FOR
DOWNLOAD FROM: WWW.PLANTANDFOOD.CO.NZ

objectives that capture the way we aspire to work. We are investing in facilities that will provide a flexible workplace, with a choice of tools, technologies and work spaces that allow people to perform at their best and inspire our staff to deliver high-impact science.

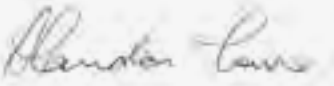
We are investing in improved infrastructure across our regional network that will equip us better to deliver impactful research. The redevelopment of our research campus at Mt Albert is our largest project, which will create state-of-the-art laboratories and make best use of workplace design to promote collaboration and flexible working styles.

New postharvest science facilities, glasshouses and laboratories at Te Puke will allow us to meet the current and future research needs of the kiwifruit and avocado sectors, and we will develop our sites in Palmerston North and Lincoln to help achieve the full potential of the Lincoln Hub and FoodHQ collaborative initiatives. An agreement with the Port of Nelson to develop new purpose-built office and laboratory facilities next to our recently opened finfish facility is the first step in the development of a new science and technology Seafood Precinct that will support the seafood industry’s targets for economic growth and environmental sustainability.

Delivering impact for New Zealand

I am proud of the impact our science and scientists are having on our sectors, supporting the growth and resilience of our Core Purpose industries, even when faced with challenging financial or environmental situations. It is encouraging to see this effort recognised by other organisations, such as the New Zealand Innovation Awards and the KiwiNet Awards.

I would like to thank all our staff for their ongoing contribution to the success of the organisation, our sectors and New Zealand. We are ready to meet the challenge set for us – to continue to deliver a competitive advantage for New Zealand and sustaining the Institute as a successful science business.



PETER LANDON-LANE
Chief Executive Officer





MISSION

A sustainable business delivering science that maximises opportunities to enhance New Zealand's economic, environmental and social prosperity

VISION

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

STATEMENT OF CORE PURPOSE

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

OUTCOME AREAS

INCREASE VALUE **PROTECT & ENHANCE** **SUSTAIN GROWTH**

STRATEGIC FOCUS

Better cultivars faster™ **Proprietary, premium foods and beverages** **Sustainable, premium seafood and marine products** **Residue-free pest and disease control** **Sustainable and profitable production systems**

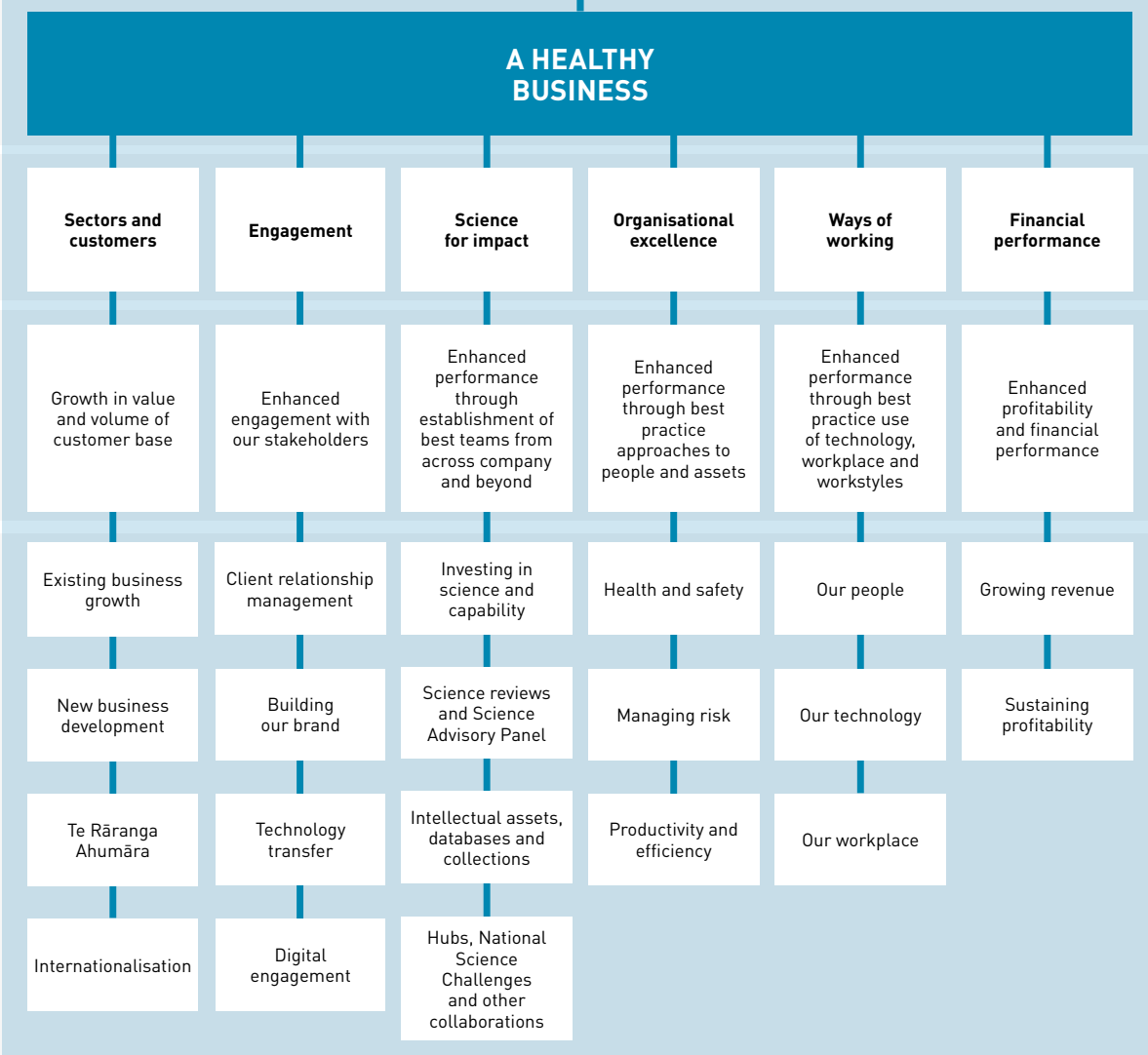
PERFORMANCE TARGETS

Growth in export value and volume from production of Plant & Food Research-bred cultivars Growth in export value and volume of whole foods and ingredients based on fruits, vegetables and grains Growth in export value and volume of premium seafood and marine products Enhanced international competitiveness and environmental quality through pest and disease management solutions Enhanced international competitiveness and environmental quality through optimal use of inputs

STRATEGIC PRIORITIES

New cultivars	Consumer insights	Seafood production	Biological control agents	Production technologies
Genomic selection tools	Food technologies	Premium seafood products	Disinfestation technologies	Systems modelling
	Wellness foods and ingredients	Novel marine products	Biosecurity	Ecoverification tools

OUR STRATEGY ROADMAP



From our Statement of Corporate Intent 2015/16 – 2019/20. Available for download at www.plantandfood.co.nz



Our research is protecting and enhancing New Zealand's reputation for high-quality seafood products and sustainable management of fishery resources.

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OUR
IMPACT

02

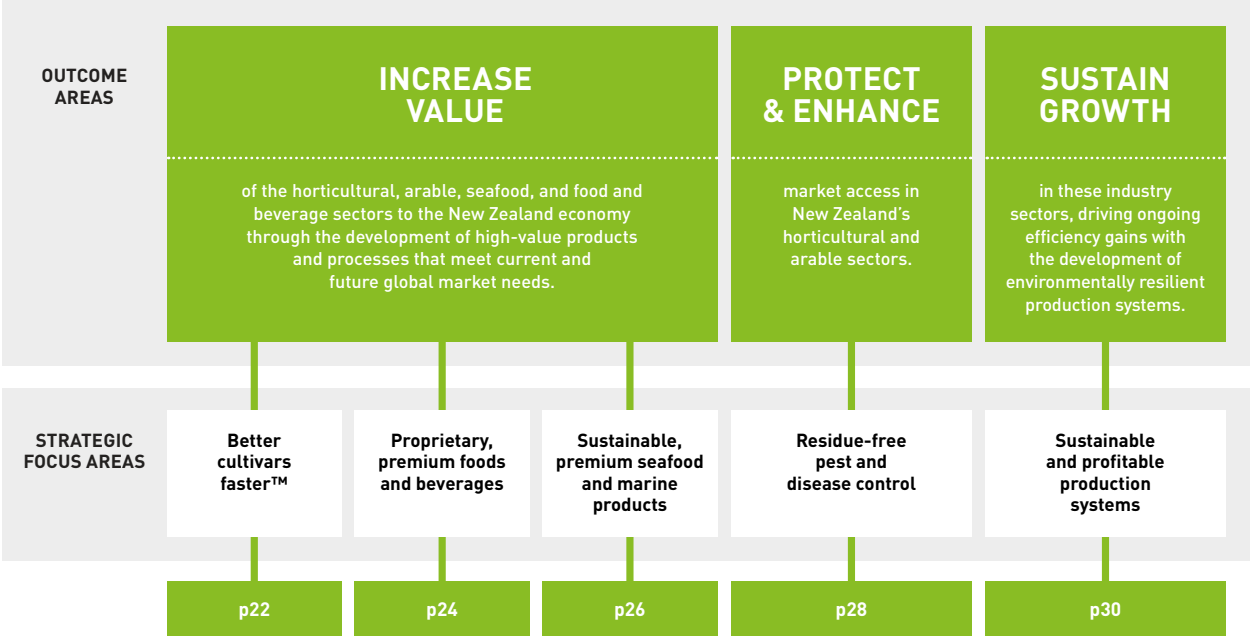


Our science is using research to identify and validate the health and wellness benefits of foods, for example, that Zespri® Green Kiwifruit contributes to normal bowel function.

[FOR MORE GO TO PAGE 29](#)

OUR CORE PURPOSE

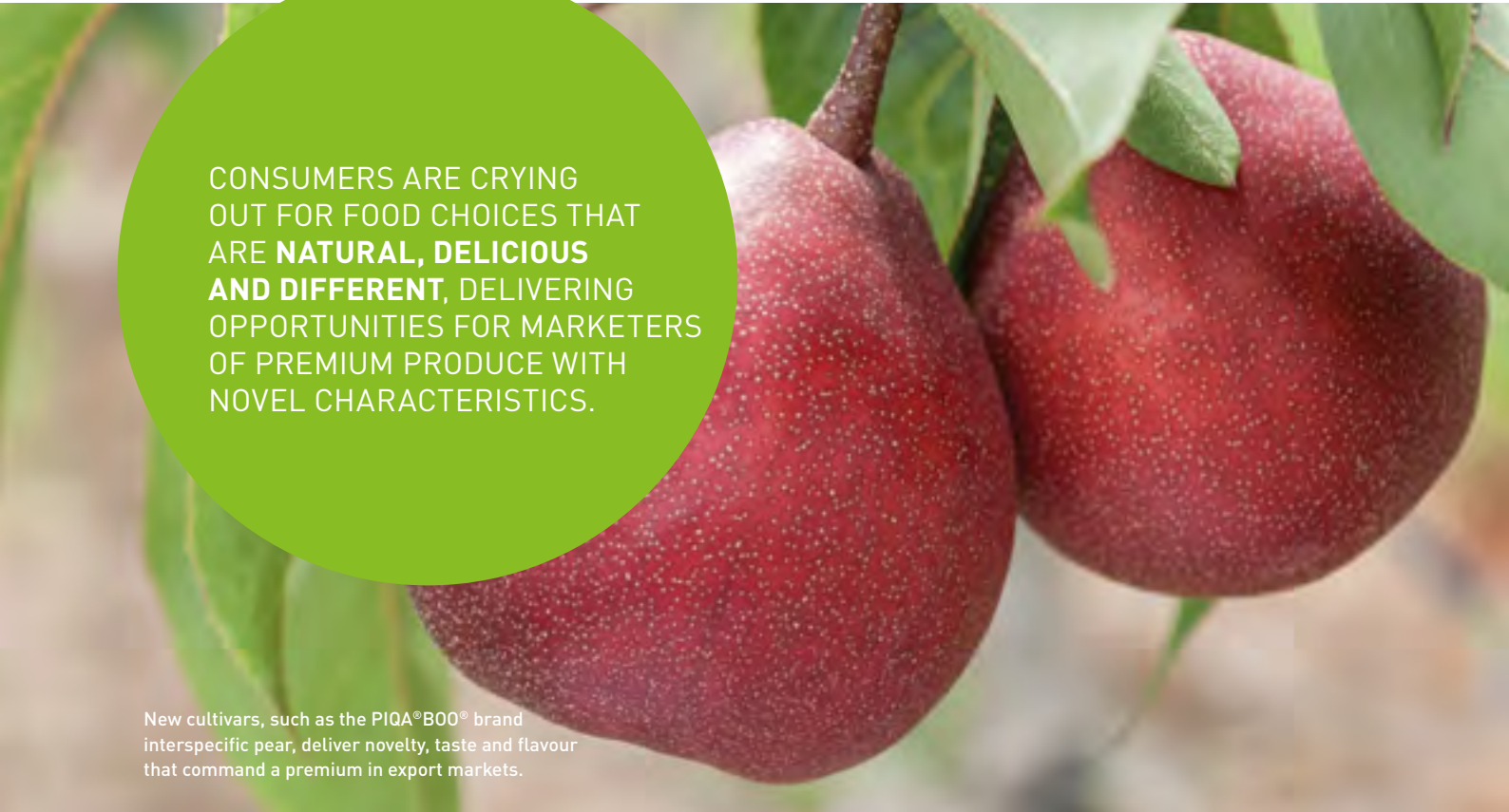
To enhance the value and productivity of New Zealand’s horticultural, arable, seafood and food and beverage industries to contribute to economic growth and the environmental and social prosperity of New Zealand. We are measured by three Core Purpose outcomes:



The following pages contain industry impact case studies. For more go to www.plantandfood.co.nz/growingfutures

OUR IMPACT → INCREASE THE VALUE

Better cultivars faster™



CONSUMERS ARE CRYING OUT FOR FOOD CHOICES THAT ARE **NATURAL, DELICIOUS AND DIFFERENT**, DELIVERING OPPORTUNITIES FOR MARKETERS OF PREMIUM PRODUCE WITH NOVEL CHARACTERISTICS.

New cultivars, such as the PIQA®B00® brand interspecific pear, deliver novelty, taste and flavour that command a premium in export markets.

TARGET

- Accelerated breeding of new and improved food plants that possess attributes which attract price premiums and deliver competitive advantages

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

New cultivars are a key driver of growth for the horticulture and cropping sectors, delivering benefits to growers by offering traits that increase production efficiency, such as increased resistance to pests and diseases and improved yield, as well as characteristics desired by consumers that command a price premium, such as novelty, superior taste and texture, and increased health and wellness benefits.

We use conventional breeding techniques to create new cultivars, using our knowledge of the genetics of key traits to inform the breeding process. Our extensive germplasm collections provide us with a wide range of genetic diversity to be included as parents in the breeding programme and to support the identification of key molecular controls for traits of interest to our partners. Our genomics research allows us to isolate and characterise genes and associated molecular markers, and apply advanced breeding technologies and an understanding of population genetics to integrate key traits into the breeding programme, narrowing the search for parents with the ideal genetic profile. We also screen offspring and select those plants with the most promising genetic potential for commercial success, reducing the number and increasing the quality of selections entering assessment trials.

NEW CULTIVARS OF AN ICONIC NEW ZEALAND CROP

Kumara, or sweet potato, is a fundamental part of the New Zealand diet, dating back to early Māori settlers. Beyond its traditional use as a whole food, kumara is now used as an ingredient in a variety of processed foods, including baby foods, soups and snack foods.

Three varieties of kumara are commonly grown commercially – orange 'Beauregard', 'Toka Toka Gold' and 'Owairaka Red'. Around 17,500 tonnes of kumara are produced each year, generating more than \$30 million of sales. The crop is mostly sold on the domestic market, due to issues with storage life which impact on its use as an export crop.

The kumara breeding programme is focused on delivering new cultivars with enhanced agronomic performance, including resistance to fungal diseases that affect storage potential, as well as extending the products available to the consumer, delivering novel skin and flesh colours as well as characteristics known to be good for health and wellness.

Since 1998, five cultivars have been released from the kumara breeding programme. The most recent releases include 'SPFR1', marketed as Purple Dawn, with purple skin and purple flesh, and 'SPFR2', marketed as Orange Sunset, with red skin and flesh marbled with orange and purple, improved resistance to fungal rots and with increased tolerance to drought conditions.



Breeding new kumara cultivars that address key environmental issues, such as resistance to disease, offer benefits to producers, as well as providing more choice for consumers.

Anthocyanins are known antioxidants that confer benefits for human health and wellness.

Apples with red flesh offer novelty for consumers, as well as increased concentrations of compounds known to be good for health.



Identifying the genes controlling key characteristics, such as fruit colour, allows breeders to select seedlings with the most promising genetic profile for commercial success.

RED APPLES FOR CONSUMER HEALTH


Consumers are increasingly demanding new products with novel characteristics that also offer them additional benefits beyond simple nutrition. Anthocyanins, the family of compounds that give fruits and vegetables a distinctive red or purple colour, are known antioxidants that confer benefits for human health and wellness.

Red flesh is a trait found in the indigenous apple population of Kazakhstan, but the majority of these naturally occurring varieties do not have characteristics that consumers enjoy, such as good taste and texture. Identification of the gene controlling red flesh has allowed scientists to screen offspring in the apple breeding programme and select those with this desired characteristic for further assessment as potential commercial cultivars.

The red flesh gene has been used to screen young seedlings from the apple breeding programme since 2012. In total, more than 36,000 seedlings have been screened, of which 20,000 were identified as having the red flesh gene and selected for further assessment in orchard trials. Reducing the number of seedlings selected and planted in the orchard has resulted in a saving of more than \$200,000 in orchard management and assessment costs.



Residue-free pest and disease control



PREMIUM PRODUCE IS ABOUT MORE THAN LOOKING GOOD AND TASTING GREAT, INCREASINGLY IT MEANS MEETING THE HIGHEST STANDARDS IN PRODUCT SAFETY, INTEGRITY AND CONSUMER TRUST.

Scientists, such as Abie Horrocks, are developing tools and techniques to minimise the use of chemical control methods in protecting crops, such as forage brassicas, from insect pests.

TARGET

- Control of plant pests and diseases, increasingly using biological and environmentally based control methods

ADOPTION INDICATORS

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

IMPACT INDICATORS

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

One of the key challenges in modern agriculture is to achieve effective pest and disease control in the face of increasing market demand for reduced chemical inputs and nil residues on fresh produce. To ensure the safety, security and sustainability of the industry, this must be achieved with optimal profitability and the maintenance of premium production quality.

Alongside this, the threat of major incursions or reduced access to markets requires strengthened border and pre-border protection.

Our scientists develop integrated pest and disease management systems, based on an in-depth understanding of the interactions between plants, insect pests and pathogens, that incorporate a range of biologically based control methods across the pre- and postharvest value chain and minimise chemical residues. We also work across country borders to minimise incursions of new pests and diseases, developing new surveillance and diagnostics technologies and working with government agencies to develop risk assessment, eradication and response programmes to minimise the threat of new incursions.

CONTROLLING BOTRYTIS IN NEW ZEALAND VINEYARDS

The New Zealand wine industry is recognised for its high-quality products and commitment to environmental sustainability. Sustainable Winegrowing New Zealand, introduced by New Zealand Winegrowers in the 1990s, is an industry initiative that aims to provide best-practice models for vineyard and winery management, while providing consumers with assurance of environmental sustainability. Currently, 94% of New Zealand's producing vineyard area is certified under the programme, with a further 7% certified by organic or biodynamic programmes.

Botrytis, a fungus that affects wine grapes, is one of the major challenges for New Zealand growers and winemakers, affecting yield, quality, colour and flavour. Most wineries have a limit of less than 5% of grapes with botrytis infection, with much lower thresholds tolerated in many red varieties.

GrapeFutures was developed by Sustainable Winegrowing New Zealand, in partnership with Plant & Food Research and the wine industry, to provide grower-based strategies to improve the control of botrytis in New Zealand vineyards. The emphasis of the programme was to reduce fungicide use in the production of 'nil-residue' wines – wines free of detectable pesticide residues.

An informal survey of viticulturists in 2012 showed that 75% reported changes to vineyard management practices for botrytis control, in many instances as a direct result of the GrapeFutures guidelines. Changes included less reliance on chemical controls and more reliance on sustainable cultural techniques, such as good canopy management. Tools and recommendations from the GrapeFutures programme have also been incorporated into the annual New Zealand Winegrowers Export Wine Grape Spray Schedule.

Botrytis, a fungus that affects wine grapes, is one of the major challenges for New Zealand growers and winemakers.

Changes in vineyard management practices have improved control of the fungus botrytis with reduced reliance on chemical fungicides.



Protecting forage brassicas, such as kale and swede, from insect pests ensures New Zealand's livestock has high-quality feed at times when pasture is limited.

ENSURING HIGH-QUALITY FEED FOR LIVESTOCK

Forage brassicas – such as kale, swede, rape and bulb turnips – are used as high-quality feed for livestock at times of the year when access to pasture is limited. Brassicas are incorporated into the pasture rotation cycle and also enhance soil health and reduce weed pest and disease issues. It is estimated that more than 350,000 hectares of forage brassica are planted each year to feed New Zealand's 6.7 million dairy cows, 3.7 million beef cattle and 29.8 million sheep. Forage brassica seed sales also provide approximately \$8 million of export income.

Forage brassica crops are subject to damage by a number of insect pests, including the diamondback moth, white butterfly, leaf miner and aphids. Traditionally, broad-spectrum insecticides have been used to control these insect pests; however, there are increasing reports globally of pest populations developing resistance to these chemical controls.

The Integrated Pest Management (IPM) programme uses monitoring of pest and beneficial insect populations to limit use of chemical control methods to times when population numbers reach defined levels, and promotes the use of biological controls, such as beneficial insects, and cultural controls throughout the growing season. Where chemical control options are required, selective sprays are used over broad-spectrum sprays, where available. This reduction in chemical insecticide use reduces the potential for insecticide resistance to develop in New Zealand, while also reducing the environmental impact.

A training programme is being rolled out to educate farmers and industry advisors on the benefits of IPM over traditional control methods. It is estimated that use of IPM techniques by 70% of New Zealand farmers growing forage brassicas will result in annual benefits of \$36 million in chemical cost savings and reduced yield loss.

Sustainable and profitable production systems

IN ADDITION TO QUALITY, CONSUMERS ARE DEMANDING THAT THE FOOD THEY EAT HAS BEEN PRODUCED USING THE **BEST POSSIBLE SUSTAINABLE PRACTICES.**

Our scientists, such as Hamish Brown, are developing crop models that help farmers, regulators and scientists to make decisions on farm management practices that optimise crop production within environmentally-sustainable limits.



TARGET

- Increasing yield and efficiency in plant production, harvesting, processing and supply chains, with an emphasis on economic and environment sustainability

ADOPTION INDICATORS

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

IMPACT INDICATORS

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

Making crop management decisions that minimise inputs and maximise productivity means growers can deliver premium products that are economically viable and certified as environmentally sustainable. Tools and methods that reduce resource use while maintaining yield and quality allow growers to meet or exceed the world's most stringent sustainability requirements, at the same time as increasing profitability.

We develop production systems and decision support tools that allow growers to make management decisions that minimise chemical and water inputs, maintain soil health and maximise returns, reducing both the financial cost and the environmental footprint of production. We also develop pre- and postharvest production technologies that ensure fresh produce is delivered to the market in the best condition with maximum consumer appeal.

SUPPORTING CROP PRODUCTION
DECISION-MAKING

Being able to simulate crop performance under different scenarios allows farmers and scientists to make decisions on how to improve farm production or predict the effects of climate change, and allows policymakers to understand how changes in agricultural policy can impact farm production. The Agricultural Production Systems Simulator (APSIM) is a world-leading, state-of-the-art farm systems modelling platform that consists of multiple modules, allowing users to simulate changes in environment, climate, soil health and management practices, and to understand how these may impact on animal and plant production on their farm.

Initiated in the 1990s by the University of Queensland, the Queensland Department of Agriculture, Fisheries and Forestry and CSIRO in Australia, the APSIM model is now used in around 100 countries worldwide. Plant & Food Research adopted APSIM in 2005, and has subsequently contributed to the development of new crop modules, including wine grape, carrot, kale and wheat, as well as modules that model changes in soil health and the effects of multiple crops on a paddock, such as in crop rotation practices. APSIM modules are consistently checked and updated to ensure the simulations accurately model real-world scientific findings, and the system uses advanced software engineering techniques to integrate the modules, giving users access to full-farm simulations.

APSIM is the second most widely used agricultural simulator worldwide. In 2014 there were 1,600 software downloads across 98 countries, with 978 user licences issued. The largest numbers of users are in Australia, China, India and the USA.



The APSIM model allows scientists to simulate crop performance under different scenarios and to better understand how management practices impact crop production.



The super orchard design will allow trees to intercept more than 85% of available light, increasing high-quality fruit production.

SUPER ORCHARDS FOR
CHERRY PRODUCTION

The Central Otago region of New Zealand produces around 3,000 tonnes of cherries each year, with exports valued at close to \$30 million. The industry has targets of increasing exports to \$175 million by 2035, at the same time as tripling domestic sales from the current value of \$14 million.

The Future Orchard Planting Systems (FOPS) programme is developing new orchard planting systems that will increase yields of summerfruit, such as cherries, as well as pipfruit and kiwifruit, by up to 150%. The new super orchards will be based around trees with a novel bi-axial structure, enabling rows to be planted as close as 1.5 metres apart and allowing trees to intercept more than 85% of available light. This will result in increased productivity, maximised high-quality fruit production and simpler plant canopies that are easier to manage.

The first stage of the programme has seen McGrath Nurseries, New Zealand's largest producer of commercial cherry nursery trees and cultivars, convert its winter cherry grafting propagation to also produce trees of the bi-axis structure required under the FOPS programme. As a result, 1,700 cherry trees have been made available to growers for "super-orchard" evaluation in Central Otago. The new orchard system is estimated to increase cherry yield by up to 30 tonnes per hectare, supporting the industry's future growth targets.

New Zealand produces around 3,000 tonnes of cherries each year with export returns close to \$30 million.



OUR IMPACT → INCREASE THE VALUE

Proprietary foods with premium prices

DISCERNING CONSUMERS ARE CALLING OUT FOR HEALTHY, CONVENIENT **FUNCTIONAL FOODS AND BEVERAGES** THAT DELIVER BENEFITS THEY CAN FEEL, AND FOOD INDUSTRIES ARE SEEKING OUT NEW MEANS OF CAPTURING VALUE FROM THIS CONSUMER TREND.

New foods and beverages with validated health and wellness benefits will command a premium in discerning export markets.



TARGET

- New whole foods, beverages and nutraceuticals from proprietary cultivars, with proven functionality in wellness

ADOPTION INDICATORS

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

IMPACT INDICATORS

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

Fresh produce is a vital part of a healthy diet, but understanding the specific components, or combination of components, that deliver benefits beyond simple nutrition is a complex challenge. Our fruit, vegetable and arable food products deliver high-impact consumer experiences that are reflected in the premium prices they achieve in global markets, but new products with validated health and wellness benefits provide a point of differentiation that meets the needs of consumers and adds value to fresh produce.

Our research is identifying and providing the scientific evidence to confirm the wellness and health-promoting compounds found in natural produce, delivering these to consumers in whole foods, through the breeding of elite plant cultivars with optimal concentrations of these compounds, and through the development of ingredients and new food and beverage concepts. Our consumer and sensory science helps to ensure that products meet the demands of the discerning consumer, increasing the likelihood of customer satisfaction and repeat purchase behaviour.

PROTECTING NEW ZEALAND
HONEY EXPORTS

Around 8,000 tonnes of New Zealand honey are exported each year, with a total value of \$187 million. Mānuka honey in particular commands a premium in export markets, with prices of up to £80 per kilogram in UK supermarkets, almost 30 times that of British honey.

Toxic honey poisoning can be caused when bees collect honeydew from vinehoppers that have been feeding on tutu, a New Zealand native plant. Tutin contamination of honey is rare, but can cause extreme effects when eaten by humans, such as vomiting, convulsions and, in severe cases, death. As such, honey producers undergo a strict regime of tutin testing, regulated by the Ministry of Primary Industries, to ensure consumer safety.

Research, in collaboration with MPI and Food Standards Australia New Zealand (FSANZ), identified certain tutin-glucose compounds found in toxic honey that were not accounted for using standard testing protocols. To ensure concentrations of all forms of potentially harmful tutin compounds are below the safety limit, in March 2015 FSANZ amended the Australia New Zealand Food Code to set a new maximum limit of tutin for honey and honeycomb, with acceptable concentrations reduced from 2 mg/kg to 0.7 mg/kg.



Bees that collect honeydew from vinehoppers that have fed on the native tutu plant can produce honey contaminated with toxic tutin compounds.



A validated health claim will support marketing of Zespri® Green Kiwifruit to global consumers.

VALIDATING THE HEALTH BENEFITS
OF KIWIFRUIT

Global consumers have an increasing interest in foods that provide benefits beyond basic nutrition, with health benefits being one of the top drivers in consumer purchasing behaviour, along with taste and quality. Fruit and vegetables have intrinsic properties that are beneficial to health, being both natural and offering additional functionality. Digestive health support is the highest ranked health benefit desired by consumers in New Zealand's key export markets.

In April 2014, Zespri lodged the first health claim for a whole fruit worldwide. This claim – that Zespri® Green Kiwifruit can contribute to normal bowel function – supports messaging that Zespri uses in marketing its kiwifruit to global consumers. The claim was based on a confidential dossier of scientific information, to which Plant & Food Research scientists contributed, including reviews of international literature and results of clinical trials, that demonstrates and validates the link between consumption of Zespri® Green Kiwifruit and improved digestive health.

Whilst the claim has currently only been filed with Food Standards Australia-New Zealand, the dossier has collated the sum of the evidence available for digestive health, and has identified areas where more evidence is needed to file similar claims in other jurisdictions, such as the EU and Asia, where Zespri exports New Zealand kiwifruit. The claim also supports Zespri's marketing approach in global markets, with New Zealand perceived as having high standards around food production and safety with many overseas consumers.



8,000 tonnes of
New Zealand honey
are exported each
year, with a value
of \$187 million.

OUR IMPACT → INCREASE THE VALUE

Sustainable, premium seafood and marine products

THE OCEAN IS A RICH RESOURCE, DELIVERING THE POTENTIAL FOR HIGH RETURNS FROM SEAFOOD AND MARINE PRODUCTS THAT MEET THE QUALITY AND SUSTAINABILITY DEMANDS OF DISCERNING CONSUMERS.

Our research is delivering improved production and harvesting technologies to ensure the quality of fish from capture to consumer.

TARGET

- New and improved foods, nutraceuticals and industrial products based on marine fauna and flora

ADOPTION INDICATORS

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

IMPACT INDICATORS

- Growth in export volume and value of premium seafood and marine products

New Zealand has a strong international reputation for high-quality seafood products and sustainable management of fisheries resources. Food safety is a priority, as events that damage consumer trust in food products can result in considerable decline in sales.

Our research is enhancing and protecting the profitability and sustainability of fishery resources by developing improved production methods and selective harvest technologies that ensure the quality of fish from capture to consumer. We are also developing new and improved processing and preservation technologies to enhance the quality, safety and storage characteristics of seafood products, improving market access and export return by delivering seafood that is 'fresher' with extended shelf life.

Our research is identifying molecules from shellfish, marine plants and the non-fillet portion of fish for use in the production of nutraceuticals and industrial biomaterials. We are also developing new technologies for the extraction and modification of these biochemical compounds that increase efficiency and reduce environmental impact.



Scientists, such as Suzy Black, are testing the Modular Harvest System, a technology that increases survival of unintended catch and improves seafood quality, for use on commercial fleets.

MAINTAINING QUALITY OF THE SNAPPER CATCH

New Zealand fishing vessels catch around 6,500 tonnes of snapper each year, predominantly in the waters around the North Island and top of the South Island. More than half is exported, primarily as chilled, whole fish to Australia and the USA, with a value of \$31 million. As fisheries are managed under the Quota Management System, increasing the value of snapper exports relies predominantly on increasing the quality of the catch.

The Modular Harvest System (MHS) technology, that has been designed and tested as part of the Precision Seafood Harvesting programme, represents Stage One of a three-stage development. The harvest system is being developed to improve selectivity and to significantly increase the quality of the seafood being harvested. As a result, survival rates of unintended catch (by-catch species and juvenile fish) are also increased. The initial survivability results have confirmed the potential of the new technology with 100% survivability for snapper taken from depths of 0 to 20 metres and 79% of those taken from a depth of 20 to 90 metres. Stage Two is the development of on-board handling systems that will capitalise on these results when applied to commercial operations and catch quantities. This work is already well underway with at-sea trials due to commence in the very near future.

The MHS, which won the Supreme Award at the 2014 New Zealand Innovators Award, is being tested and commercialised under Precision Seafood Harvesting Primary Growth Partnership, with funding from the Ministry for Primary Industries and three major New Zealand companies – Aotearoa Fisheries Ltd, Sanford Ltd and Sealord Group Ltd. It is expected that use of the system will increase New Zealand’s GDP by \$43.6 million by 2025.

PROTECTING CONSUMERS FROM SEAFOOD-BORNE ILLNESS

New Zealand exports about 1,500 tonnes of Pacific oysters each year with a value of \$15 million, mainly to consumers in Australia and Asia. *Vibrio* bacteria present in seawater, such as *Vibrio parahaemolyticus* and *Vibrio vulnificus*, can be ingested by oysters and can cause gastroenteritis and other diseases if these are then consumed by humans, potentially affecting the perceived safety of all New Zealand seafood exports.

Research, designed to determine the potential effects of climate change on *Vibrio* bacteria, analysed oysters during the summer harvests of 2009 to 2012 compared with data collected in the 1980s. The research showed that *Vibrio vulnificus* numbers were higher than expected in the key Pacific oyster harvest areas of Northland, Auckland and Coromandel, and occasionally reached critical levels during times of high seawater temperature.

As a result, a new monitoring programme was put in place by the Ministry for Primary Industries (MPI) for the 2014/15 summer season. Under the programme, when *Vibrio vulnificus* population numbers reach a critical threshold, harvesting must cease or Pacific oysters harvested from affected areas are required to undergo strict postharvest treatments to reduce the potential effects of *Vibrio* bacteria when consumed. In addition, Plant & Food Research initiated a new research programme to develop a protocol for frozen storage of Pacific oysters that reduces *Vibrio* numbers to safe concentrations.



Ensuring the safety of Pacific oysters (below) protects both consumer health and New Zealand’s reputation as a premium producer of seafood.





Our staff, such as Andrew Granger, Director of Research for Plant & Food Research Australia, works with our industry partners, like Michael Stafford from the Lenswood Cold Stores Co-operative, to develop research that allows them to meet their targets.



OUR
RELATIONSHIPS

03



ALBY MARSH
Māori Relationship Advisor

Engagement with Māori



Te Raranga Ahumāra (TRA) is the pātaka (repository of knowledge) of Plant & Food Research's Māori strategy. A key responsibility for the rōpū (group) is the development of opportunities that will help realise the full potential of Māori-owned assets and deliver impact for the organisations we partner. Te Raranga Ahumāra has an established rōpū of Kaumatua connected to each site who provide tikanga and kawa guidance and advice on opportunities to enhance science through mātauranga Māori.

Te Raranga Ahumāra has two working groups focused on specific activities:

- Te Aka Matua – to develop and nurture business interactions that realise the value from Māori assets
- Ngā Toa Ngaki Kai – to develop and nurture greater understanding of the relationship between science, Plant & Food Research and Māori.

IMPACT INDICATORS

- Enhanced profitability, sustainability and productivity of Māori assets and iwi organisations

KEY TARGETS

- Adding value to Māori assets in horticulture, wine, food and seafood
- Realising the value from taonga Māori
- Increasing understanding of science by Māori and understanding of Māori by our staff



Four new Vision Mātauranga Capability Fund projects will support engagement with Māori organisations, including a project with Kono Seafood to develop nutraceuticals from Greenshell™ Mussels.

2014/15 HIGHLIGHTS

- Launching a new (\$200,000 per annum) internal funding scheme, He Kakano Whakatipu, to support projects with impact for Māori across our five outcome areas.
- Securing funding for four new Vision Mātauranga Capability Fund projects – working with Kono Seafood to support development of nutraceuticals from Greenshell™ Mussels; working with Shark Nett to enhance yellow-belly flounder fisheries in the Marlborough Sounds; introducing Te Awanui Huka Pak to the broader capabilities of Plant & Food Research through its Kiwisphere Trustee training programme; and developing better understanding of Chinese consumers as a pathway for premium Māori food products.
- Active participation in Nuku ki te Puku, a network of Māori businesses and other entities, convened by Callaghan Innovation, that seeks to develop a leadership position in developing food value chains for Māori-branded food products.
- Partnering with Callaghan Innovation to support an Asia trade mission by Māori honey producers and landowners as part of the Poutama Trust's "Miere Coalition" initiative, which aims to develop options for greater branding and export opportunities for New Zealand honey.
- Signing a Memorandum of Understanding with Te Tumu Paeroa: the new Māori Trustee, to identify new opportunities for R&D to support the development of Māori land assets.
- Securing funding from the Unlocking Curious Minds funding round to deliver a three-day wānanga for Year 9 and 10 rangatahi, in collaboration with Wakatū Incorporation.
- Award of the first Ngā Toa Ngaki Kai Scholarship to Patricia Clark from Kaikohe to support her tertiary studies in Environmental Science.

CASE STUDIES



The Summer Studentship programme allows students, such as Hanareia Ehau-Taumaunu, to build better understanding of real-life science by contributing to a research project over a three-month period.

BUILDING CAPACITY IN SCIENCE

Each year, Plant & Food Research provides an opportunity for students to work with scientists over the summer as part of our Excellence Programme. This Summer Studentship programme provides students with industry-focused research experience, and often leads them to identify potential career paths in research.

Over the 2014/15 summer period, eight Māori and Pasifika students worked on diverse projects, including seafood technologies, virus and virus-like organisms, kiwifruit breeding and food innovation.

One of these students was Hanareia Ehau-Taumaunu, who was returning for her third Summer Studentship at Plant & Food Research. Hanareia's project looked at the Institute's engagement with Māori in the kiwifruit sector and how this could be enhanced. She is currently completing a Postgraduate Diploma in Science and will start a Masters in 2016 through the Bioprotection Research Centre (of which Plant & Food Research is a partner).



More than 115 people attended Te Ara Putaiao, a joint meeting organised by the seven Crown Research Institutes, to learn more about how R&D can support Māori businesses.

BUILDING STRONGER TIES WITH WAKATŪ INCORPORATION

In February 2015, Plant & Food Research signed a Memorandum of Understanding (MoU) with Wakatū Incorporation, a Nelson-based Māori corporation. Wakatū's food and beverage businesses, managed through its associated entity Kono NZ LP, have aspirations to grow their business from \$73 million to \$247 million by 2020, through the production of premium food and beverage products for consumers who value quality and authenticity. The new MoU will support the strategic use of R&D to support these goals, as well as help Wakatū and Kono develop a new cohort of Māori scientists.

The research partnership with Kono NZ LP will support all four operating divisions of the business – Kono Seafood, Kono Horticulture, Kono Beverages and Annies® snack foods and ingredients. The MoU builds on a long-term relationship between the two companies, most recently realised with the funding of a Vision Mātauranga Capability Fund project to develop Greenshell™ Mussel nutraceuticals. Other research areas under discussion include orchard production techniques, vineyard management practices, biological control of pests and diseases, land sustainability, and food innovation.



A new Memorandum of Understanding with Wakatū Incorporation will identify how research can contribute to the long-term growth of the Māori corporation's food and beverage businesses.

TE ARA PUTAIAO

Plant & Food Research collaborated with the six other Crown Research Institutes to deliver the first Te Ara Putaiao conference to stimulate interaction between Māori business and the R&D ecosystem.

The two-day meeting was opened by Māori Development Minister the Honourable Te Ururoa Flavell and saw 117 people attend and discuss how CRIs work for Māori, and how they integrate with a wider set of actors in government and R&D. There was a strong showing from key government ministries and agencies including the Ministry for Primary Industries, the Ministry of Business, Innovation & Employment, Te Puni Kōkiri, New Zealand Trade & Enterprise and Callaghan Innovation.



BRUCE CAMPBELL
Chief Operating Officer

Enhancing our customer focus

We are further evolving the way we work with our customers to enhance their experience of science.

There has never been a more important time for science to be working in close partnership with business to address global and national priorities in food security, environmental management and nutrition for public health.

We want to increase our orientation on serving the needs of our horticulture, arable, seafood and food business customers. We see it as critical to have close alignment between our strategy and the strategies of these key customers, with an increasing shared focus on the needs of their ultimate end consumers.

At Plant & Food Research, we are striving to increase our focus on customer satisfaction, forging deeper partnerships that give more value to our customers and building a better understanding of what they want and need.

We are shifting from a focus on outputs to a focus on outcomes for our customers to ensure we are thinking carefully about the impact that our work has for them.



We join with our industry partners to acknowledge key events, such as, with the Te Tau Ihu Fisheries Forum and Ministry for Primary Industries, recognising the contribution to the seafood industry of Te Rangi o Kiwa John Morgan at the release of the first cohort of snapper fingerlings from our Maitai site.



Showcasing our research, such as inviting Zespri staff to tour our Mt Albert facilities, ensures our industry partners understand the breadth of science we can deliver to support their growth strategies.

This year we have developed critical steps for pathway to impact roadmaps, that chart our progress towards the longer term impact targets for our customers over the next five to 15 years. This has sharpened our focus on what is important to our customers and where our efforts should be channelled.

It is pleasing to have confirmed our intentions to develop enhanced partnership agreements with a number of customers this year, including a number in the emerging Māori food business sector. These have emerged from our *kōrero mai* (let's talk) approach where we have sat down together and talked to deepen our understanding of customer needs so we can put customer satisfaction first.



Working together with our industry partners allows us to develop research and capability to support their targets, such as opening an experimental brewery with New Zealand Hops to analyse characteristics of new hop cultivars.

In the coming phase of building our customer focus we will be developing several new initiatives to enhance our customers' experiences with us, including:

- **Embedding a customer focus approach** throughout all levels of the organisation so we can deliver a consistently great experience for our customers
- **Looking at the endpoints of our science and commercialisation** in terms of ultimate outcomes for our customers and the impacts for the wider economy, environment and society
- **Enhancing relationships** between the people that form the chain of connections between us and our customers
- **Developing more longer term partnerships** that lead to a deeper shared understanding between us and our customers
- **Setting clear expectations and following through on agreed actions** by agreed deadlines so we consistently "do what we say we will do"
- **Proactively transferring new knowledge** to customers in formats that allow rapid uptake and innovation by industry.

This is still an evolving area for us and we are proud of the progress we have made so far. We are always interested in hearing from our partners on how we can build on these relationships further.



DAVID HUGHES
Group General Manager Commercial

International relationships

The last 12 months have been a time of significant development for the international dimension of Plant & Food Research's activities. We have made good progress against all four of our international objectives:

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

Science is a truly global endeavour and our New Zealand sectors are strongly export focused, making it critical that Plant & Food Research builds and strengthens its global connections.

The last year has seen a **75% increase in our international work and we expect to see even more international activity in the year ahead.**

2014/15 HIGHLIGHTS

Some of the highlights from the past 12 months include:

- The expansion of our international development activities. We continue to work with the New Zealand Aid Programme and the Ministry of Foreign Affairs and Trade (MFAT) on significant development projects with the aim of using our science capabilities to benefit communities in developing countries in South East Asia and Africa.
- In conjunction with MFAT, New Zealand Trade & Enterprise (NZTE) and other New Zealand organisations, we are using science, developed to support resource allocation decisions in New Zealand, to help governments in the Middle East effectively manage water, one of their scarcest and most valuable resources.
- Through joint laboratories in China (see page 55) and commercial arrangements in the USA and Europe, we are working overseas to develop new technologies and products which we can bring back to New Zealand for the benefit of the New Zealand industry.

Our research, funded through the New Zealand Aid Programme, is improving the competitive advantage of Vietnamese dragon fruit by improving production and postharvest approaches.

CASE STUDIES



The development of new growing systems will improve profitability and productivity of almonds in Australia.

INCREASED ALMOND YIELDS FOR AUSTRALIA

The Australian almond industry has grown from a boutique industry in the 1980s to the world's second largest exporter of almonds. A five-year research programme, funded by the Australian Almond Board, is investigating tree architecture and intensive production systems. The research will study the natural growth habits of a number of almond tree varieties and rootstock combinations, then apply basic plant physiology principles – using pruning and training techniques, light management and trunk girdling – to develop new growing systems with increased profitability and set new standards in almond productivity.

DRAGON FRUIT IN VIET NAM

A project funded through the New Zealand Aid Programme aims to improve the livelihoods and competitive advantage of Vietnamese dragon fruit farmers and supply chain participants. The project, which began in 2013, is a collaboration with the Southern Horticultural Research Institute (SOFRI) and the Sub-Institute of Agricultural Engineering and Post-Harvest Technology (SIAEP). To date, the project has developed a range of new production, disease control and postharvest approaches and technologies to enhance the supply chain. These are currently being trialled in preparation for transfer to the local industry.

NEW BERRIES FOR THE USA

Pacific Berries is a joint venture company of Plant & Food Research and Washington-based Northwest Plant Company, specialising in raspberry genetics. Pacific Berries is currently developing new raspberry cultivars, with a primary focus on the Pacific Northwest region. These varieties are bred and trialled in market, with specific characteristics that address environmental and disease pressures in the region, as well as processing requirements. The first cultivar released from the programme, 'Wakefield', now makes up about 15% of the planted area of processed raspberries in the Pacific North West region.

WATER MANAGEMENT IN ABU DHABI

Abu Dhabi's useable groundwater reserves are diminishing, but the country is heavily dependent on irrigation of horticulture and forestry crops. Two four-year projects, in collaboration with Maven International and funded by Environment Abu Dhabi, have been initiated, building on previous research looking at water requirements for date production. These new projects are investigating the effect of water salinity on a range of date palm varieties and the potential use of water waste for forestry.

HIGH-VALUE VEGETABLES IN CAMBODIA

The five-year Cambodia CODES programme, funded by the New Zealand Aid Programme and led by international NGO iDE, is working to sustainably and significantly increase small-scale farmer income via commercial horticulture in the northwest provinces of Cambodia. Our scientists are involved with identification of high-value vegetable crops and training in their production. These dedicated scientists will also be passing on their expertise via training in efficacy/health and safety/environmental aspects of agrichemical use.

AVOCADO FARMERS IN KENYA

The five-year Kenya Avocado programme, funded by the New Zealand Aid Programme and working alongside New Zealand industry partner Olivado, is supporting the sustainable economic development of small-holder avocado growers in Kenya. Under the programme, avocado varieties with improved quality and yield will be selected, improved production systems will be developed, and a training and extension programme will be set up to facilitate uptake of the development findings. Key activities over the past year include the initiation of a remedial pruning programme, generation of the first plants from the nursery and trialling of a pilot irrigation device. In addition, postharvest protocols have put into operation and training is ongoing in multiple areas.

International relationships



EUROPE

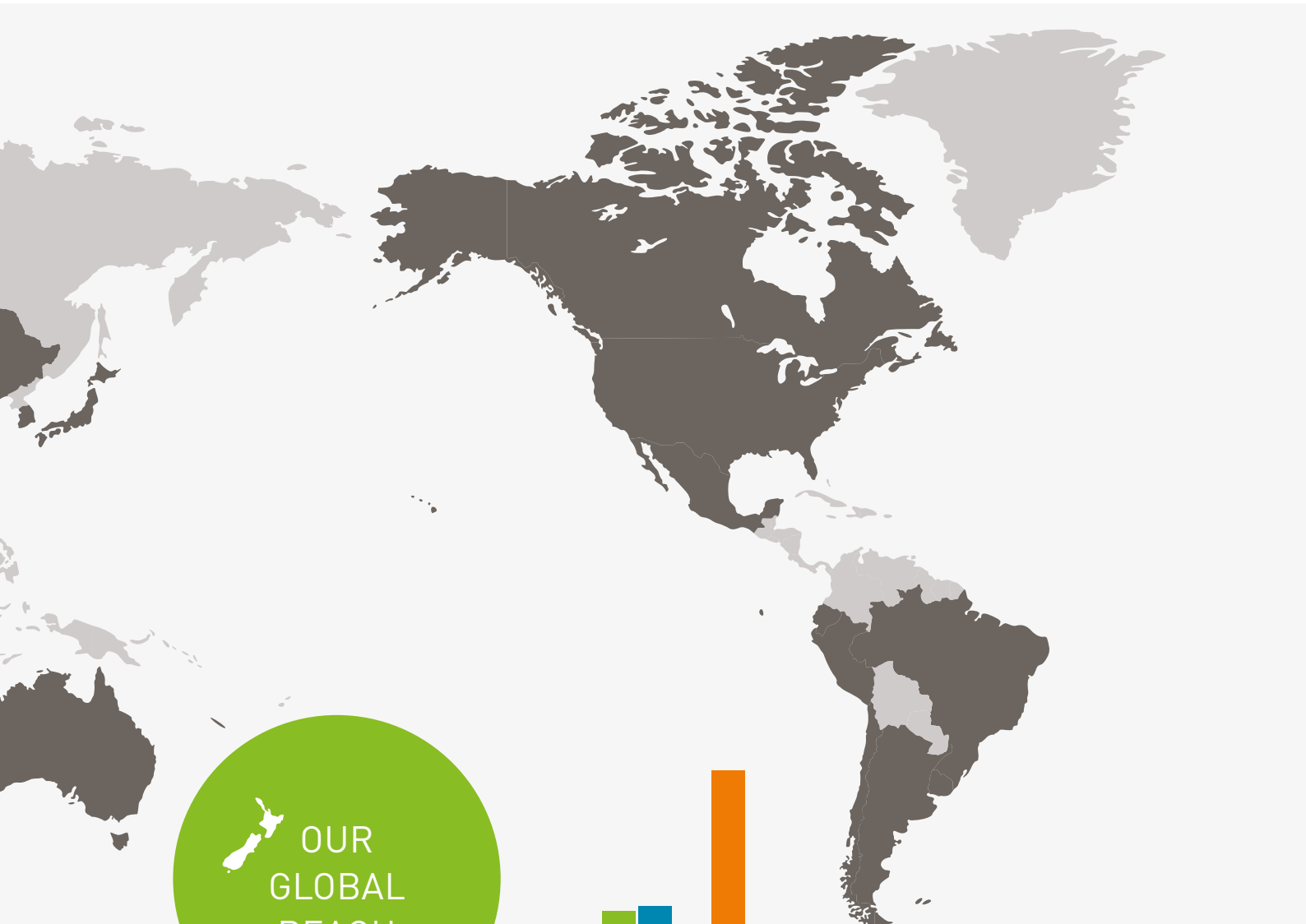
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Belgium	3	2	
Czech Republic		1	
Denmark	1	1	
Finland	1	1	
France	4	5	19
Germany	3	3	17
Greece			1
Iceland	1		
Italy	13	5	11
Netherlands	2	4	9
Norway	3	1	
Poland			5
Spain	4	3	13
Sweden	1	1	
Switzerland	2	1	2
Turkey	1	1	
UK	8	2	23
Ukraine			1
TOTAL	50	28	- 105

MIDDLE EAST & AFRICA

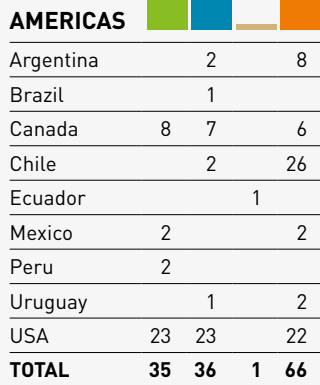
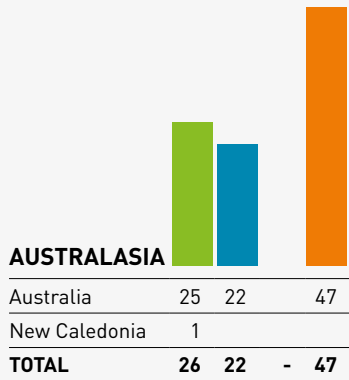
Egypt	2		
Iran	1		
Israel			1
Kenya	2	2	1
Morocco			1
South Africa	4		7
Tunisia	1		
UAE	2	1	
TOTAL	5	9	2 9

ASIA

Cambodia			1
China	25	2	4
India		3	
Japan	3	1	14
Hong Kong		1	
Korea	3	1	5
Nepal			8
Singapore	4		
Viet Nam	2		1
TOTAL	37	8	2 31



OUR GLOBAL REACH



KEY

- Research collaborators
- Commercial collaborators
- Aid projects
- Cultivars licensed



We have close to 850 staff across New Zealand, with offices in Australia and the USA, and more than 80% are involved in research or research support.



OUR
PEOPLE

04



CRAIG JENSEN
General Manager Human Resources

Good employer responsibilities

Our performance and reputation as a good employer is underpinned by our commitment to fostering a positive workplace culture that is characterised by three shared values:

- 1 THE CREATIVE APPLICATION OF OUR KNOWLEDGE
- 2 RELATIONSHIPS BASED ON HONESTY, MUTUAL RESPECT AND TRUST
- 3 ACHIEVEMENT THROUGH LEADERSHIP

Our values capture what is important for us and provide a framework for our people-related initiatives and decision-making.

We are committed to the practice of equality of opportunity, which provides for equal access, consideration and encouragement in recruitment, selection, promotion, conditions of employment and career development for both current and prospective employees.

We view our diverse workforce, comprising people from many different cultures and nationalities, as a strength that aligns well with the increasingly international nature of our research and development programmes.

BEST PRACTICE RECRUITMENT, SELECTION AND INDUCTION

We use best practice selection procedures for all appointments, with line managers being supported throughout the selection process by our HR Advisory team. All vacancies are advertised internally to provide opportunities for career development and advancement. When advertising externally we use web-based technologies to access a diverse range of communities and candidates. A comprehensive induction and orientation programme ensures all new recruits are supported to become effective contributors as early as possible.

→ **In 2014/15 we appointed 57 people from 16 different nationalities** (26 female, 31 male), including 14 from within the organisation.

The application of our knowledge supports the growth of New Zealand's fresh produce exports.



Ensuring our staff have access to development opportunities, such as getting first-hand experience of how our industries work, is key to our performance.

PROGRESSIVE CONDITIONS OF EMPLOYMENT

The Plant & Food Research *General Terms & Conditions of Employment* include provisions promoting equal employment opportunities, career development and employee participation in the development of the workplace.

- **Our partnership agreement with the PSA** serves as an effective mechanism for involving staff in the ongoing development of a quality work environment in line with the principles of partnership and equal employment opportunities (EEO).
- **Additional paid parental leave, on-site child care facilities at our larger sites and provision for flexible and part-time hours of work** enable employees to balance their work and family responsibilities and minimise disruption to their careers. 19% of our salaried staff work part-time, including a significant number who have reduced their hours while they care for dependents.
- **Career and associated remuneration structures utilise standard job evaluation methodologies** and peer review to ensure equity and transparency in both pay and progression opportunities. The historic pay gap between male and female science staff is reducing, with median female pay levels now between 98% and 101% of the median pay rates for males in each of our eight science salary ranges.
- **Staff working towards retirement** have the option of progressively reducing their hours and responsibilities. Retraining and outplacement support is available to staff affected by change in the workplace.

PROMOTING EQUAL EMPLOYMENT OPPORTUNITIES

Our EEO initiatives are directed at increasing the percentage of women at senior levels, both in science and in other areas of the Institute, and increasing the opportunities for groups who are historically under-represented in our workforce including Māori, Pasifika and people with disabilities. Progress is reviewed annually through a set of workplace demographic metrics.

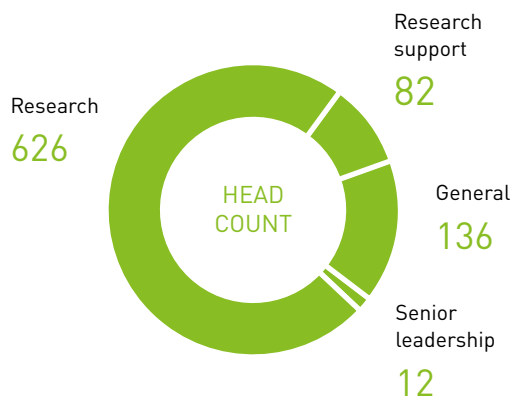
- **The proportion of senior women scientists continues to increase**, mainly through internal promotions, and we expect that further progress will be made over the next decade as significant numbers of our senior scientists retire.
- **Our Māori business unit Te Raranga Ahumāra** is focused on leading the implementation of Māori research and innovation objectives. This is supported by performance indicators for developing capability and increasing understanding within Plant & Food Research and among Māori regarding the opportunities to work more closely.
- **Our annual Summer Studentship Programme** provides promising science students from across New Zealand with their first experience of working in science. In 2014 nine of the 29 studentships were awarded to Māori and Pasifika people as part of a broader initiative for increasing participation from groups that are under-represented in the science workforce.
- **Participation in the Mainstream programme is increasing the opportunities for people with disabilities**, with one person recruited into the programme in each of the past three years.

NATIONAL/ETHNIC ORIGIN OF NEW RECRUITS AT 30 JUNE

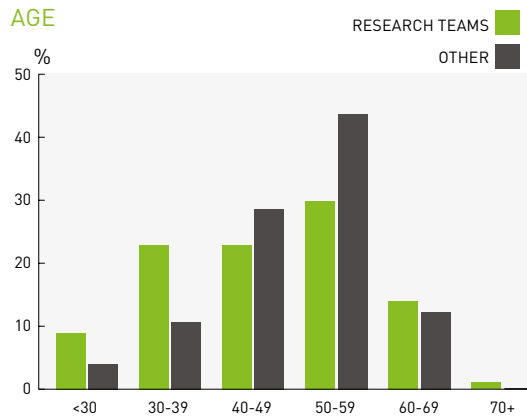
	2011	2012	2013	2014	2015	Total
Māori	2	1	4	1	2	10
NZ European/Pakeha/NZ	29	22	19	31	18	119
Pacific Island	1				1	2
Australia	3		3	3	2	11
Chinese	2	3	2	4	5	16
India/Pakistan/Bangladesh/Sri	7	4	4	2	5	22
Other Asia	3	7	3	4	6	23
United Kingdom/Ireland	5	1	1	5	5	17
Other Western Europe	1	4		3	5	13
Eastern Europe	1	2		1		4
USA/Canada		3	4	2	2	11
Latin America/Caribbean	1	1		1		3
South Africa				2		2
Other Africa	1	1	1	1	2	6
Total	56	49	41	60	53	259

PLANT & FOOD RESEARCH WORKFORCE PROFILE AS AT 30 JUNE 2015

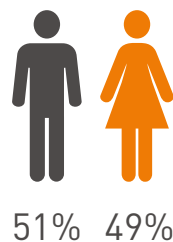
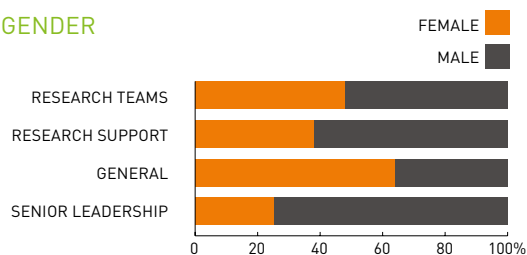
STAFF PROFILE



AGE



GENDER



STAFF ENGAGEMENT

Our biennial workplace survey is our primary vehicle for assessing how people are viewing their jobs and the organisation. Areas of established strength include how people view their work, immediate manager and team, together with well-being, pride in the organisation, ethical standards and health and safety. The 2014 survey, which was completed by 86% of staff, continued the established trend of steady improvement across all survey dimensions and overall, against the survey benchmark.

Staff across the organisation have been involved in the development of a set of actions to address the issues identified in the survey and are involved in the future development of their workplace through our Ways of Working programme.

DEVELOPING POTENTIAL AT ALL LEVELS

Our Performance, Planning and Review process ensures that all staff have work and development plans that are reviewed annually with their manager. All staff have the opportunity to be supported in studying toward qualifications that align with the Institute's requirements. Women across the organisation have the opportunity to apply for financial support through the Margaret Hogg-Stec scholarship, with up to three being awarded annually.

Our Leadership Programme provides development opportunities for current and future leaders at all levels of the organisation.

→ **Over the past year 108 people participated in the Programme**, including 26 for the first time through the Cornerstones of Leadership option, which is targeted at people who have yet to have line management responsibilities. Other intakes were for new team leaders (16 participants) and team development (66 participants from four teams). A further 59 people participated in follow-up development sessions, which use 360° surveys to measure programme impact.

We apply continuous improvement principles to ensure the ongoing health and safety of our staff, a vital element of our business.

A SAFE AND HEALTHY WORK ENVIRONMENT

The National Health & Safety Committee, comprising staff and management representatives, is responsible for setting and reviewing the Institute's health and safety programme, in line with continuous improvement principles. The programme includes objectives developed by local health and safety committees drawn from staff at each of the Institute's sites.

- **The Institute's ongoing efforts in this regard have seen it achieve tertiary level requirements** for ACC's Workplace Safety Management Practices programme in successive biennial audits.
- **They are also reflected in continuing low levels of injury rates** including those requiring medical treatment or time off.

Our *Code of Conduct & Ethics* and *Policy on Unacceptable Behaviour* define those actions including harassment, bullying and unlawful discrimination that will not be tolerated and provide processes for responding to situations where unacceptable behaviour may have occurred. A network of trained contact people provides confidential support and advice on the Policy.



People highlights

INTERNAL AWARDS

- ➔ **Health & Safety Champion** for 2014 is Michelle Thompson, in recognition of her dedication in ensuring health and safety and compliance systems work at a practical level in the areas for which she is responsible.
- ➔ **Lab Safety Manager Awards** (presented quarterly) were awarded to David Billing, Bridie Carr, Robert Diack, Jan Grant, Martin Hunt, Dr Paul Johnston, Ann Krebs, Karen Mason, Dr Adam Matich, Heather McBrydie, Josie Noble and Dr Nick Tuckey for their contribution to good laboratory practices.
- ➔ **Margaret Hogg-Stec Memorial Scholarships** were awarded to Tracy Williams, Bridie Carr and Dr Rebekah Frampton. These Scholarships were designed to encourage and support women through participation in development initiatives to further their careers.
- ➔ **Chairman's Awards** were presented to Dr Robert Beresford, for leadership and dedication in mitigating the impact of fungicide resistance on New Zealand's fruit industries; Dr Suzanne Black and Dr Gerard Janssen, for vision, leadership and determination in the development of the science and technologies underpinning the Precision Seafood Harvesting programme; and the Kiwifruit Breeding Team for delivering the new 'Zesy002' cultivar (known as Gold3 and marketed as Zespri® SunGold Kiwifruit).

EXTERNAL AWARDS

- ➔ **Dr Richard Falloon** was elected a Life Member of the New Zealand Plant Protection Society for outstanding service to the Society.
- ➔ **Professor Marston Conder**, Chair of the Science Advisory Panel, was awarded the Hector Medal for service to mathematics.
- ➔ **BELOW: Dr Bruce Campbell**, Chief Operating Officer, was made a Fellow of the New Zealand Institute of Agricultural and Horticultural Science, recognising his contribution to agriculture, horticulture and the wider food industry.



➔ **ABOVE: Dr Suzanne Black**
Chairman's Awards



➔ **LEFT: Dr Robert Beresford**
and Chairman **Michael Ahie**,
Chairman's Awards
(left to right)

→ **RIGHT: Dr Mark McNeilage** was recognised for his contribution to the global kiwifruit industry with a Lifetime Achievement Award by the Kiwifruit Working Group of the International Society for Horticultural Science. The award recognises Dr McNeilage's 30-year career in research that has included the development of several kiwiberry and kiwifruit cultivars.

→ **BELOW: Dr Sathiyamoorthy Meiyalaghan** was awarded a Trimble Agricultural Research Fund Fellowship and a grant from the New Zealand Horticultural Science Advancement Fund to travel to South America to further collaboration with potato research organisations, including the International Potato Centre in Peru.



LIFETIME ACHIEVEMENT AWARD BY THE KIWIFRUIT WORKING GROUP OF THE INTERNATIONAL SOCIETY FOR HORTICULTURAL SCIENCE



→ **RIGHT: Associate Professor Andrew Allan** was awarded the Roger Slack Award by the New Zealand Society of Plant Biologists, as recognition of an outstanding contribution to research into plant molecular biology; and the President's International Fellowship for Distinguished Scientists by the Chinese Academy of Science, which supports collaboration between international and Chinese scientists.



→ **Dr Brent Clothier** was awarded the Grange Medal of the New Zealand Society of Soil Science for Outstanding Service to New Zealand soil science. The award recognises his contribution to the promotion and advocacy of soil science, notably his mentoring of young scientists, advocacy for funding, and input into environmental policy.

→ **Dr Stuart Tustin** was awarded the AgMARDT Technology Transfer Award by the New Zealand Institute of Agricultural and Horticultural Science to recognise his research into orchard production systems and his regular promotion of new practices with growers and the wider horticultural industry.



We combine existing and emerging scientific technologies, such as scanning electron microscopy, to better understand the biology of organisms of interest to our industries, including insect pests.



OUR
SCIENCE

05



RICHARD NEWCOMB
Chief Scientist

Our science

Maintaining a high level of scientific rigour in our research is critical. To ensure this, Plant & Food Research engages a Science Advisory Panel to oversee our science and undertakes a programme of workshops and science reviews, bringing in external experts to review various aspects of our science, including where we can improve science quality, enhance focus to increase impact and identify capability gaps. A key aspect in our science programmes is the appropriate communication of results, from encouraging publication of research findings in international peer-reviewed journals to implementing outcomes with end-users.

This year our Science Advisory Panel reviewed the fit-for-purpose and processes around our \$10 million 'Future Science' fund within Core Funding (see page 56). This fund allows us to support highly innovative, over-the-horizon and potentially high-risk research, as well as to develop and redirect capabilities into new areas. The panel were complimentary of the fund and how it was being utilised by our scientists to develop new ideas for future application by our sectors. One of their recommendations was to use a targeted Request for Proposals that aligns with the organisation's strategic needs. In response to this, we ran this year's allocation process with a target of Data Management, which was the subject of another science review. Ten programmes were selected to develop best practice and new tools for the management and analysis of our precious scientific data. Other science reviews completed this year included reviews of the foods for health area and our fundamental and translational research in plant molecular biology, which resulted in recommendations and actions to better promote and coordinate publishing of research in international journals.

FUTURE SCIENCE

Investment in Future Science across our outcome areas includes:

- **Better cultivars faster™** – DNA-informed whole genome selection and breeding, regulation of hormone pathways, developing interspecies hybrids, optimising mānuka breeding technologies, exploring ways to handle metadata, developing skills in network analysis, developing a genotype database.
- **Residue-free pests and diseases** – stress signalling pathways, regulators of resistance to fungi, developing insect gustatory recording technology, sensing disease, biodiversity and ecosystem services for sustainability, culture collection database development.
- **More sustainable production systems** – models to predict developmental phenotype from genotype, optimising crop pollinator assemblages, plant nutrition, branching in woody perennials, data checking automation and data management, and a big data approach for supply chain management.
- **Proprietary foods with premium prices** – benefits to consumers from food beyond eating, the role of plant mRNAs in health, biosensors, foods for endurance sports, fruit quality attributes of skin, interaction between circadian rhythms and the gut, and chemistry database development and integration.
- **Secure, sustained seafood production** – domestication of new finfish species, seafood production.

INDICATORS OF SCIENCE QUALITY



16
INTERNATIONAL
AWARDS



8
INVITATIONS FOR
EDITORIAL BOARDS



35
INVITATIONS FOR
INTERNATIONAL
COMMITTEES



9.0
AVERAGE NUMBER
OF CITATIONS PER
PUBLISHED PAPER



20%
PROPORTION OF PUBLISHED
PAPERS IN TOP 25
INTERNATIONAL JOURNALS

CASE STUDIES



Understanding the cellular signals that control flowering will support the breeding and management of kiwifruit with optimised fruit production.

SENSING SUGAR FOR FLOWERING

Understanding flower regulation is important in many horticultural crops, as the number and availability of mature flowers affect fruit yield. Being able to control flowering habits may allow breeders to develop new varieties with earlier flowering times in perennial crops, such as apple and kiwifruit, which will reduce the time from seedling to full fruit production, or allow more control of crops that flower irregularly, such as avocado.

Trehalose metabolism has been implicated in sensing and signalling carbohydrate availability, a key control mechanism for flowering in some plants. This project has been investigating the genetic controls for trehalose metabolism in key horticultural crops and has shown that this metabolic pathway alters flowering time and flower architecture, as well as plant growth. The resulting knowledge will support the future development of molecular markers that will allow breeders to screen parents and offspring for those plants with specific genes that encode favourable flowering habits.

UNDERSTANDING THE NITROGEN CYCLE

Nitrogen is an important plant nutrient yet, at the same time, is also a significant environmental contaminant through greenhouse gas emissions and nitrate leaching into groundwater. There is significant worldwide interest in understanding how nitrogen sources can be managed to ensure crop demand is met while nitrogen losses are reduced.

The microbial organisms and soil conditions that contribute to the supply of available nitrogen for plants, the metabolism of nitrogen and the production of nitrogen greenhouse gases are not well understood under New Zealand conditions. This research project examined New Zealand soils using molecular and biochemical techniques, and has built a greater understanding of the nitrogen cycle, major microbial players in the cycle and the role of rapid soil chemical change in nitrogen cycling processes. This knowledge will be used in the development of new soil management strategies that can aid horticultural and wider agricultural industries in meeting environmental sustainability criteria and optimising chemical inputs.

BIO-ELECTRONIC NOSES FOR VOLATILE SENSING

Insects have an ultrasensitive sense of smell, allowing them to detect a wide range of natural and synthetic compounds more rapidly and with greater sensitivity than the most advanced physical approaches. Insect odorant receptors are the key to this powerful sense of smell. Research has investigated whether insect odorant receptors can be combined with electronics to produce novel odorant-sensing technologies, and has successfully demonstrated proof of principle detection of odorants in two sensor technology formats. This work paves the way for sensors that could have a wide variety of potential applications, including the detection of volatiles associated with pests and diseases in orchards, in biosecurity monitoring, in the detection of volatiles indicative of spoilage or contamination of food products, or to help speed the identification of new flavour profiles in breeding programmes.



Combining knowledge of insect odorant receptors with electronics will lead to the development of new technologies for use in the horticultural supply chain.

Innovation through research collaborations

Through collaborations with research agencies both in New Zealand and overseas, Plant & Food Research can bring together teams of scientists with the right expertise and experience to address these key challenges. These collaborations also raise New Zealand's profile on the world stage, connecting us with new collaborators and sources of international funding.

NATIONAL SCIENCE CHALLENGES

Plant & Food Research is a partner in several National Science Challenges launched by the New Zealand government in 2013. The three Challenges that align most closely with the Institute's strategy and research – High Value Nutrition, New Zealand's Biological Heritage and Our Land & Water – have transitioned from scoping, priority setting and engaging with stakeholders to developing research plans and business cases, and identifying research projects that will deliver targets with impact for New Zealand.

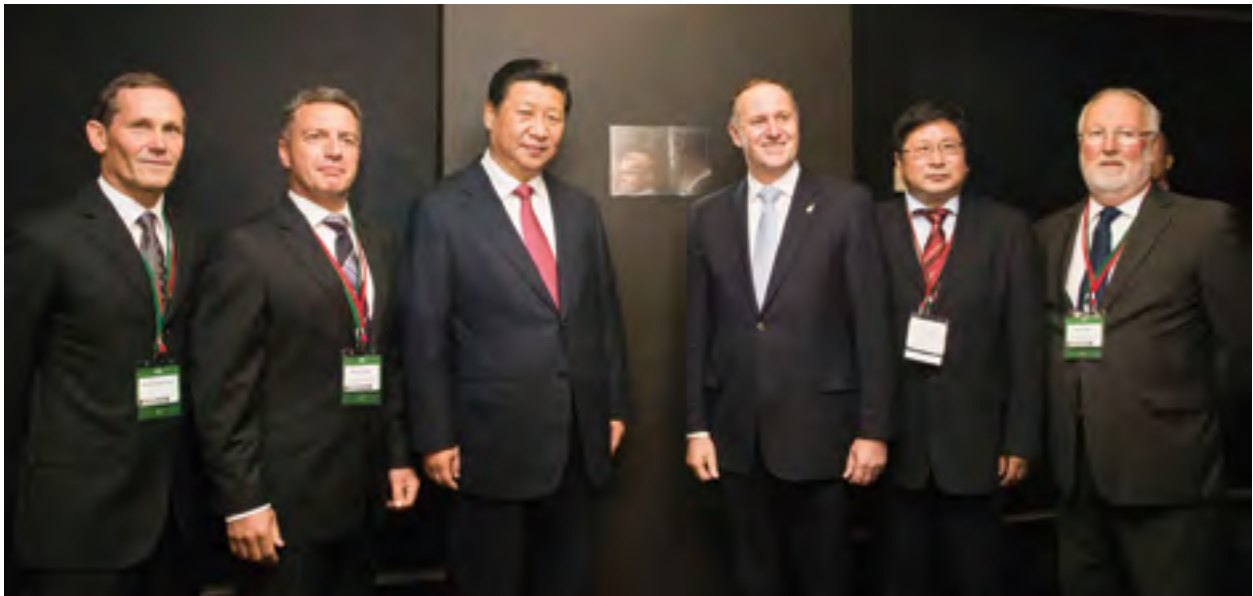
High Value Nutrition, the first Challenge to be launched, has now received funding to 2018 and our researchers are responding to a Request for Proposals for this new contestable fund. The Institute has also contributed expertise to the Science Leadership Team, Expert Panels, the Board and the Business Team. The Challenge will focus on developing high-value foods with validated health benefits, by improving the value proposition to consumers through health claims on food, increasing the value of New Zealand food exports through increased premiums and sales volumes.

The mission of the Biological Heritage Challenge is to reverse the decline of New Zealand's biological heritage, focusing on biodiversity assessment, reducing risks and threats, and sustaining resilient ecosystems. Plant & Food Research is contributing expertise to two initial projects commissioned by the Challenge – monitoring of biological heritage using environmental DNA, and wasp pest management. The Institute is also discussing ways to ensure research undertaken by the Better Border Biosecurity (B3) collaboration, which focuses on science to protect New Zealand's borders from new pest and disease incursions, contributes to the wider interests of the Challenge.

We have also been working closely with our partners in the Our Land & Water Challenge on the design of a research programme that will enhance primary sector production and productivity while maintaining and improving our land and water quality for future generations. We are co-leading one of the Challenges four research themes – Resilient & Responsible Land Use Systems – with fellow Crown Research Institute NIWA. This role involves Plant & Food Research reviewing Expressions of Interest for delivering research project and recommending a research portfolio to the Assessment Panel for investment.



Collaborating with Chinese scientists will conserve the natural kiwifruit germplasm found in China and support the screening of varieties for genes controlling key characteristics, such as flesh colour.



FROM LEFT: Plant & Food Research CEO Peter Landon-Lane, Chairman Michael Ahie, President of the People's Republic of China Xi Jinping, New Zealand Prime Minister John Key, Li Mingzhang from SPANRS and Plant & Food Research Manager for Asia Breeding & Biotechnology Allan White at the launch of the Joint Laboratory for Kiwifruit Research.

THE LINCOLN HUB

The vision of the Lincoln Hub is to grow wealth through land-based excellence and support the growth of exports from New Zealand's land-based sectors through growing business, growing talent and accelerating extension. The innovation cluster, based at Lincoln, will bring together industry, research and education to transform the productivity and performance of the primary sector and enhance sustainable economic and environmental outcomes.

The Lincoln Hub – a partnership between Lincoln University, AgResearch, DairyNZ, Landcare Research and Plant & Food Research – will have more than 900 scientists forming the most significant concentration of environmental and land-based research in the Southern Hemisphere. The initial phase of development is linked to significant plans for investment in, or growth of, facilities at Lincoln by the New Zealand Government through the partner organisations.

In the future, the cluster will expand to include other industries, research enterprises and commercial partners, creating a multi-agency, multidisciplinary research, development, education, training and extension hub to support sustainable increases in productivity and growth of land-based exports. The opportunity to co-locate or share space will allow industry, research and students to work together, delivering new research and technologies, attracting new talent and developing a skilled scientific workforce.

JOINT LABORATORY FOR KIWIFRUIT RESEARCH

The New Zealand-China Joint Laboratory for Kiwifruit Research is a collaboration between Plant & Food Research and the Sichuan Provincial Academy of Natural Resource Sciences (SPANRS). The virtual laboratory will allow scientists in both organisations to work together and share resources to further research into kiwifruit diseases and physiology, as well as conservation of the native kiwifruit germplasm found in China.

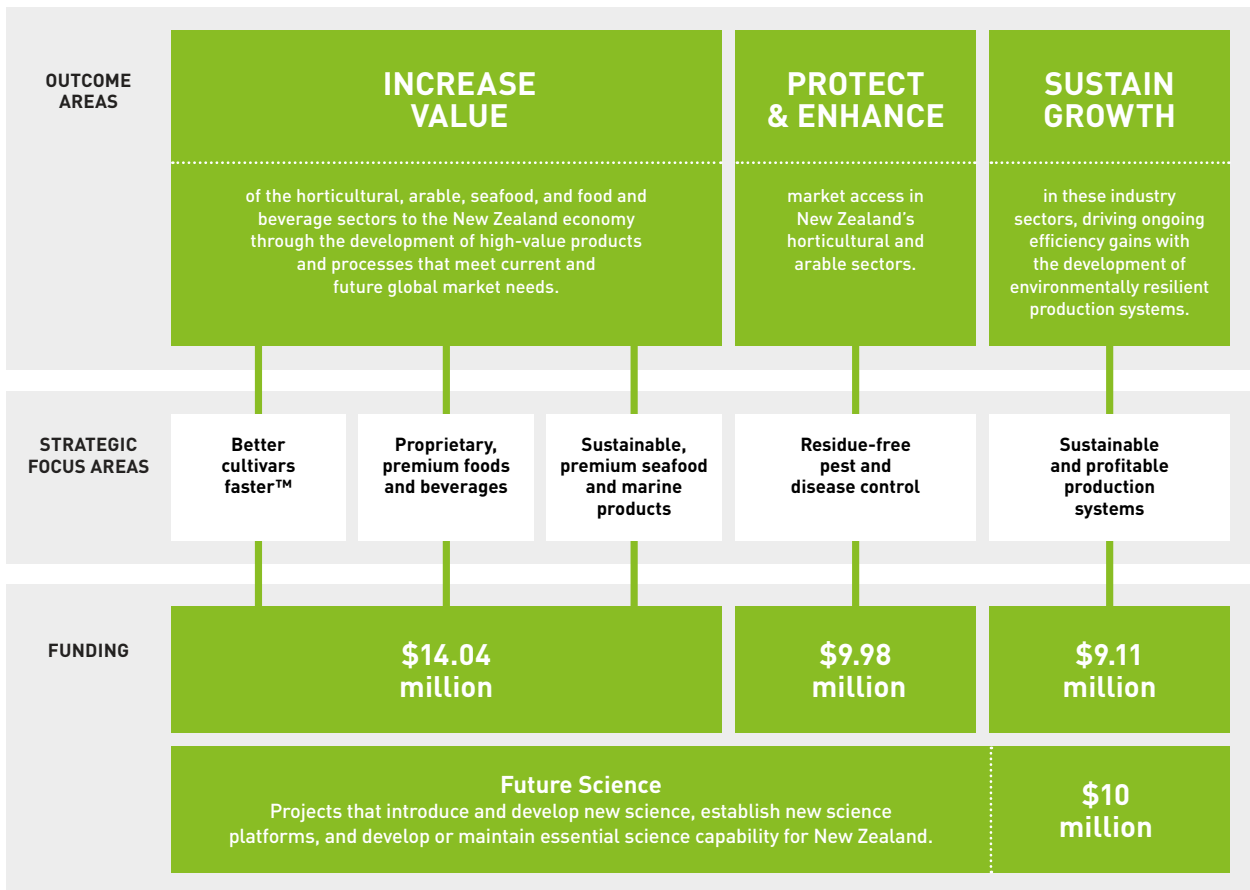
Plant & Food Research's relationship with SPANRS dates back to the early 1990s. Through this long-term collaboration – originally between Plant & Food Research's predecessor, HortResearch, and SPANRS predecessor, the Sichuan Provincial Natural Resources Research Institute (SPNRRRI) – a one hectare kiwifruit research orchard and germplasm collection was established in 1996, in the Shi Fang county of Sichuan province. This orchard provided a mechanism for the two organisations to share knowledge and resources, as well as establish a scientific exchange programme. The orchard was extended in 2000, with new genetic material sourced from the Three Gorges area of China, approximately 700km east of Sichuan, and again in 2004 with new material from the Jianxi province. By 2009, scientists from Plant & Food Research and SPANRS had collected more than 600 different genotypes from wild populations of the *Actinidia* species, with a cross-section of these samples being used to establish the New Zealand germplasm collection.

Since the kiwifruit disease Psa was discovered in New Zealand in 2010, the relationship with SPANRS has been extended to include assessing varieties held in the germplasm collection for susceptibility to Psa, and to identify potential biological controls for the disease naturally present in wild kiwifruit populations. The establishment of the Joint Laboratory allows scientists from Plant & Food Research to visit SPANRS to screen the germplasm collection and wild kiwifruit populations for genes that may confer natural resistance to Psa, as well as other key traits that may have commercial potential, and use this knowledge to identify these traits in the New Zealand breeding population. The collaboration is also allowing scientists to increase their knowledge of kiwifruit diseases that are not currently found in New Zealand, such as white peach scale, and develop surveillance and control methods to protect the industry should these diseases cross the border.

The Joint Laboratory was officially launched in November 2014 by President Xi Jinping, President of the People's Republic of China, and New Zealand Prime Minister John Key.

Core Funding

A total of **\$43.1 million** of Core Funding is invested in research that contributes to all three of the outcomes listed in our Statement of Core Purpose.



Our strategy for allocating Core Funding involves a portfolio approach that gives consideration to the collective outputs and impacts that result from a suite of investment mechanisms, including Discovery Science, Core, Contestable and Commercial revenue.



INCREASE THE VALUE

Better cultivars faster™

\$8.14 million

Subcontractor: Lincoln University

Sector & industry alignment: Arable, Kiwifruit, Onion, Vegetable, Ornamental, Pipfruit, Potato, Wine

2014/15 targets

- 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

2014/15 achievement highlights

- Two Plant Variety Rights have been granted for forage oats in the USA, and one new application for a milling wheat was filed in NZ.
- A new system for checking the integrity of commercial cultivar seed multiplications against reference 'breeder' samples based on molecular fingerprints has been introduced and successfully tested against the three latest commercial wheat releases.
- Recent Plant & Food Research (PFR) commercial cereal cultivars continue to dominate the premium milling wheat ('Reliance' and 'Duchess') and biscuit markets ('Empress'); new cultivars for the wheat medium milling ('Viceroy') and gristing ('Hanson') markets continue to perform well; and a barley feed line (CRB144) has been identified as the likely latest commercial release with very high yields and good grain quality.
- 'Monty', the first commercial awnless barley cultivar to be released in NZ, is performing well with improved whole-crop silage quality.
- New FT-NIR technology is being successfully introduced into the breeding test pipeline, allowing high-throughput screening for a range of biochemical and physical grain attributes, improving the efficiency and effectiveness of plant selection.
- A DNA marker has been used for the first time to accelerate breeding of red flesh kiwifruit cultivars. Fifteen diploid and one tetraploid red entry have been selected for Stage 2 semi-commercial evaluation, and one new red cultivar has been recommended for Stage 3 commercial evaluation.

- Plant Variety Rights have been granted for gentian cultivars in Japan ('Koi Beni') and the EU ('Showtime Diva'); and new applications filed in NZ, the USA and the EU.
- A public portal is enabling genome sequences for kiwifruit and the Psa bacterium to be shared, creating new collaborations with Chinese and Italian researchers. Together we are disentangling the genomic complexity underlying control of critical traits such as sex or colour in kiwifruit.
- A new chromosome doubling protocol has been applied to produce the first hexaploid *Actinidia chinensis* material in NZ, significantly increasing inter-species crossing options and the potential reach of the breeding programmes.
- A technology for testing for the presence of Psa in *in vitro* kiwifruit, even to very low titres, has been successfully tested and will form the basis of a new protocol to allow movement of kiwifruit plant material from Psa zoned to non-Psa zoned regions.
- Marker-assisted selection molecular technologies have been successfully applied to two apple rootstock seedling families for the selection of dwarfing, fire blight and woolly apple aphid genes, speeding the selection process significantly. This technology allows simultaneous selection of multiple genes for the same trait.
- Several significant publications on the genetic understanding of apple flavour have confirmed PFR's international presence in this area. For the first time, the molecular basis for the production of phenylpropene estragole, an odour impact compound with an aromatic, aniseed-like note, has been shown, and further evidence found that manipulating single compounds can affect the sensory perception of aroma and flavour. It was demonstrated that the production of esters and phenylpropenes in ripe fruit is directed by the *Alcohol acyl transferase 1* locus. Flux experiments using transgenic plants have shown that the phenylpropene pathway can be positively (chalcone synthase) or negatively (AAT1) influenced by down-regulation of these different pathway genes. In collaboration with PFR pathologists, down-regulation of α -farnesene in ripe apples was shown to be associated with changes in pathogen susceptibility.
- The Whole Genome Sequence of two isolates differing in virulence for European canker (*Neonectria ditissima*) has been assembled. Together with an unpublished genome assembled by colleagues at East Malling Research, UK, these are the first draft assemblies of this damaging pathogen, allowing new molecular research for understanding and manipulating resistance to it.
- Nine new advanced potato breeding lines have been cleared of pathogens (virus-free confirmation by MPI) and established within tissue-culture ready for domestic and/or international distribution: eight to India; three to Australia; three to the USA; two to Canada; and two to China.
- A visit to the International Potato Centre (CIP) strengthened existing R&D collaborations and explored opportunities for PFR to contribute to CIP's global potato initiatives such as the supply of low-input genotypes for subsistence farming in SE Asia. NZ international aid funding opportunities are being explored.
- Five new breeding lines have been successfully imported (as tissue cultured plantlets) from the USA, including some with claimed resistance/tolerance to the tomato potato psyllid and/or *Candidatus Liberibacter solanacearum*. These materials are being evaluated for inclusion in our potato breeding programme.

Core Funding continued

- Two new sweet potato lines, SPFR1 and SPFR2, have been released for commercial production, and three commercial packhouses have requested licences to produce both. Plant Variety Rights applications for these lines have been filed.
- Results from three seasons of zebra chip disease field trials suggest that PFR potato clones Crop 52 (which is used as a cold-induced sweetening-resistant parental line) and Crop 78 (which is a new pre-release French fry line) have a small but significant reduction in disease symptoms relative to commercial standard lines.
- A protocol for producing large numbers of clonal grape variants has been developed and 200 Pinot noir (PN) and 100 Sauvignon blanc variants are ready for field evaluation (another 2000 PN variants are ready for de-flasking and transfer to the glasshouse).
- Genetic resistance to virus has been confirmed in some wild grape species and new rootstocks are being developed with resistance to root-zone transfer of the *GLRaV3* virus.
- A new blackcurrant cultivar ('Victoria') has been released in NZ for the blackcurrant juice concentrate market, and raspberry Shortcake™ has been released in the USA where planting material has rapidly sold out.
- A new blueberry advanced breeding line (ZZ04115) has been entered in Plant Variety Rights trials and is being prepared for commercial release later in 2015.

Proprietary, premium foods and beverages

\$3.07 million

Subcontractors: Lincoln University and the University of Auckland
Sector & industry alignment: Arable, Onion, Vegetable, Potato, Wine

2014/15 targets

- In-market consumer insights, alongside in depth knowledge of product attributes, guide development/placement of NZ foods for export markets
- Progress towards the development of new tools and technologies developed to deliver high value food products effectively to export markets
- Steps towards the development of functional foods/ingredients and biomaterials, utilising knowledge of raw materials, nutrition, health and wellness developed with local and multinational companies

2014/15 achievement highlights

- Manipulation of commercial millstreams by flour millers shows potential to reduce the coeliac potential of wheat flours. The focus is now on breeding new wheat cultivars with reduced levels of coeliac-toxic peptides.
- Retention of cell wall integrity during cooking was demonstrated to vary between potato cultivars, indicating there is potential to lower the glycaemic impact of potato products through selective cultivar breeding. The effects of adding fibre or changing processing technique on glycaemic impact of mashed potato are also being examined to confirm breeding targets.

- Metabolomic analytical techniques have been used to identify potentially valuable compounds and flavour volatiles in potatoes. Flavour profiles of potatoes have been established with sensory panels and will be linked to the volatiles identified from the metabolomics analysis, providing breeders with clear targets and industry with leads on new, high-value potato products.
- A collaboration has been initiated with the School of Food Science & Bioengineering, Zhejiang Gongshang University, Hang Zhou, to investigate our hypothesis that NZ-Asian consumers differ from NZ-born consumers in their mouth movements when eating solid foods.
- An analysis of FODMAPS (Fermentable Oligosaccharides, Disaccharides, Monosaccharides and Polyols) in NZ grains shows that feed/biscuit wheats are typically higher in fructans than are bread and durum wheats. Grains like quinoa and oats have negligible levels. Information about raw materials helps food processors make decisions about ratios of ingredients in manufactured products.
- A comprehensive dossier of information on the biological, treatment and logistical factors influencing postharvest physiology of capsicums and tomatoes has been assembled and presented to industry sector groups, enabling industry to optimise sea-freight protocols for these crops.

Sustainable, premium seafood and marine products

\$2.45 million

Sector & industry alignment: Seafood

2014/15 targets

- Progress towards new harvest and postharvest technologies to support higher value seafood products
- Steps towards the development of new technologies to support extended shelf life and food safety
- 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

2014/15 achievement highlights

- The snapper breeding programme has been successful again with more than 100,000 reared this year. Of these, 24,000 were released into the Nelson Haven, many at a ceremony jointly hosted with Te Tau Ihu Fisheries Forum and MPI in recognition of the late Te Rangi o Kiwa John Morgan of Ngati Rarua.
- The 750 MB snapper genome (*Chrysophrys auratus*) has been assembled. The high-quality genome will serve as a scaffold for all future genomic analyses and form the basis for genome-wide estimates of linkage disequilibrium. It will also serve as a template for RNA-seq studies (isoform-specific, allele-specific) and studies investigating epigenetic modifications (such as methylation) and DNA-protein interactions.
- Presentations and posters at the Marine Sciences Society and NZIFST conferences, the Foodtech and Packtech trade shows and seminar presentations, including one in Beijing, have enabled information to be disseminated to the seafood, food and packaging industries as well as extend existing and build future research collaborations.

Science collections and infrastructure

\$0.38 million

2014/15 achievement highlights

- Fruit, arable and vegetable collections maintained, made accessible and germplasm incorporated into breeding programmes to meet industry impact targets and generate new knowledge.



PROTECT & ENHANCE

Residue-free pest and disease control

\$9.98 million

Subcontractors: Lincoln University and Landcare Research
Sector & industry alignment: Avocado, Arable, Kiwifruit, Onion, Vegetable, Pipfruit, Summerfruit, Potato, Wine, Biosecurity

2014/15 targets

- Progress towards the development of new tools and systems for biologically based pest and disease control
- Steps towards new cultivars stacked with targeted pest and disease resistance
- Progress towards the development of new 'safe' disinfestation technologies
- Improved biosecurity risk assessments, detection technologies, optimised surveillance approaches and new tools for response and eradication

2014/15 achievement highlights

- A new technology for controlling leafroller caterpillars in avocado based on mating disruption has been developed. Current control is based on conventional pesticide technology, which is limited by issues with spray penetration into the canopy. The new technology features pheromones loaded on to dispensers strategically positioned in orchards. Trial results for numbers of males trapped on lures and female mating status confirm successful mating disruption.

- Analyses of the genetic control of disease in cereal crops continue due to its effect on yield and quality. Knowledge is being generated of the genomic location of a durable stripe rust resistance QTL in wheat that will allow those loci to be manipulated in the wheat breeding programme. Ongoing effort in barley introgression lines is identifying new disease resistance genes and developing molecular markers linked to resistance genes for use in marker-assisted breeding.
- Results of a rust pathotype survey are providing information on current rust pathotypes that will enable NZ and Australia to assess the likelihood of new pathotypes entering the Australasian region. Four pathotypes of cereal rust have migrated between NZ and Australia in the last three decades, via prevailing westerly wind across the Tasman Sea or modes of dispersal such as on travellers' clothing. This information will guide management responses such as selecting different cereal crop varieties and/or altering fungicide spray programmes. It can also guide breeding strategies seeking to integrate durable resistance for these rust pathogens into new cultivars.
- Research on resistance to fungicides in *Zymoseptoria tritici*, the cause of speckled leaf blotch in wheat, has revealed that some fungicides are still effective in controlling *Z. tritici* whilst some had reduced sensitivities. The baseline sensitivity to a new group of fungicides has been established, enabling future changes in sensitivity to be detected promptly and fungicide resistance management strategies to be updated and communicated to industry.
- Resistance against *Ascochyta* blight, a serious disease of field and process peas, is a key breeding target. Four candidate defence-related genes have been identified. Resolution of QTL mapping is relatively low but these genes provide very good markers for future marker-assisted selection. Research on epistatic interactions has confirmed that these lead to non-additive interactions between genes and have a major role in determining disease resistance or susceptibility. Results are being prepared for publication and implications for the pea breeding programme are being discussed.
- Improving biodiversity on farms is a key goal for the cropping sector. Native plant species have been identified that increase the abundance and diversity of key beneficial arthropods while minimising pest populations. This evidence provides farmers with options to establish native habitats on farms to bolster beneficial arthropod diversity.
- Large-scale sequencing analysis of *Psa* gene transcripts induced in the early stages of kiwifruit infection has shown massive increases in the secretion of proteins produced by the bacterium to suppress plant defence responses. Researchers are using this information to identify and rank bacterial components to target in resistance breeding strategies.
- Codling moth eradication has been attempted using the sterile insect technique in a group of orchards in Central Hawke's Bay. Sterile (irradiated) moths were air-freighted from Canada and released on two 100 ha properties, in 10 consignments each of 40,000 moths. Mating between these moths and wild ones produce infertile eggs or infertile larvae. The intention is to saturate the wild population and drive it to extinction in combination with standard control measures such as insecticides and pheromone mating disruption. Early signs suggest a pronounced reduction in pheromone trap catches of wild moths compared with last year.

Core Funding continued

- Valuable new research tools have been developed based on model plant systems such as tobacco and applied to reconstruct and test interactions between Psa genes, the plant defence targets they interfere with and model resistance genes that can detect these manipulation events to trigger a resistance response. These systems are being used to test hypotheses and identify candidate kiwifruit response genes for use in resistance breeding programmes.
- Results from collaborative research with Landcare Research show the generalist predatory mite *Amblydromalus limonicus* has potential as a biological control tool for tomato potato psyllid (TPP) in covered vegetable crops. *A. limonicus* prefers TPP over other pest species. This research, along with the discovery of artificial diets for this mite, is a crucial step towards establishing *A. limonicus* as a tool in NZ for managing TPP.
- Two disinfestation technologies have been trialled as alternatives to methyl bromide fumigation for capsicum and tomato fruits. Neither is suitable as stand-alone replacements for methyl bromide treatment of fruit for export, but both show considerable promise as components of management systems for small insect pests of export capsicums and tomatoes.
- A survey of 50+ pea fields in Canterbury has revealed that two species of root rot, *Fusarium avenaceum* and *F. solani*, are principally responsible for pea root rot. While *F. solani* has previously been associated with pea root rot, this is the first report of the association of *F. avenaceum*. The survey also indicated that *Phoma* species, part of the Ascochyta blight disease complex on peas, were associated with collar rot. Confirmation of these pathogens will enable more effective control systems to be designed.
- A new control method for apple pest apple leafcurling midge to supplement current insecticidal and biological control is under development. In orchards where pheromone lures were positioned as part of a 'lure and kill' strategy, catches of adult males were reduced by 97%, shoot damage by 52% and numbers of midge larvae by 72%. This control tactic shows considerable promise with a practical system to deliver the pheromone and insecticide into orchards being investigated.
- The effect of pruning date on the development of canker lesions caused by *Pseudomonas* pathovars on cherry was investigated in a field trial. Results are guiding the management of bacterial canker in cherry orchards.
- Learnings from research on tomato potato psyllid management options have been used to inform spray programme treatments in three regional pest and disease management trials with co-funding from Potatoes New Zealand.
- A potato trial assessing the effects of spraying edges of crops and timing of insecticide applications on tomato potato psyllid (TPP) egg and sticky trap action thresholds indicates that these monitoring tools may be used to trigger insecticide applications and could be useful components of Integrated Pest Management decision tools for managing TPP and zebra chip disease.
- Differences in the impact of recently identified variants of Grapevine leafroll virus have been analysed in four winegrape cultivars across four different climatic regions. These trials are helping train visual assessors of red berry grapes to identify virus-infected vines rather than vines with nutrient deficiencies.

- Options for biological control of brown marmorated stink bug have been examined as a pre-emptive biosecurity strategy. While NZ research is aimed at ensuring this insect does not establish here, current surveillance and eradication tools are limited and pre-emptive biological control is seen as a worthwhile hedge-betting approach.
- Investments in plant biosecurity research are being optimised through collaborative projects in Australia. Researchers in the SITplus consortium are working to develop new lures for Queensland fruit fly and in the Plant Biosecurity CRC to develop a framework to help develop mass trapping methods for invasive insects.



SUSTAIN GROWTH

Sustainable and profitable production systems

\$9.11 million

Subcontractors: AgResearch, Landcare Research, Lincoln University
Sector & industry alignment: Avocado, Arable, Kiwifruit, Ornamental, Vegetable, Pipfruit, Potato, Summerfruit, Wine, Environment

2014/15 targets

- Progress towards the development of tools and technologies to guide sustainable farming practices
- Extending and refining pan-sector modelling platforms (e.g. Overseer and APSIM)
- New scientific understanding underpinning farming within limits, including productivity, profitability, environmental constraints and regulatory/compliance frameworks

2014/15 achievement highlights

- Studies of the relationship between orchard temperature patterns and fruit set in avocado suggest that fruit set in NZ occurs during wider temperature conditions than in other countries. A tool for estimating pollination date of fruit successfully set and still present on trees in January has been trialled. It is being refined to determine its potential as a tool for growers to understand factors limiting fruit set in their orchards.
- A technique for determining paternity of young avocado fruit has been developed. Fruit drop can be a major cause of production losses and determining the source of pollen will help determine whether pollen quality/source is a factor in premature fruit drop.

- Work on orchard protocols for new varieties of kiwifruit released to industry has continued with information transferred to orchardists through meetings, workshops and published articles. Applications of these orchard management protocols increase fruit quality and quantity.
- Early stage trials investigating red colour development in kiwifruit and ways to enhance it using orchard management techniques are in progress and have identified some promising candidate treatments. Initial results suggest orchard practices supporting good red flesh colour are compatible with other quality and production techniques.
- Interactions continued with growers to define Class 1 onions. This category is a combination of size and quality, especially skin colour. Monitoring of crops indicated that plant spacing in the field and variability in irrigation and nutrient supply contribute significantly to both size and evenness of quality, while diseases can have a direct effect on downgrading because of skin blemishes.
- Research on the potential to export tomatoes and capsicum fruit by sea freight has revealed that varieties display markedly different potential to survive the long storage time required. This discovery offers quick opportunities for growers to transition to these varieties. Treatments are showing promise to reduce the threshold at which these fruits develop chilling injury.
- A quick test that vegetable growers can use to determine soil nitrogen content has been field tested, and initial guidance on actions growers can take to determine fertiliser applications have been devised.
- Cation exchange capacity of soils affects adsorption of nutrient ions. In turn this determines the retention of applied fertiliser nutrients and their subsequent supply to soils. A mechanistic model has been scoped to take account of these complex interactions. It will be applied to help predict nutrient leaching and availability to plants.
- Mechanical thinning protocols have now been adopted as common procedure in commercial vineyards. Smaller berries and reduced Botrytis incidence have been commonly reported where mechanical thinning has been practised. This effect has been confirmed as being directly related to trauma to young berries during the mechanical thinning procedure.
- Contributions towards the modelling components of the Matrix of Good Management (MGM) project led by Ecan but with significant other regional council and industry body funding continued. Definitions by industry of Good Management Practices (GMP) have allowed modellers to translate these practices into potential nitrogen and phosphorus losses from farm systems in Canterbury, helping to populate the Matrix. Tools for partial automation of this process have been developed.
- Improvements to underlying modelling procedures and individual crop models have been made and delivered to the community of researchers working to enhance APSIM – a model developed to simulate biophysical processes in agricultural systems.
- PRONTI is a new tool being developed to assess non-intentional impacts of pest and disease control efforts on non-target organisms, such as beneficial and native species. A recent workshop with EPA, DoC and MPI reinforced the importance of this scientific approach and the potential use of this tool as part of the process for intentional introduction of biological control agents in NZ.
- Two Māori students participating in our Excellence Programme investigated the threat of myrtle rust to Māori taonga plant species. This research highlighted the potential social/cultural impact of this invasive rust species, which is currently found in Australia, to some of NZ's best known and iconic plant trees such as pōhutukawa, rata, kānuka and mānuka.

INCREASE THE VALUE, PROTECT & ENHANCE, SUSTAIN GROWTH

Future Science

\$10 million

2014/15 targets

- Innovative, over-the-horizon and high-risk research projects and associated capability managed to create value for New Zealand's sectors to support science quality

2014/15 achievement highlights

- A portfolio of Future Science projects that are consistent with our SCP initiated to deliver value to New Zealand's sectors through high-quality science over time.





Our research is supporting the growth of New Zealand's horticultural sector and its targets for delivering on the Government's Business Growth Agenda.



OUR
MANAGEMENT

06

Corporate governance

The Plant & Food Research Board, appointed by the Minister of Science & Innovation, sets the Institute's strategic direction and delegates responsibility for the management of the Institute to the Chief Executive.

STATEMENT OF CORE PURPOSE

The Statement of Core Purpose (SCP) outlines the clear, explicit and enduring strategic role for Plant & Food Research as determined by the New Zealand Government. The SCP outlines the Institute's roles and responsibilities and how these will benefit New Zealand, and is used by the Crown to evaluate performance on a four-year rolling basis.

Plant & Food Research's SCP can be found online at www.plantandfood.co.nz/file/pfr-scp.

STATEMENT OF CORPORATE INTENT

The Statement of Corporate Intent (SCI) outlines the Institute's five-year strategy, including the nature and scope of activities and performance targets. The SCI includes plans to contribute to the outcomes described in the SCP and outlines key performance indicators to support their delivery.

Plant & Food Research's SCI 2015/16 to 2019/20 can be found online at www.plantandfood.co.nz/sci-2015-16.pdf.

LEGAL OBLIGATIONS

Plant & Food Research is subject to (amongst others):

- Crown Research Institutes Act 1992
- Commerce Act 1986
- Crown Entities Act 2003
- Crown Entities Amendment Act 2013
- Health & Safety in Employment Act 1992
- Official Information Act 1982
- Public Audit Act 2001
- State Sector and Public Finance Reform Act 2012.

BOARD OF DIRECTORS

The Board of Directors, appointed by the Minister of Science & Innovation according to the Crown Research Institutes Act, sets the Institute's strategic direction and delegates responsibility for the management of the Institute to the Chief Executive.

The Board acts under a Charter which formalises and sets out the manner in which the Board's powers and responsibilities will be exercised and discharged, adopting principles of good corporate governance and practices that accord with best practice and the application of laws in the jurisdictions in which the company operates. In line with best practice, the Board completes an annual Board performance evaluation.

The Board regularly reviews key policies across the Institute. Deep dive reviews are also periodically undertaken; in the past year, these have included:

- Health & Safety
- Strategic Risks
- Research Investment Portfolio
- Future Science
- International business development
- Science reviews
- Strategy refresh

For the 2014/15 year

Number of meetings held: 9

Meetings held at: Mt Albert, Marlborough, Hawke's Bay

Michael Ahie, Chairman (9)

Appointed: 1 July 2010

Greg Gent, Deputy Chair (8)

Appointed: 1 July 2013

Professor Juliet Gerrard (8)

Appointed: 1 July 2013

Stana Pezic (8)

Appointed: 1 July 2011

Mark Stuart (9)

Appointed: 1 July 2010

Andrew von Dadelzsen (9)

Appointed: 1 July 2014

(number in brackets indicates number of meetings attended during the 2014/15 year)

Profiles of the current Board of Directors can be found on page 66 or on the plantandfood.co.nz website. Remuneration details for the Directors can be found on page 74.

There are currently three standing Committees operating under the direction of the Board Chair:

Audit & Risk Management Committee

Stana Pezic (Chair), Greg Gent, Mark Stuart
Number of meetings in 2014/15: 4

The primary objective of the Audit & Risk Management Committee is to act as the main conduit with the company's auditors, serve as an independent and objective party in reviewing financial information, and review the company's risk management, auditing, accounting, compliance and financial reporting strategies and processes.

In the 2014/15 year, the Committee reviewed and approved the Institute's:

- Internal Audit Programme
- External Audit Programme
- Annual Report
- Insurance Renewal.

Appointments & Remuneration Committee

Mark Stuart (Chair), Juliet Gerrard, Michael Ahie
Number of meetings in 2014/15: 2

The purpose of the Appointments & Remuneration Committee is to oversee the appointment, performance review and remuneration of the Chief Executive Officer and senior executives who report directly to the CEO.

Mt Albert Redevelopment Project Committee

Juliet Gerrard (Chair), Greg Gent, Stana Pezic
Number of meetings in 2014/15: 6

The Mt Albert Redevelopment Project Committee was established in 2014 to ensure effective Board visibility and oversight of the three-year redevelopment project for the Mt Albert Research Centre.

SCIENCE ADVISORY PANEL

The Board also receives advice from the Institute's external Science Advisory Panel. In 2014/15, members of the Science Advisory Panel presented to the Board on two occasions (August and October 2014).

The purpose of the Panel is to provide objective strategic advice to the Board to promote its decisions on research strategies, future science activities and development associated with achieving Plant & Food Research's Core Purpose.

Members of the Science Advisory Panel are:

- Professor Marston Conder (Chair, University of Auckland)
- Professor Cathie Martin (John Innes Centre, UK)
- Professor Alastair Robertson (Australia)
- Professor Ernst van den Ende (Wageningen University & Research Centre, The Netherlands)

Profiles of the Science Advisory Panel members can be found on page 67 or on the plantandfood.co.nz website.

RISK MANAGEMENT

Plant & Food Research has an established framework for managing risk in an effective, efficient and consistent manner, to inform strategic and business planning processes, optimise allocation of resources and allow Plant & Food Research to effectively recognise, prioritise and respond to risks. The Risk Management Framework adopts processes consistent with those established in the ISO 31000:2009 Standard: Risk Management – Principles & Guidelines.

Plant & Food Research has a Business Continuity Plan (BCP) which acts as a framework for organisational preparedness, emergency response and recovery after disruption by a significant natural or man-made incident. The BCP focuses on the response and recovery of critical assets and operations to mitigate the potential impact of an incident to the Institute's ability to deliver on its business and strategic plan and to protect Institute staff and the wider community. The BCP also includes a framework for site-specific Emergency Response Plans (ERPs).

CODE OF CONDUCT & ETHICS

Plant & Food Research's reputation is determined to a large degree by perceptions of the conduct and performance of its staff. The Code of Conduct & Ethics is intended to inform and guide the Institute's staff on the standards of conduct, decision-making and ethical behaviour that are important at Plant & Food Research.

The Code of Conduct & Ethics includes guidelines on:

- Acting with honesty and integrity
- Consistently demonstrating professionalism
- Respecting and acting within the law
- Maintaining confidentiality
- Avoiding conflicts of interest
- Being socially responsible.

Plant & Food Research operates its scientific research activities in accordance with national legislation, including ethics approvals for all human and animal studies (coordinated by the Institute's Biosafety Advisory Committee).

Board of Directors

Michael Ahie (Chairman)

Taranaki
Ngā Ruahine
Ngāti Ruanui



Michael Ahie is a business owner and company director based in Wellington. He is a founding partner of leadership and business coaching company AltusQ. He is Pro Chancellor of Massey University, Chairman of the Food Safety Assurance and Advisory Council, Chairman of ComplyWith Limited and a director of a number of companies including FMG and BCC Limited.

Greg Gent (Deputy Chair)



Greg Gent, of Ruawai, is a senior commercial director with dairy farming interests in Northland. He has strong governance expertise having spent a decade on the Fonterra Board, and holding other directorships in the dairy, insurance and financial services. Mr Gent currently serves as a Crown appointee on his local District Health Board and has contributed to local government reform.

Andrew von Dadelszen



Andrew von Dadelszen has held diverse governance and leadership roles, including central and local government and corporate governance, finance and investment advice, large-scale farming, service industries and the not-for-profit sector. He has been a member of the Board of the Environmental Protection Authority – a Crown Agency. Andrew is a qualified Resource Management Consent Hearings Commissioner with a Chairs Endorsement, and has been a member of the District Licensing Committee for Tauranga City Council.

Professor Juliet Gerrard



Professor Juliet Gerrard is Professor in the School of Biological Sciences and School of Chemical Sciences at The University of Auckland. Juliet has more than 125 publications, as well as three books. She is an active member of three of New Zealand's Centres of Research Excellence, as a Principal Investigator in both the MacDiarmid and Riddet Institutes and an Associate Investigator in the Maurice Wilkins Centre. Juliet was made a Fellow of the Royal Society of New Zealand in 2012; she is also Chair of the RSNZ Marsden Fund Council.

Colin Dawson



Colin Dawson was formerly Chief Executive of Otago Innovation Ltd, the commercialisation arm of Otago University. He has held directorships of a number of biotechnology and medical companies including BLIS Technologies and Pacific Edge Ltd, and is the owner/director of Dawson Cherries. He is director of MARS Bio Imaging Ltd and executive Chair of TIRO Life Sciences Ltd. [Appointed 1 July 2015]

Stana Pezic



Stana Pezic has held roles as Chief Financial Officer of Stevenson Group and Metrowater, the Auckland City Council's water retailer and infrastructure manager. Ms Pezic was previously General Manager at Whitcoulls Group Ltd, and has extensive experience in financial management, general management, strategy development and process change.

Mark Stuart



Mark Stuart has broad general management and governance expertise combining entrepreneurial and public sector experience and a strong focus on innovation. He is a Partner in Movac, a leading Venture Capital firm, and has a background in building technology-based businesses including as the Chief Executive of WaikatoLink, the technology transfer company of the University of Waikato. Mr Stuart has extensive governance experience and is currently also a director of Author-it Holdings, Industrial Tube Manufacturing Company and KiwiNet.

FOR THE 2014/15 YEAR

Number of meetings: 9

Meetings held at: Mt Albert,
Marlborough and Hawke's Bay

Science Advisory Panel

Our Science Advisory Panel is an important part of ensuring our science continues to have a focus on high quality, and is open to new international developments and ideas. The panel provides our Board with their insights on Plant & Food Research's science quality, strategy, and involvement in and uptake of new international developments.

Professor Marston Conder (Chairman)

MSocSc (Waikato) MSc DPhil DSc (Oxford)
FNZMS FRSNZ FTICA
Department of Mathematics,
University of Auckland, New Zealand



Professor Marston Conder is currently a Professor of Mathematics at the University of Auckland. He is one of New Zealand's most eminent mathematicians and scientists, recognised, for example, through Fellowship of the Royal Society of New Zealand, Marsden awards, a James Cook Fellowship, and a DSc from Oxford University. He has played a significant role in University and Government science policy, serving, among many other positions, as Deputy Vice Chancellor Research for the University of Auckland, on the Marsden Council, as President of the New Zealand Royal Society Academy, and chairing the New Zealand Committee to establish the Performance Based Research Fund (PBRF) for University funding.

Professor Conder brings to the panel particular expertise in governance, in evaluation and assessing science and science quality, and a wide understanding of the New Zealand science scene, Government policy, and funding and policy systems and processes.

Professor Cathie Martin

PhD
Group Leader, Department of
Cell and Developmental Biology,
John Innes Centre, UK



Professor Cathie Martin is an international leader in plant science, focusing on cellular specialisation and differentiation, particularly in relation to gene function. She has an extensive background in University and Research Institute research processes and programmes. Professor Martin, in addition to her position at the John Innes Centre, has a background in University visiting professorships and University relations. As Editor of the world's leading plant science journal, *Plant Cell*, she has particular experience in identifying current and future international trends in plant science, and in evaluating science quality. Her own research interests in cellular and gene regulation and functionality, particularly in the areas of food properties of plants, are of particular importance to Plant & Food Research's research interests.

Professor Martin brings to the panel particular experience in leading international plant science, science evaluation, and an in-depth understanding of current and future trends and developments in both research technologies and science disciplines. She also strengthens Plant & Food Research's links with UK and European research organisations of interest.

Professor Ernst van den Ende

PhD
Managing Director,
Plant Sciences Group (PSG),
Wageningen University, The Netherlands



Professor Ernst van den Ende has an extensive international background in agricultural science, particularly in management of urban green areas, plant diseases, plant pathogenic fungi and plant and crop protection. He has responsibility for the Plant Sciences Group at Wageningen, which conducts plant-related research and teaching programmes from the molecular through to the population level. Professor van den Ende has particular experience in the Wageningen University/PRI structure, which provides a relevant model for University/Research Institute collaboration and interaction. This is seen in the cluster of the Plant Sciences Group (PSG) which embodies applied research (Applied Plant Research), strategic research (Plant Research International), fundamental research and education (Wageningen University).

Professor van den Ende brings to the panel particular understanding of research collaboration and development of interacting research structures. He also provides an important link with European organisations of interest to Plant & Food Research and an international perspective on sustainable plant production.

Professor Alastair Robertson

PhD FFSC CChem FIFST
Group Executive Food, Health & Life
Science Industries,
CSIRO, Australia



Professor Alastair Robertson is a leading international expert in food science. His career has involved research positions in both industry (in the UK) and in research institutes. These positions have included Director of the UK's Institute of Food Research (IFR), CEO of Food Science Australia, a joint venture between CSIRO and the Victorian Government, and CSIRO Executive Director (and subsequently Deputy Chief Executive), Science Strategy and Investment. He led the consolidation of the Australian National Research Flagships and oversaw the integration of the CSIRO Science Investment Process and Performance Management Framework as strong governance mechanisms to underpin CSIRO's delivery of impact from mission-directed research. Professor Robertson currently holds an Honorary Professorship at the University of East Anglia (UK) and is a Research Professor at the University of Tasmania.

Professor Robertson brings to the panel wide international expertise in food science, and in developing and managing research structures based on science excellence and delivery. He also helps to consolidate Plant & Food Research's developing interaction with key Australian research centres and science initiatives.

Senior management team

Peter Landon-Lane

Chief Executive Officer (CEO)



Peter Landon-Lane took up the role of CEO at Plant & Food Research in September 2008, following a number of senior positions within Fonterra and one of its predecessors, the New Zealand Dairy Board, including heading the business in Japan (1998-2004) and Europe (2005-2008). Peter started his career at the former Department of Trade and Industry which included serving as a trade commissioner in China and the Philippines. He is currently a director of several Plant & Food Research subsidiaries and joint ventures, including Prevar Limited, Rhindo International Limited and Seafood Innovations Limited, and he is on the governance boards of the Riddet Institute and the Vital Vegetables Research Partnership.

Dr Bruce Campbell

Chief Operating Officer (COO)



As Chief Operating Officer, Dr Bruce Campbell is responsible for the science staff within Plant & Food Research and for providing effective leadership of company strategy, operational excellence and productivity, business growth, capital investments, regulatory compliance and enhancing relationships with Māori. Bruce is a member of The Royal Society of New Zealand, the Institute of Directors and the International Society of Horticultural Science, and is a director on several Boards; Horticulture NZ Vegetable Research and Innovation Board; National Centre for Advanced Bio-Protection Technologies; Jukebox NZ Limited; and Kiwifruit Supply Research Limited.

Michael James

Chief Financial Officer (CFO)



Michael James' responsibilities include the finance, IT, assets and services, and legal functions of Plant & Food Research. He has extensive experience in senior management roles with innovative and high-technology companies, is a Chartered Accountant and holds a Bachelor of Commerce from Otago University. Michael's past positions include CFO at Navman, a global supplier of GPS-based navigation products for marine and land applications, and General Manager, Europe for Dynamic Controls, a global supplier of electronic control systems for power wheelchairs and scooters.

Craig Jensen

General Manager Human Resources



Craig Jensen, as General Manager Human Resources, is responsible for Plant & Food Research's people-related activities including organisational and workforce development, recruitment, employment relations, remuneration and health & safety. Craig has a strong interest in the relationship between employee engagement, leadership and organisational culture and performance. He has extensive experience in human resource management within the New Zealand science sector, and holds a Bachelor of Arts and Postgraduate Diploma in Personnel and Employment Relations from the University of Auckland.

David Hughes

Group General Manager Commercial



David Hughes, as Group General Manager Commercial, oversees all aspects of the commercial groups within Plant & Food Research, including client and customer management, marketing and communication, international business development, and the commercialisation of plant varieties and cultivars. David joined Plant & Food Research in July 2009 and has a successful track record of business development and innovation within the food sector, including several high-profile roles within the dairy industry in New Zealand, Australia, USA, Japan and Bahrain. He is a member of the New Zealand Institute of Directors, a Director of KiwiNet and Chair of the Biopolymer Network Limited.

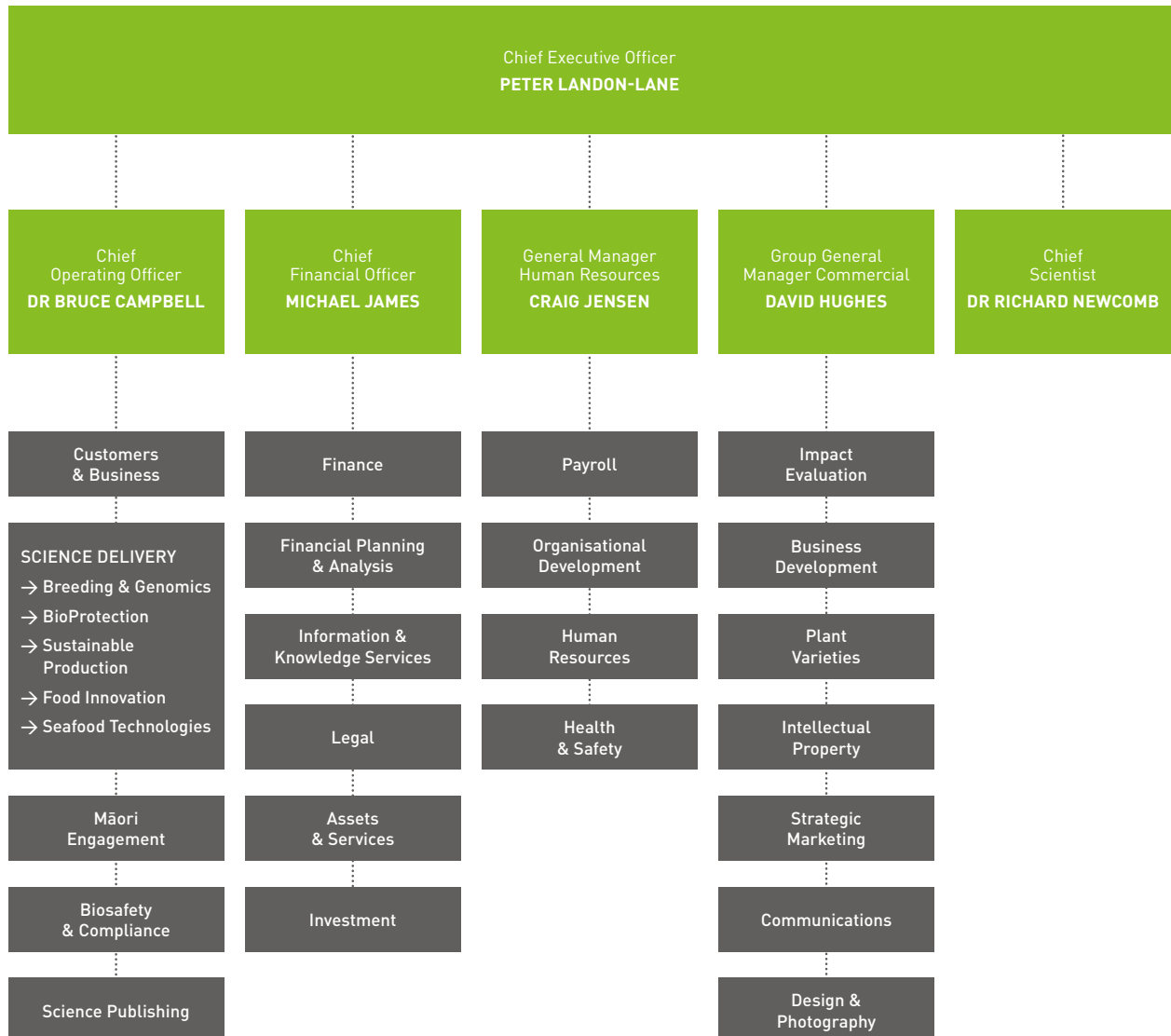
Dr Richard Newcomb

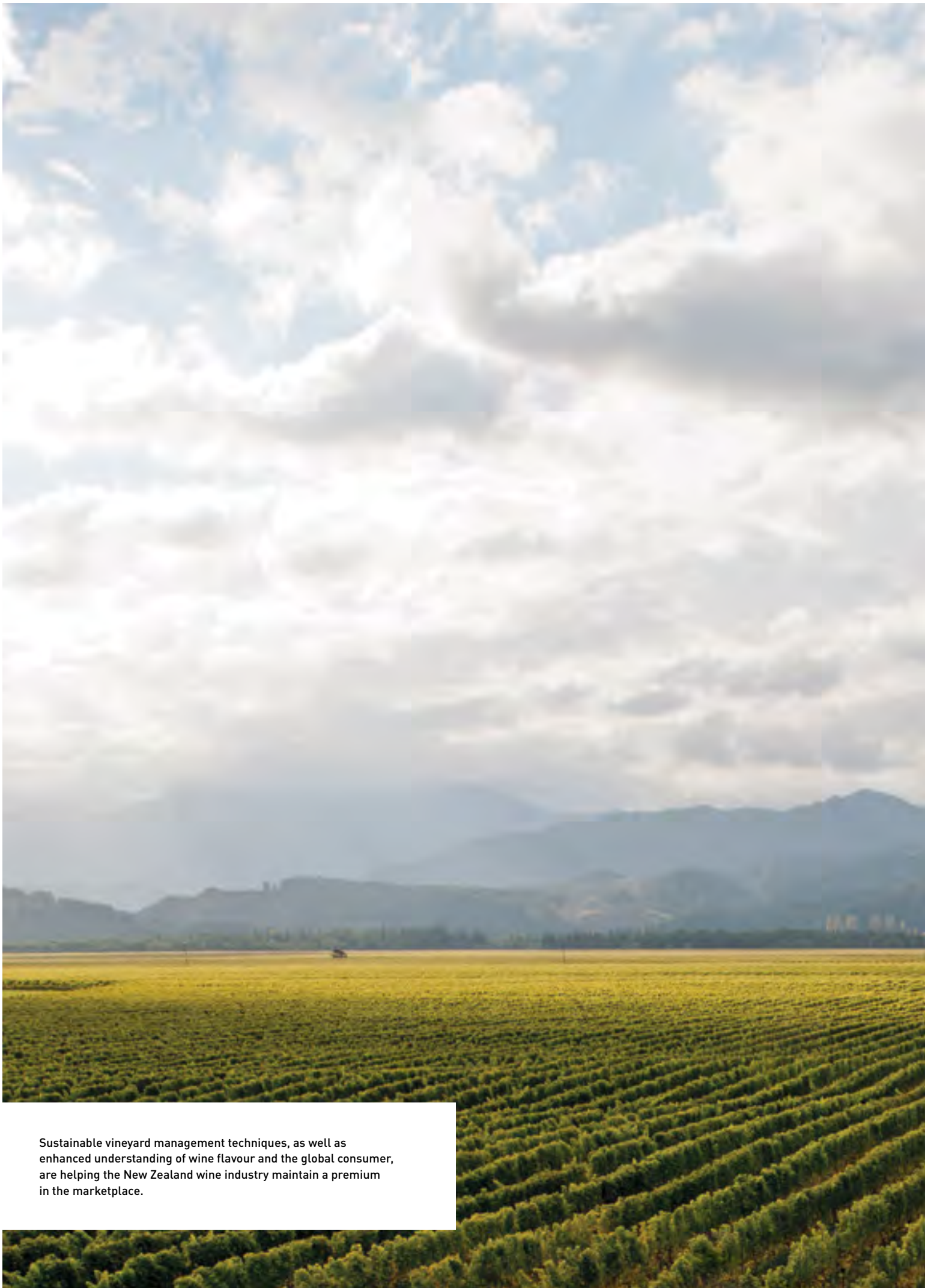
Chief Scientist



Dr Richard Newcomb completed his BSc and MSc in Zoology at the University of Auckland, followed with a PhD in Biochemistry and Molecular Biology from The Australian National University based at the CSIRO in Canberra. He is associate editor for the Journal of Chemical Ecology and PLoS ONE and on the editorial boards of Insect Biochemistry and Molecular Biology, Chemical Senses and Flavour, and is a regular reviewer for a number of other international scientific journals and granting agencies. Richard is currently President of the Australasian Association for ChemoSensory Science, New Zealand's representative on committee at the Genetics Society of Australasia and is Professor of Evolutionary Biology at the University of Auckland. He is also a Principal Investigator at the Allan Wilson Centre for Molecular Evolution and Ecology and an Associate Investigator at the Maurice Wilkins Centre for Molecular Biodiscovery.

Organisational chart





Sustainable vineyard management techniques, as well as enhanced understanding of wine flavour and the global consumer, are helping the New Zealand wine industry maintain a premium in the marketplace.



FINANCIAL
STATEMENTS

07



MICHAEL JAMES
Chief Financial Officer

Financial statements

Plant & Food Research has achieved a better than budget performance again this year, driven by improving revenues and good cost control. Our Operating Profit after Tax target result was \$0.7 million better than budget. This result was achieved without a planned gain on sale of property of \$2.8 million, which we now expect to occur next year.

Excluding gains on sale, Operating Profit after Tax was \$3.5 million better than budget and \$4.6 million better than last year.

Total revenue for the year was \$128.9 million, \$3.0 million better than budget and \$9.3 million better last year. Higher commercial research revenues and royalty revenues more than offset lower Crown-funded research revenues. Encouragingly, we have been able to grow our commercial research and royalty revenues over the last two years in line with our Business Plan expectations and this is underpinned by the performance of the sectors our customers operate in. This positive performance track record gives us confidence in our ability to achieve the five-year business plan and targets in our Statement of Corporate Intent.

Our long-term asset plans are being executed well, with the benefits of these investments for our staff, customers and collaborators already being seen. Our Balance Sheet has the capacity to enable the significant investment phase of the asset plan over the next five years. The largest of these investments has begun in Auckland with the refurbishment of end of life facilities at our largest site in Mt Albert. Investments in science facilities at a number of our sites total over \$60 million over the next five years, which will contribute not only to an improved capital structure and return on equity for our shareholder, but also to a more sustainable and future-proofed organisation for New Zealand.

New hop cultivars are delivering novel flavour and aroma characteristics desired by the craft beer industry.





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THE FINANCIAL STATEMENTS

and notes for the year ended 30 June 2015 presented in this Annual Report on pages 76 to 102 represent 12 months of trading from Plant & Food Research.

DIRECTORS' REPORT

THE DIRECTORS ARE PLEASED TO PRESENT THE FINANCIAL STATEMENTS OF THE NEW ZEALAND INSTITUTE FOR PLANT & FOOD RESEARCH LIMITED FOR THE YEAR ENDED 30 JUNE 2015.

	2015 Actual \$000	2015 Budget \$000	2014 Actual \$000
RESULTS OF GROUP OPERATIONS			
Revenue	128,879	125,950	119,588
Operating profit before taxation	6,453	4,089	8,806
Less taxation (benefit)/expense	2,008	361	(74)
Operating profit attributable to Owners	4,445	3,728	8,880

PRINCIPAL ACTIVITY OF THE GROUP

The Group's principal activity is to provide scientific research that benefits New Zealand, within the horticulture, arable, seafood and processed food industries; in accordance with the purpose and principles for the operation of Crown Research Institutes as set out in sections 4 and 5 of the Crown Research Institutes Act 1992.

The Company is a private company limited by shares and incorporated in accordance with the Companies Act 1993.

REVIEW OF OPERATIONS

A review of the operations accompany this report on page 12.

SHARE DEALINGS

The Directors have not, and are unable to, trade in shares of the Company as all shares of the Company are held by the Shareholding Ministers on behalf of the Crown. Accordingly the Board has received no notices of dealings in relevant interests in shares of the Company.

DIRECTORS' INSURANCE

Directors' and Officers' liability insurance was effected for the Directors and certain employees of the Company. The insurance is in respect of certain specified liabilities, not including criminal liability, incurred by a Director or employee in respect of any act or omission in his or her capacity as a Director or employee of the Company.

The Company has indemnified Directors and certain employees of the Company for costs and proceedings and for liabilities incurred by the employee in respect of any act or omission in his or her capacity as an employee of the Company. The indemnity for liabilities incurred does not extend to criminal liability or liability for breach of a fiduciary duty owed to the Company.

AUDITORS

Paul Clark of PricewaterhouseCoopers has been appointed as the audit service provider by the Auditor-General. The Auditor-General is the statutory auditor pursuant to section 14 of the Public Audit Act 2001 and section 21 of the Crown Research Institutes Act 1992.

SIGNIFICANT CHANGES

There were no significant changes to the business of the Company during the year.

DIRECTORS' REMUNERATION

During the year the following remuneration was paid or payable to Directors in accordance with the schedule approved by the Shareholding Ministers:

	Group \$
M Ahie	70,400
G Gent	44,750
S Pezic	39,200
M Stuart	36,200
J Gerrard	36,200
A von Dadelszen	34,200 (appointed 1 July 2014)

REMUNERATION OF EMPLOYEES

The number of employees and ex-employees whose total remuneration, including benefits and severance payments, on an annualised basis, was in excess of \$100,000 in \$10,000 bands, is:

Remuneration bands in \$000	Number of employees	Remuneration bands in \$000	Number of employees
100 - 109	52	200 - 209	1
110 - 119	36	210 - 219	1
120 - 129	21	230 - 239	3
130 - 139	22	240 - 249	1
140 - 149	11	250 - 259	1
150 - 159	6	350 - 359	2
160 - 169	2	400 - 409	1
170 - 179	5	560 - 569*	1
180 - 189	2		
190 - 199	3		

* Includes the Chief Executive's remuneration

For and on behalf of the Board of Directors:



Michael Ahie, Chairman
27 August 2015

INDEPENDENT AUDITORS' REPORT

TO THE READERS OF THE NEW ZEALAND INSTITUTE FOR
PLANT & FOOD RESEARCH LIMITED GROUP'S
FINANCIAL STATEMENTS FOR THE YEAR ENDED 30 JUNE 2015



The Auditor-General is the auditor of The New Zealand Institute for Plant & Food Research Limited and its New Zealand domiciled subsidiaries and other controlled entities. The Auditor-General has appointed me, Paul Clark, using the staff and resources of PricewaterhouseCoopers, to carry out the audit of the financial statements of the group consisting of The New Zealand Institute for Plant & Food Research Limited and its subsidiaries and other controlled entities (collectively referred to as 'the Group'), on her behalf.

OPINION

We have audited the financial statements of the Group on pages 76 to 102, that comprise the balance sheet as at 30 June 2015, the statement of comprehensive income, statement of changes in equity and statement of cash flows for the year ended on that date and the notes to the financial statements that include accounting policies and other explanatory information.

In our opinion, the financial statements of the Group:

- present fairly, in all material respects:
 - its financial position as at 30 June 2015; and
 - its financial performance and cash flows for the year then ended; and
- comply with generally accepted accounting practice in New Zealand and have been prepared in accordance with Financial Reporting Act 2013.

Our audit was completed on 27 August 2015. This is the date at which our opinion is expressed.

The basis of our opinion is explained below. In addition, we outline the responsibilities of the Board of Directors and our responsibilities, and explain our independence.

BASIS OF OPINION

We carried out our audit in accordance with the Auditor-General's Auditing Standards, which incorporate the International Standards on Auditing (New Zealand). Those standards require that we comply with ethical requirements and plan and carry out our audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

Material misstatements are differences or omissions of amounts and disclosures that, in our judgement, are likely to influence readers overall understanding of the financial statements. If we had found material misstatements that were not corrected, we would have referred to them in our opinion.

An audit involves carrying out procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on our judgement, including our assessment of risks of material misstatement of the financial statements whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the preparation of the Group's financial statements in order to design audit procedures that are appropriate in the circumstances but not for the purpose of expressing an opinion on the effectiveness of the Group's internal control.

An audit also involves evaluating:

- (i) the appropriateness of accounting policies used and whether they have been consistently applied;
- (ii) the reasonableness of the significant accounting estimates and judgements made by the Board of Directors;
- (iii) the adequacy of the disclosures in the financial statements; and
- (iv) the overall presentation of the financial statements.

We did not examine every transaction, nor do we guarantee complete accuracy of the financial statements. Also we did not evaluate the security and controls over the electronic publication of the financial statements.

We believe we have obtained sufficient and appropriate audit evidence to provide a basis for our audit opinion.

RESPONSIBILITIES OF THE BOARD OF DIRECTORS

The Board of Directors is responsible for the preparation and fair presentation of financial statements for the company that comply with generally accepted accounting practice in New Zealand.

The Board of Directors' responsibilities arise from the Crown Research Institutes Act 1992.

The Board of Directors is responsible for such internal control as it determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error. The Board of Directors is also responsible for the publication of the financial statements, whether in printed or electronic form.

RESPONSIBILITIES OF THE AUDITOR

We are responsible for expressing an independent opinion on the financial statements and reporting that opinion to you based on our audit. Our responsibility arises from section 15 of the Public Audit Act 2001.

INDEPENDENCE

When carrying out the audit, we followed the independence requirements of the Auditor-General, which incorporate the independence requirements of the External Reporting Board.

Other than the audit, we have no relationship with or interests in the Group.

MATTERS RELATING TO THE ELECTRONIC PRESENTATION OF THE AUDITED FINANCIAL STATEMENTS

This audit report relates to the financial statements of the group, consisting of The New Zealand Institute for Plant & Food Research Limited and its subsidiaries and other controlled entities for the year ended 30 June 2015 included on the Company's website. The Company's Board of Directors is responsible for the maintenance and integrity of the Company's website. We have not been engaged to report on the integrity of the Company's website. We accept no responsibility for any changes that may have occurred to the financial statements since they were initially presented on the website.

The audit report refers only to the financial statements named above. It does not provide an opinion on any other information which may have been hyperlinked to or from the financial statements. If readers of this report are concerned with the inherent risks arising from electronic data communication they should refer to the published hard copy of the audited financial statements and related audit report dated 27 August 2015 to confirm the information included in the audited financial statements presented on this website.

Legislation in New Zealand governing the preparation and dissemination of financial information may differ from legislation in other jurisdictions.

A handwritten signature in black ink, appearing to read 'Paul Clark', is written over a light-colored background.

Paul Clark
PricewaterhouseCoopers
On behalf of the Auditor-General
Auckland, New Zealand
27 August 2015

STATEMENTS OF COMPREHENSIVE INCOME

for the year ended 30 June 2015

	Note	GROUP		
		2015 Actual \$000	2015 Budget \$000	2014 Actual \$000
PROFIT AND LOSS				
Revenue				
Core funding		43,103	43,103	43,103
Crown-funded research contracts		17,092	18,128	18,378
Commercial science research contracts	(4)	66,284	62,874	55,276
Other income		2,400	1,845	2,831
		128,879	125,950	119,588
Less operating costs				
Personnel costs	(4a)	74,732	74,980	72,017
Depreciation expense	(5)	8,410	8,481	7,928
Amortisation expense	(5)	703	900	889
(Gain) on sale of assets		(10)	(2,800)	(9,001)
Other operating expenses	(6)	39,384	40,813	39,744
		123,219	122,374	111,577
Operating profit before interest & taxation				
Finance income		5,660	3,576	8,011
Finance costs		875	568	751
Share of retained profit of associates	(15)	(91)	(55)	(72)
		9	-	116
Operating profit before taxation				
Taxation (benefit)/expense	(7)	6,453	4,089	8,806
		2,008	361	(74)
Operating profit after taxation attributable to owners				
		4,445	3,728	8,880
OTHER COMPREHENSIVE INCOME				
Items that may be reclassified subsequently to profit or loss:				
Currency translation differences	(17)	67	-	(36)
Cashflow hedges	(18)	(63)	-	19
Other comprehensive income		4	-	(17)
Total comprehensive income attributable to owners				
		4,449	3,728	8,863

The accompanying notes form part of these financial statements.

STATEMENTS OF CHANGES IN EQUITY

for the year ended 30 June 2015

ATTRIBUTABLE TO OWNERS OF THE GROUP

	Note	Share capital \$000	Retained earnings \$000	Foreign currency translation \$000	Cash flow hedge \$000	Total Equity \$000
Balance as at 01 July 2013		17,436	54,445	(53)	(7)	71,821
Changes in equity for						
Profit for the year	(17)		8,880			8,880
Other comprehensive income, net of taxes	(17) (18)			(36)	19	(17)
Balance as at 30 June 2014		17,436	63,325	(89)	12	80,684
Changes in equity for						
Profit for the year	(17)		4,445	67	(63)	4,445
Other comprehensive income, net of taxes	(17) (18)					4
Balance as at 30 June 2015		17,436	67,770	(22)	(51)	85,133

The accompanying notes form part of these financial statements.

BALANCE SHEETS

as at 30 June 2015

	Note	GROUP		
		2015 Actual \$000	2015 Budget \$000	2014 Actual \$000
Current assets				
Cash and short-term deposits	(8)	12,004	10,809	11,256
Short-term investments		7,500	-	9,500
Receivables and prepayments	(9)	24,838	19,975	21,865
Inventories		258	550	230
Taxation receivable		-	-	378
Assets held for sale	(12)	690	-	690
Total current assets		45,290	31,334	43,919
Current liabilities				
Accounts payable and accruals	(10)	17,389	12,673	14,323
Employee entitlements	(11)	8,428	10,985	10,287
Current portion mortgage		18	16	17
Taxation payable		1,453	120	-
Total current liabilities		27,288	23,794	24,627
Working capital		18,002	7,540	19,292
Non-current assets				
Property, plant and equipment	(12)	68,423	78,777	62,906
Intangible assets	(13)	936	1,300	1,220
Investments - associates	(15)	486	300	477
Investments - other		166	-	159
Total non-current assets		70,011	80,377	64,762
Non-current liabilities				
Employee entitlements	(11)	1,456	1,000	1,103
Mortgage		207	234	225
Deferred tax liability	(16)	1,217	2,600	2,042
Total non-current liabilities		2,880	3,834	3,370
NET ASSETS		85,133	84,083	80,684
Represented by:				
Equity				
Share capital	(17)	17,436	17,436	17,436
Retained earnings	(17)	67,770	66,647	63,325
Foreign currency translation reserve	(17)	(22)	-	(89)
Cash flow hedge reserve	(18)	(51)	-	12
TOTAL SHAREHOLDERS EQUITY		85,133	84,083	80,684

For and on behalf of the Board of Directors:



Michael Ahie, Chairman
27 August 2015



Stana Pezic, Director
27 August 2015

The accompanying notes form part of these financial statements.

CASH FLOW STATEMENTS

for the year ended 30 June 2015

		GROUP	
	2015	2015	2014
	Actual	Budget	Actual
Note	\$000	\$000	\$000
Cash flows from/(applied to) operating activities			
	129,527	130,982	122,342
Receipts from customers			
Interest and dividends received	876	568	745
	(118,905)	(121,283)	(116,217)
Payments to employees and suppliers			
Interest paid	(75)	(55)	(10)
Tax paid/received	(676)	-	(766)
Net cash flows from operating activities	10,747	10,212	6,094
(20)			
Cash flows from/(applied to) investing activities			
	38	4,000	9,099
Sale of property, plant and equipment			
Sale of investment	-	-	768
Proceeds from short-term investments	2,000	-	2,000
	(11,859)	(23,958)	(12,534)
Purchase of property, plant and equipment			
Purchase of intangible assets	(214)	-	(660)
(13)			
Net cash flows (applied to) investing activities	(10,035)	(19,958)	(1,327)
Cash flows from/(applied to) financing activities			
	(18)	(16)	(17)
Repayment of mortgage			
Net cash flows (applied to) financing activities	(18)	(16)	(17)
Net cash flow			
	694	(9,762)	4,750
Effect of foreign currency translation adjustment	54	-	(55)
Opening cash and short-term deposits	11,256	20,571	6,561
Closing cash and short-term deposits	12,004	10,809	11,256
(8)			

The accompanying notes form part of these financial statements.

NOTES TO THE FINANCIAL STATEMENTS

for the year ended 30 June 2015

1. REPORTING ENTITIES

The New Zealand Institute for Plant & Food Research Limited (the "Company" or "Plant & Food Research") and its subsidiaries (the "Group") is a Crown Research Institute governed by the Crown Research Institutes Act 1992 and is a limited liability company incorporated and domiciled in New Zealand. The whole of the share capital is held by Ministers of the Crown on behalf of the New Zealand Government. The Company's registered office is 120 Mt Albert Road, Sandringham, Auckland 1025.

The Group is primarily involved in research services on a fee-for-service basis.

The parent Company and the Group are designated as profit-oriented entities for financial reporting purposes.

These financial statements have been approved for issue by the Board of Directors on 27 August 2015.

2. BASIS OF PREPARATION

The financial statements are presented in New Zealand dollars (NZD), which is the Company's functional and presentation currency. All financial information presented in New Zealand dollars has been rounded to the nearest thousand dollars (\$000).

The financial statements have been prepared under the historical cost convention, as modified by the revaluation of financial assets, and financial assets and financial liabilities (including derivative instruments) at fair value through profit or loss.

(A) Statement of Compliance

These financial statements have been prepared in accordance with the requirements of the Crown Research Institutes Act 1992, the Public Finance Act 1989, the Companies Act 1993 and the Financial Reporting Act 2013. As group financial statements are prepared and presented for Plant & Food Research and its subsidiaries, separate financial statements for Plant & Food Research are no longer required to be prepared and presented under the Companies Act 1993.

The financial statements have also been prepared in accordance with New Zealand generally accepted accounting practice (NZ GAAP). They comply with New Zealand equivalents to International Financial Reporting Standards (NZ IFRS), and other Financial Reporting Standards, as appropriate for profit-oriented entities. They comply with International Financial Reporting Standards (IFRS).

The Group has adopted External Reporting Board Standard A1 Accounting Standards Framework (for-profit entities update) (XRB A1). XRB A1 establishes a for-profit tier structure and outlines which suite of accounting standards entities in different tiers must follow. The Group is a Tier 1 entity. There was no impact on the current or prior year financial statements.

(B) Use of Estimates

The preparation of financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue and expenses. Although these estimates are based on management's knowledge of current events and actions that may be undertaken in the future, actual results may ultimately differ from estimates. It also requires management to exercise its judgement in the process of applying the Group's accounting policies.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to estimates are recognised in the period in which the estimate is revised and in any future periods affected. Use of estimates and assumptions is disclosed further in note 3(W) .

(C) New and Amended Standards and Interpretations Adopted by The Company

The following new standards and amendments to standards are mandatory for the first time during this accounting period:

NZ IAS 32 Financial Instruments: Presentation

Effective from 1 January 2014 the amendment to NZ IAS 32 clarifies that the right to set-off must not be contingent on a future event. It must also be legally enforceable for all counterparties in the normal course of business, as well as in the event of default, insolvency or bankruptcy. The amendment also considers settlement mechanisms. The application of this amendment has had no material impact on the Group financial statements.

NZ IFRIC 21 Levies

Effective from 1 January 2014 NZ IFRIC 21 sets out the accounting for a liability to pay a levy that is not income tax. The interpretation requires a liability to pay a levy to be recognised when the obligating event occurs. The obligating event that gives rise to a liability to pay a levy is the event identified by the legislation that triggers the obligation to pay the levy. The application of this standard has had no material impact on the Group financial statements.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

(D) Standards and Interpretations Issued and not yet Adopted

The following new standards and amendments to standards that have been issued but are not yet effective and have not been early adopted by the Group are:

NZ IFRS 9 Financial Instruments

Effective from 1 January 2018 NZ IFRS 9 will replace the classification and measurement models in NZ IAS 39 Financial Instruments: Recognition and Measurement. NZ IFRS 9 retains but simplifies the mixed measurement model and establishes three primary measurement categories for financial assets: amortised cost, fair value through other comprehensive income and fair value through profit or loss. The basis of classification depends on the entity's business model and the contractual cash flow characteristics of the financial asset. The Group does not intend to adopt the new standard before the effective date and is currently assessing its full impact.

NZ IFRS 15 Revenue from Contracts with Customers

Effective from 1 January 2017 NZ IFRS 15 replaces the current guidance in IAS 18 Revenue and IAS 11 Construction Contracts. It deals with revenue recognition and establishes principles for reporting useful information to users of financial statements about the nature, amount, timing and uncertainty of revenue and cash flows arising from an entity's contracts with customers. Revenue is recognised when a customer obtains control of a good or service and thus has the ability to direct the use and obtain the benefits from the good or service. The Group does not intend to adopt the new standard before the effective date and is currently assessing its full impact.

3. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The accounting policies set out below have been applied consistently to all periods presented in these financial statements.

(A) Basis of Consolidation

(i) Subsidiaries

The consolidated financial statements of the Group include the parent entity, Plant & Food Research, and its controlled entities. The Group controls an entity when the Group is exposed to, or has right to, variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. This power exists where the Group controls the majority voting power on the governing body or where such policies have been irreversibly predetermined by the Group or where the determination of such policies is unable to materially impact upon the level of potential ownership benefits that arise from the activities of the subsidiary. The financial statements of subsidiaries are included in the consolidated financial statements from the date which the Group obtains control and until such time as the Group ceases to control the entity. Any changes in the Parent ownership interest that do not result in the loss of control are accounted for as equity transactions.

The Group measures the cost of a business combination as the aggregate of fair values, at the date of exchange, of assets given, liabilities incurred or assumed, in exchange for control of the subsidiary plus any costs directly attributable to the business combination.

Any excess of the cost of the business combination over the Group's interest in the net fair value of the identifiable assets, liabilities and contingent liabilities is recognised as goodwill. If the Group's interest in the net fair value of the identifiable assets, liabilities and contingent liabilities recognised exceeds the cost of the business combination, the difference will be recognised immediately in the Statement of Comprehensive Income.

The purchase method of accounting is used to prepare the consolidated financial statements of the Group. In preparing the consolidated financial statements, the effects of all transactions, balances and unrealised gains and losses on transactions between entities in the Group have been eliminated. The Group's investment in its subsidiaries are initially carried at cost in the Parent's financial statements subject to any write-down arising from an annual impairment review.

The financial statements of controlled entities have been prepared for the same reporting period as the parent entity, using consistent accounting policies.

(ii) Associates

Associates are those entities over which the Group has significant influence, but not control, of the financial and operating policies. Investments in associate companies have been accounted for using the equity method of accounting and are initially recognised at cost and the carrying amount is increased or decreased to recognise the Group's share of the surplus or deficit of the associate after the date of acquisition. The Group's share of the surplus or deficit of the associate is recognised in the Group's Statement of Comprehensive Income. Distributions received from an associate reduce the carrying amount of the investment.

If the Group's share of deficits of an associate equals or exceeds its interest in the associate, the Group discontinues recognising its' share of further deficits. After the Group's interest is reduced to zero, additional deficits are provided for, and a liability is recognised only to the extent that the Group has incurred legal or constructive obligations or made payments on behalf of the associate. If the associate subsequently reports surpluses, the Group will resume recognising its share of those surpluses only after its share of the surpluses equals the share of the deficits not recognised.

The Group's share in the associate's surplus or deficits resulting from unrealised gains on transactions between the Group and its associates is eliminated.

(iii) Joint Ventures

A joint venture is a contractual arrangement whereby two or more parties undertake an economic activity that is subject to joint control. The Group recognises its interest in jointly controlled entities using the equity method. The investment in a jointly controlled entity is initially recognised at cost and the carrying amount is increased or decreased to recognise the Group's share of the surplus or deficit of the jointly controlled entity after the date of acquisition. The Group's share of the profit or loss of the jointly controlled entity is recognised in the Group's Statement of Comprehensive Income.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

(B) Revenue

Revenue is recognised at the fair value of consideration received or receivable to the extent that it is probable that economic benefits will flow to the Group. Revenue is shown net of GST, returns and discounts and after eliminating sales within the Group. The following specific recognition criteria must be met before revenue is recognised:

(i) Core funding

Core funding from the Crown was established 1 July 2011 and is recognised in the Statement of Comprehensive Income in the year it is received.

(ii) Crown-funded research contracts

Revenue from the Crown is recognised in the Statement of Comprehensive Income when the requirements under the funding agreement have been met.

(iii) Commercial science research contracts

Sale of goods

Revenue from the sale of goods is recognised when the significant risks and rewards of ownership of the goods have passed to the buyer and the amount of revenue can be reliably measured. Risks and rewards are considered passed to the buyer at the time of delivery of the goods to the customer.

Sale of services

Research services are provided on a fixed-price contract, with contract terms generally ranging from less than a year to five years.

Revenue from a contract to provide services is recognised by reference to the stage of completion of the transaction, assessed on the basis of the actual service provided as a proportion of the total services to be provided. If circumstances arise that may change the extent of the progress toward completion, the estimates are revised. These revisions may result in increases or decreases in estimated revenues or costs and are reflected in income in the period in which the circumstances that give rise to the revision become known by management.

Royalties

Royalty revenue is recognised on an accrual basis in accordance with the substance of the relevant agreement.

(iv) Other income

Rental income

Lease receipts under an operating lease are recognised as revenue on a straight-line basis over the lease term.

(v) Dividend and interest revenue

Dividend revenue from investments is recognised when the shareholders' rights to receive payment have been established. Interest revenue is recognised on a time-proportion basis using the effective interest method.

(C) Foreign Currency Translation

Foreign currency transactions are translated into New Zealand dollars using the exchange rates prevailing at the dates of the transactions, except when forward currency contracts have been taken out to cover short-term forward currency commitments. Where short-term forward currency contracts have been taken out, the transaction is translated at the rate contained in the contract. Foreign currency denominated monetary assets and liabilities are translated at the exchange rate prevailing at the period end. Foreign exchange gains or losses resulting from the settlement of such transactions and from the translation at balance date of foreign denominated monetary assets and liabilities are recognised in the Statement of Comprehensive Income, except when deferred in equity as qualifying cash flow hedges.

The results and balance sheets of all foreign operations that have a functional currency different from New Zealand dollars are translated into the presentation currency as follows:

The assets and liabilities of foreign controlled entities are translated by applying the rate ruling at balance date and revenue and expense items are translated at the average rate calculated for the period. The exchange differences arising on the re translation are taken directly to equity in the foreign currency translation reserve.

On consolidation, exchange differences arising from the translation of the net investment in foreign operations, and of borrowing and other currency instruments designated as hedges of such investments, are taken to shareholders' equity.

(D) Borrowing Costs

Borrowing costs are recognised as an expense in the period in which they are incurred.

(E) Cash and Short-term Investments

Cash and cash equivalents includes cash in hand, deposits held at call with banks, other short-term highly liquid investments with maturities of three months or less from date of acquisition, and bank overdrafts. Bank overdrafts are shown within borrowings in current liabilities in the Balance Sheet.

Short-term investments are investments with maturities of more than three months from date of acquisition.

(F) Trade and Other Receivables

Trade receivables are recognised initially at fair value, plus any transaction costs, and subsequently measured at amortised cost using the effective interest method, less any provision for doubtful receivables.

Collectibility of trade receivables is reviewed on an ongoing basis. Debts which are known to be uncollectible are written off when identified. A provision for doubtful receivables is established when there is objective evidence, for example notice of liquidation or receivership, that the Group will not be able to collect all amounts due according to the original terms of receivables. The amount of the provision is the difference between the asset's carrying amount and the present value of the estimated future cash flows, discounted at the effective interest rate, if applicable. The amount of the provision is recognised in the Statement of Comprehensive Income.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

When a trade receivable is uncollectible, it is written off against the provision if it has been provided for or immediately recognised in the Statement of Comprehensive Income, within other operating expenses, if not. Any recoveries of trade receivables written off are credited against bad debts in the Statement of Comprehensive Income.

(G) Property, Plant and Equipment

The Group has four classes of property, plant and equipment:

- Land
- Buildings
- Plant and equipment
- Motor vehicles

Land is recorded at cost. All other property, plant and equipment is shown at cost less accumulated depreciation and any accumulated impairment losses, except for assets transferred from the Crown. Property, plant and equipment transferred from the Crown have been included in the accounts at values established by independent valuers which is the deemed cost. All subsequent expenditure has been initially recorded at cost.

Cost includes expenditure that is directly attributable to the acquisition of the asset. Subsequent costs are included in the asset's carrying amount only when it is probable that future economic benefits or service potential associated with the asset will flow to the Group and the cost of the item can be measured reliably. All other costs are recognised in the Statement of Comprehensive Income when the expense is incurred. Where an asset is acquired at no cost, or for a nominal cost, it is recognised at fair value as at the date of acquisition. The Group constructs some items of plant for use in research. These have been brought into the accounts at the cost of direct labour and materials plus an appropriate proportion of direct overheads.

Land transferred to the Group cannot be freely traded. Section 30 of the Crown Research Institutes Act 1992 requires that prior to sale sections 40–42 of the Public Works Act 1981 be complied with. These sections require that land offered for sale must be offered to the original owner of that land or their successors. An arbitration clause is included to establish fair values for such offers.

Gains and losses on disposals are determined by comparing the proceeds with the carrying amount of the asset. Gains and losses on disposal are included in the Statement of Comprehensive Income.

(i) Non-current Assets Held for Sale

Non-current assets are classified as assets held for sale when their carrying amount is to be recovered principally through a sale transaction and a sale is considered highly probable. They are stated at the lower of carrying amount and fair value less costs to sell if their carrying amount is to be recovered principally through a sale transaction rather than through continuing use and a sale is considered highly probable.

(H) Depreciation

Depreciation on assets, except land, is calculated using the straight-line method, at rates calculated to allocate the asset's cost, less estimated residual value, over its estimated useful life. Leasehold improvements are depreciated over the shorter of the unexpired period of the lease and the estimated useful life of improvements.

The useful lives of major asset classes of property, plant and equipment have been estimated as follows:

Buildings	10 – 100 years
Plant and equipment	3 – 10 years
Motor vehicles	3 – 10 years

The assets' residual values and useful lives are reviewed, and adjusted if appropriate, at each financial year-end.

The assets' carrying value is written down immediately to its recoverable amount if the asset's carrying amount is greater than its estimated recoverable amount.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

(I) Intangible Assets

(i) Software

The cost of software, databases and related items, either acquired or internally generated, is recognised as an expense when incurred, except for:

The cost of software, databases and related items, either acquired or internally generated, which are unique and controlled by the Group, and that will probably generate measurable economic benefits exceeding costs beyond one year, is capitalised as intangible assets.

Costs associated with maintaining computer software are recognised as an expense when incurred.

The carrying value of software is amortised on a straight-line basis over its useful life. Amortisation begins when the asset is available for use and ceases at the date that the asset is derecognised. The amortisation charge for each period is recognised in the Statement of Comprehensive Income.

The useful lives and associated amortisation rates of major classes of intangible assets have been estimated as follows:

Software 3 – 5 years

(ii) Trademarks and licences

The cost of acquired trademarks and licences is capitalised as intangible assets where these assets will probably generate measurable economic benefits exceeding costs beyond one year. Trademarks and licences have a finite useful life and are carried at cost less accumulated amortisation.

Amortisation is calculated using the straight-line method to allocate the cost over their estimated useful lives, which is between 10 and 15 years.

(iii) Research and development

Research and development is the business of the Company. Most work is performed under contract for others, and in most cases intellectual property rights are retained. All research and development costs are expensed in the period they are incurred.

When a project reaches the stage where it will probably generate future measurable economic benefits exceeding development cost, development cost is recognised as an intangible asset. The asset is amortised from the commencement of commercial production of the product to which it relates, on a straight-line basis, over the period of expected benefit.

(J) Investments and Other Financial Assets

The Group classifies its investments by the following categories: financial assets at fair value through profit or loss, held-to-maturity investments, loans and receivables and available-for-sale financial assets. The classification depends on the purpose for which the investments were acquired. Management determines the classification of its investments at initial recognition and re-evaluates this designation at each reporting date.

Financial assets and liabilities are initially measured at fair value plus transaction costs unless they are carried at fair value through profit or loss, in which case the transaction costs are recognised in the Statement of Comprehensive Income.

Purchases and sales of financial assets are recognised on trade-date, the date on which the Group commits to purchase or sell the asset. Financial assets are derecognised when the rights to receive cash flows from the financial assets have expired or have been transferred and the Group has transferred substantially all the risks and rewards of ownership.

The fair value of financial instruments traded in active markets is based on quoted market prices at the balance sheet date. The quoted market price used is the current bid price.

The fair value of financial instruments that are not traded in an active market is determined using valuation techniques.

The Group uses a variety of methods and makes assumptions that are based on market conditions existing at each balance date. Quoted market prices or dealer quotes for similar instruments are used for long-term debt instruments held. Other techniques, such as estimated discounted cash flows, are used to determine fair value for the remaining financial instruments.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

(i) Financial assets at fair value through profit or loss

This category has two sub-categories: financial assets held for trading, and those designated at fair value through profit or loss at inception. A financial asset is classified in this category if acquired principally for the purpose of selling in the short term or if so designated by management.

Derivatives are also categorised as held for trading unless they are designated as hedges. Assets in this category are classified as current assets if they are either held for trading or are expected to be realised within 12 months of the balance sheet date. After initial recognition they are measured at their fair values. Gains or losses on remeasurement are recognised in the Statement of Comprehensive Income.

Financial assets in this category include derivatives, see note 3 (S).

(ii) Financial assets at fair value through equity (available for sale)

Financial assets at fair value through equity are those that are designated as fair value through equity or are not classified in any of the other categories. This category encompasses:

- Investments that Plant & Food Research intends to hold long-term but which may be realised before maturity; and
- Shareholdings that Plant & Food Research holds for strategic purposes.

After initial recognition these investments are measured at their fair value. Gains and losses are recognised directly in equity except for impairment losses, which are recognised in the Statement of Comprehensive Income. In the event of impairment, any cumulative losses previously recognised in equity will be removed from equity and recognised in the Statement of Comprehensive Income even though the asset has not been derecognised. On derecognition, the cumulative gain or loss previously recognised in equity is recognised in the Statement of Comprehensive Income.

(iii) Loans and receivables

These are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market.

After initial recognition they are measured at amortised cost using the effective interest method. Gains and losses when the asset is impaired or derecognised are recognised in the Statement of Comprehensive Income. Loans and receivables are classified as "trade and other receivables" and "cash and short-term deposits" in the Balance Sheet.

(K) Impairment of Financial Assets

At each balance sheet date the Group assesses whether there is any objective evidence that a financial asset or group of financial assets are impaired. Any impairment losses are recognised in the Statement of Comprehensive Income.

(L) Impairment of Non-Financial Assets

The carrying amounts of the Group's non-financial assets, other than inventories and deferred tax assets, are reviewed at each reporting date to determine whether there is an indication that an asset may be impaired. Where an indicator of impairment exists, or where annual impairment testing for an asset is required, the Group makes a formal estimate of the recoverable amount. Assets that have a finite useful life are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable.

An impairment loss is recognised for the amount by which the asset's carrying amount exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs to sell and value in use. Value in use is depreciated replacement cost for an asset where the future economic benefits or service potential of the asset are not primarily dependent on the asset's ability to generate net cash flows and where the entity would, if deprived of the asset, replace its remaining future economic benefits or service potential.

For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows (cash-generating units). The value in use for cash-generating assets is the present value of expected future cash flows. An impairment loss is recognised in the Statement of Comprehensive Income. Non-financial assets that suffered impairment are reviewed for possible reversal of the impairment at each reporting date; this is recognised in the Statement of Comprehensive Income.

(M) Trade Payables

Trade payables are initially measured at fair value and subsequently measured at amortised cost using the effective interest method.

(N) Provisions

Provisions are recognised when the Company has a present obligation (either legal or constructive), as a result of a past event, it is probable that an outflow of economic benefits will be required to settle the obligation and a reliable estimate can be made of the amount of the obligation. Provisions are not recognised for future operating losses.

Provisions are measured at the present value of management's best estimate of the expenditure required to settle the present obligation at the balance sheet date. The discount rate used to determine the present value reflects current market assessments of the time value of money and the risks specific to the liability. The increase in the provision due to the passage of time is recognised as an interest expense.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

(O) Employee Benefits

(i) Wages and salaries, annual leave, sick leave and other benefits

Provision is made for employee benefits accumulated as a result of employees rendering services up to balance date including related oncosts.

The benefits include wages and salaries, annual leave, sick leave, incentives and other benefits. The provision for employee benefits is measured at the remuneration rates expected to be paid when the liability is settled.

The Group recognises a liability for sick leave to the extent that absences in the coming year are expected to be greater than the sick leave entitlements earned in the coming year. The amount is calculated based on the unused sick leave entitlement that can be carried forward at balance date, to the extent that the Group anticipates it will be used by staff to cover those future absences.

The Group recognises a liability and an expense for bonuses where contractually obliged or where there is a past practice that has created a constructive obligation.

(ii) Long service leave and retirement leave

Service leave and retirement leave entitlements are calculated based on the employee's entitlement and their current pay rate. The liability for long service leave is recognised in the provision for employee benefits and measured as the present value of expected future payments to be made in respect of services provided by employees up to the reporting date. Consideration is given to expected future wage and salary levels, experience of employee departures and periods of service.

Long-term benefits expected to be settled within 12 months are classified as employee entitlements under current liabilities.

(iii) Pension and post-retirement benefits

The Group operates a defined contribution superannuation plan. A defined contribution plan is a pension plan under which the Group pays fixed contributions to a separate entity. The Group has no legal or constructive obligations to pay further contributions if the fund does not hold sufficient assets to pay all employees the benefits relating to employee service in the current and prior periods.

The Group's contributions made to defined contribution superannuation plans are recognised as an expense in the Statement of Comprehensive Income when they are due.

(P) Leases

The Company leases certain plant and equipment, land and buildings.

Finance leases, where the lessee is transferred substantially all the risks and benefits incidental to ownership of an asset, whether or not title is eventually transferred.

At the commencement of the lease term, the Group recognises finance leases as assets and liabilities in the Balance Sheet at the lower of the fair value of the leased item or the present value of the minimum lease payments. The amount recognised as an asset is depreciated over its useful life. If there is uncertainty as to whether the Group will obtain ownership at the end of the lease term, the asset is fully depreciated over the shorter of the lease term and its useful life.

Operating lease payments, where the lessor effectively retains substantially all the risks and benefits incidental to ownership of the leased item, are recognised as an expense in the Statement of Comprehensive Income on a straight line basis over the lease term.

(Q) Income Tax

(i) Current tax

Income tax expense comprises both current tax and deferred tax, and is calculated using tax rates that have been enacted or substantially enacted by balance date. Current tax and deferred tax are charged or credited to the Statement of Comprehensive Income, except when they relate to items charged or credited directly to equity, in which case the tax is dealt with in equity. Current tax is the amount of income tax payable based on the taxable profit for the current year, plus any adjustments to income tax payable in respect of prior years.

(ii) Deferred tax

Deferred tax is the amount of income tax payable or recoverable in future periods in respect of temporary differences calculated using the liability method and unused tax losses. Deferred tax is not accounted for if it arises from initial recognition of goodwill or from initial recognition of an asset or liability in a transaction, other than a business combination, that at the time of the transaction affects neither accounting nor taxable profit or loss.

Deferred tax is recognised if it arises from investments in subsidiaries and associates, and interests in joint ventures, except where the company can control the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future.

Deferred tax is measured using the tax rates (and laws) that have been enacted or substantively enacted by the balance sheet date and are expected to apply when the related deferred income tax asset is realised or the deferred income tax liability is settled. A deferred tax asset is recognised to the extent that it is probable that future taxable profits will be available against which the temporary differences can be utilised. Deferred tax assets are reviewed at each reporting date and are reduced to the extent that it is no longer probable that the related tax benefit will be realised.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

(R) Goods & Services Tax (GST)

The Statement of Comprehensive Income has been prepared so that all components are stated exclusive of GST. All items in the Balance Sheet are stated net of GST, with the exception of receivables and payables which include GST invoiced. Where GST is not recoverable as input tax then it is recognised as part of the related asset or expense. The net amount of GST recoverable from, or payable to, the Inland Revenue Department (IRD) is included as part of receivables or payables in the Balance Sheet.

The net GST paid to, or received from the IRD, including the GST relating to investing and financing activities, is classified as an operating cash flow in the Cash Flow Statement.

Commitments and contingencies are disclosed exclusive of GST.

(S) Derivative Financial Instruments

The Group enters into derivative transactions, principally forward currency contracts. The purpose of these transactions is to manage the currency risk arising from the Group's operations. All derivative financial instruments are recognised in the Balance Sheet at their fair value. Changes in the fair value of derivative financial instruments are recognised either in the Statement of Comprehensive Income in equity depending on whether the derivative financial instrument qualifies for hedge accounting, and if so, whether it qualifies as a fair value hedge or cash flow hedge.

In accordance with its treasury policy, the Group does not hold or issue derivative financial instruments for trading purposes.

Changes in the fair values of forward currency contracts that are designated and qualify as cash flow hedges, to the extent that they are effective hedges, are recorded in equity. The gains and losses that are recognised in equity are transferred to the Statement of Comprehensive Income in the same period in which the hedged item affects earnings. On sale, expiry, or de-designation of a forward currency contract, the cumulative gains or losses are maintained in equity until such time as the forecast transaction impacts earnings. If the forecast transaction is no longer expected to occur, the cumulative gain or loss is transferred to the Statement of Comprehensive Income. The Group documents at inception of the transaction the relationship between hedging instruments and hedging items, as well as its risk management objective and strategy for undertaking various hedge transactions. The process includes linking all forward currency contract derivative financial instruments to specific firm commitments or forecast transactions. The Group also documents its assessment, both at the hedge inception and on an ongoing basis, of whether the forward currency derivative financial instruments used are highly effective.

(T) Borrowings

Borrowings are initially recognised at their fair value plus transition costs. After initial recognition all borrowings are measured at amortised cost using the effective interest method.

(U) Equity

Ordinary shares are classified as equity.

Incremental costs directly attributable to the issue of new shares are shown in equity as a deduction, net of tax, from the proceeds.

(V) Budget Figures

The budget figures are derived from the Statement of Corporate Intent as approved by the Board, and the Shareholder, at the beginning of the financial year. The budget figures have been prepared in accordance with NZ IFRS, using accounting policies that are consistent with those adopted by the Group for the preparation of these financial statements. The budget figures are unaudited.

(W) Critical Accounting Estimates and Assumptions

In preparing these financial statements the Group has made estimates and assumptions concerning the future. These estimates and assumptions may differ from the subsequent actual results. Estimates and assumptions are continually evaluated and are based on historical experience and other factors, including expectation of future events that are believed to be reasonable under the circumstances. The estimates and assumptions that have a significant risk of causing a material adjustment to the carrying amounts of assets and liabilities within the next financial year are discussed below:

(i) Property, plant and equipment useful lives and residual value

At each balance date the Group reviews the useful lives and residual values of its property, plant and equipment. Assessing the appropriateness of useful life and residual value estimates of property, plant and equipment requires the Group to consider a number of factors such as the physical condition of the asset, expected period of use of the asset by the Group, and expected disposal proceeds from the future sale of the asset.

An incorrect estimate of the useful life or the residual value will impact the depreciation expense recognised in the Statement of Comprehensive Income, and carrying amount of the asset in the Balance Sheet. The Group minimises the risk of this estimation uncertainty by physical inspection of assets, an asset replacement programme, review of second-hand market prices for similar assets and an analysis of prior asset sales. The Group has not made significant changes to past assumptions concerning useful lives and residual values. The carrying amount of property, plant and equipment is disclosed in note 12.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

(ii) Retirement and long service leave

The present value of the retirement and long service leave obligations depend on a number of factors that are determined on an actuarial basis using a number of assumptions. Two key assumptions used in calculating this liability include the discount rate and the salary inflation factor. Any changes in these assumptions will impact on the carrying amount of the liability.

In determining the appropriate discount rate the Company considered the interest rates on New Zealand government bonds which have terms to maturity that match, as closely as possible, the estimated future cash outflows. The salary inflation factor has been determined after considering historical salary inflation patterns. A weighted average discount rate of 3.69% and a salary inflation factor of 3.75% were used.

If the discount rate were to differ by 1% from the Company's estimates, with all other factors held constant, the carrying amount of the liability would be an estimated \$47,000 higher / lower.

If the salary inflation factor were to differ by 1% from the Company's estimates, with all other factors held constant, the carrying amount of the liability would be an estimated \$14,000 higher / lower.

The carrying amount of employee entitlements is disclosed in the Balance Sheet.

(X) Critical Judgements in Applying the Company's Accounting Policies

Management has exercised the following critical judgement in applying the Company's accounting policies for the period ended 30 June 2015:

(i) Lease classification

Determining whether a lease agreement is a finance or an operating lease requires judgement as to whether the agreement transfers substantially all the risks and rewards of ownership to the Group. Judgement is required on various aspects that include, but are not limited to, the fair value of the leased asset, the economic life of the leased asset, whether or not to include renewal options in the lease term and determining an appropriate discount rate to calculate the present value of the minimum lease payments.

Classification as a finance lease means the asset is recognised in the Balance Sheet as property, plant and equipment, whereas for an operating lease no such asset is recognised. The Group has exercised its judgement on the appropriate classification of building and equipment leases and has determined all leases are operating leases.

(Y) Dividend Distribution

Dividend distribution to the company's shareholders is recognised as a liability in the Group's financial statements in the period in which the dividends are approved by the company's shareholders.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

		GROUP	
		2015	2014
Note		\$000	\$000
4. COMMERCIAL SCIENCE RESEARCH CONTRACTS			
	Royalties	20,261	16,406
	Other commercial science research contracts	46,023	38,870
	Total commercial science research contracts	66,284	55,276
4A. OPERATING PROFIT BEFORE TAXATION			
	After charging		
	Auditors' remuneration		
	Audit fees for financial statement audit	119	116
	Bad debts written off	3	18
(9)	Change in provision for doubtful debts	-	(17)
	Directors fees	261	279
	Employer contributions to defined contribution plans	1,131	1,059
	Unrealised foreign exchange losses/(gains)	(677)	157
	(Gain) on sale of assets	(10)	(9,001)
5. DEPRECIATION AND AMORTISATION			
	Depreciation		
	Buildings	2,395	1,993
	Plant and equipment	5,498	5,453
	Motor vehicles	517	482
(12)	Total depreciation on property, plant and equipment	8,410	7,928
	Amortisation		
	Software and databases	703	889
	Patents, trademarks and licences		-
(13)	Total amortisation of intangible assets	703	889
6. OTHER OPERATING EXPENSES			
	Other operating expenses		
	Materials	5,495	5,945
	Research contracts	9,976	9,989
	Rental and operating costs	7,292	7,255
	Travel	4,211	3,968
	Other general operating costs	12,410	12,587
	Total general operating expenses	39,384	39,744

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

		GROUP	
		2015	2014
		\$000	\$000
7. TAXATION			
Profit before taxation		6,453	8,806
Prima facie taxation @ 28%		1,807	2,466
Plus/(less) taxation effect:			
Non-assessable income		2	(2,501)
Non-deductible expenditure		33	35
Prior period adjustment		220	(23)
Imputation credits on dividends received		(4)	(1)
Utilisation of tax losses		(50)	(50)
		2,008	(74)
The taxation charge is represented by:			
Current taxation		2,833	399
Deferred tax benefit	(16)	(825)	(473)
		2,008	(74)

The Company is not required to maintain an Imputation Credit Account pursuant to section OB1(2)(d) of the Income Tax Act 2007.

8. CASH AND SHORT-TERM DEPOSITS

Cash on hand and at bank	7,004	8,756
Short-term deposits	5,000	2,500
	12,004	11,256

The carrying value of short-term deposits with maturity dates of three months or less approximates their fair value. The weighted average effective interest rate for term deposits is 3.75% (2014: 3.64%).

Cash and short-term deposits are held with banks that have a credit rating of at least A-.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

9. RECEIVABLES AND PREPAYMENTS

Trade receivables
Provision for impairment

Accrued income
Prepayments and other receivables

	GROUP	
	2015	2014
	\$000	\$000
Trade receivables	16,981	15,761
Provision for impairment	(204)	(204)
	16,777	15,557
Accrued income	6,006	4,363
Prepayments and other receivables	2,055	1,945
	24,838	21,865

The carrying value of receivables approximates their fair value. The carrying amount of receivables that would otherwise be past due, but not impaired, whose terms have been renegotiated is \$1,451,000 (June 2014 \$954,000). As at 30 June 2015 and 30 June 2014, all overdue receivables have been assessed for impairment and appropriate provisions applied, as detailed below:

	GROUP					
	30 June 2015			30 June 2014		
	Gross	Impairment	Net	Gross	Impairment	Net
Not past due	15,470	(144)	15,326	14,719	(116)	14,603
Past due 1 — 30 days	966	-	966	423	-	423
Past due 31 — 60 days	258	-	258	114	-	114
Past due 61 — 90 days	209	(10)	199	417	-	417
Past due > 91 days	78	(50)	28	88	(88)	-
Total	16,981	(204)	16,777	15,761	(204)	15,557

The provision for impairment has been calculated based on expected losses for the Group's pool of debtors. Expected losses have been determined based on an analysis of the Group's losses in previous periods, and review of specific debtors.

Movements in the provision for impairment of receivables are as follows:

	GROUP	
	2015	2014
	\$000	\$000
Balance at 01 July	(204)	(221)
Additional provisions made during the year	-	-
Receivables written-off during the year	-	17
Balance at end of year	(204)	(204)

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

GROUP

2015 2014
\$000 \$000

10. ACCOUNTS PAYABLE AND ACCRUALS

Trade payables and accruals
Other payables and accruals
Revenue in advance

10,935	8,140
2,702	2,588
3,752	3,595
17,389	14,323

Accounts payable and accruals are non-interest bearing and are normally settled on 30-day terms, therefore the carrying value of accounts payable and accruals approximates their fair value.

11. EMPLOYEE ENTITLEMENTS

Annual leave
Service leave
Retirement leave
Other leave and accruals

5,097	4,795
1,084	942
2,697	2,454
1,006	3,199
9,884	11,390
Comprising:	
8,428	10,287
1,456	1,103
9,884	11,390

Total employee entitlements

Comprising:
Current
Non-current

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

12. PROPERTY, PLANT AND EQUIPMENT

	GROUP				
	Land \$000	Buildings \$000	Plant and Equipment \$000	Motor Vehicles \$000	Total \$000
Cost					
Opening balance 01 July 13	7,069	56,061	90,944	5,112	159,186
Additions	464	6,002	5,610	306	12,382
Disposals	-	(405)	(160)	(137)	(702)
Transfers	(118)	(572)	(267)	-	(957)
Foreign exchange movement	-	-	-	(1)	(1)
Closing balance 30 June 14	7,415	61,086	96,127	5,280	169,908
Accumulated depreciation					
Opening balance 01 July 13	-	26,472	69,965	3,168	99,605
Additions	-	1,993	5,453	482	7,928
Disposals	-	(240)	(150)	(130)	(520)
Transfers	-	-	(11)	-	(11)
Closing balance 30 June 14	-	28,225	75,257	3,520	107,002
Net book value	7,415	32,861	20,870	1,760	62,906

	GROUP				
	Land \$000	Buildings \$000	Plant and Equipment \$000	Motor Vehicles \$000	Total \$000
Cost					
Opening balance 01 July 14	7,415	61,086	96,127	5,280	169,908
Additions	463	6,988	6,375	333	14,159
Disposals	-	-	(426)	(158)	(584)
Transfers	-	(95)	427	-	332
Foreign exchange movement	-	-	1	-	1
Closing balance 30 June 15	7,878	67,979	102,504	5,455	183,816
Accumulated depreciation					
Opening balance 01 July 14	-	28,225	75,257	3,520	107,002
Additions	-	2,395	5,498	517	8,410
Disposals	-	-	(405)	(151)	(556)
Transfers	-	(95)	632	-	537
Closing balance 30 June 15	-	30,525	80,982	3,886	115,393
Net book value	7,878	37,454	21,522	1,569	68,423

Some land holdings are restricted assets to the extent that they are potentially subject to Maori land claims. The book value of land potentially subject to Maori claims is \$7,069,000.

There are no restrictions over the title of the remaining Group's property, plant and equipment, nor is any property, plant or equipment pledged as security for liabilities except property at Kerikeri pledged as security for the mortgage liability.

The Company holds numerous germplasm collections of horticultural material for research purposes. Due to the nature of the collections, their value cannot be measured reliably for financial purposes, however they have a fundamental importance to the Company's research.

Assets held for sale comprise of land and buildings of \$690,000 (2014: \$690,000).

Included within total additions for the year is \$6.0M associated with the redevelopment of our Mt Albert site.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

13. INTANGIBLE ASSETS

	GROUP			
	Software, Databases \$000	Patents, Trademarks \$000	Goodwill \$000	Total \$000
Cost				
Opening balance 01 July 13	7,029	467	19	7,515
Additions	660	-	-	660
Disposals	-	-	-	-
Transfers	267	-	-	267
Closing balance 30 June 14	7,956	467	19	8,442
Accumulated amortisation				
Opening balance 01 July 13	5,836	467	19	6,322
Additions	889	-	-	889
Disposals	-	-	-	-
Transfers	11	-	-	11
Closing balance 30 June 14	6,736	467	19	7,222
Net book value	1,220	-	-	1,220

	GROUP			
	Software, Databases \$000	Patents, Trademarks \$000	Goodwill \$000	Total \$000
Cost				
Opening balance 01 July 14	7,956	467	19	8,442
Additions	214	-	-	214
Disposals	-	-	-	-
Transfers	(332)	-	-	(332)
Closing balance 30 June 15	7,838	467	19	8,324
Accumulated amortisation				
Opening balance 01 July 14	6,736	467	19	7,222
Additions	703	-	-	703
Disposals	-	-	-	-
Transfers	(537)	-	-	(537)
Closing balance 30 June 15	6,902	467	19	7,388
Net book value	936	-	-	936

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

14. INVESTMENTS - SUBSIDIARIES

	Principal Activity	Balance Date	Interest Held %
CropSeed Limited (previously GraceLinc)	Seed growing services	30 June	100
Plant & Food Research (USA) Corporation	Marketing and consultancy services in the USA	30 June	100
Plant & Food Research Australia Pty Limited	Science, marketing and consultancy services in Australia	30 June	100
Truffle Investment New Zealand Limited	Non trading	30 June	100
New Zealand Institute for Crop & Food Research International Limited	Non trading	30 June	100
New Zealand Institute for Crop & Food Research Rosehip Limited	Non trading	30 June	100

Plant & Food Research Australia Pty Limited is incorporated in Australia. Plant & Food Research (USA) Corporation is incorporated in the USA. All other subsidiaries are incorporated in New Zealand. The accounts of Plant & Food Research Australia Pty Limited and Plant & Food Research (USA) Corporation have not been audited.

15. INVESTMENTS - ASSOCIATES

The Group's share of profit/(loss) in its associated companies for the year was \$9,000 (2014: \$116,000).

30 June 2015	Principal Activity	Interest Held	Total Assets	Total Liabilities	Revenue	Profit/(Loss)
Jukebox NZ Limited	Developing & commercialising IP	50.0%	78	6	-	(1)
Forage Innovations Limited	Developing & commercialising IP	49.0%	1,231	688	1,440	(13)
Biopolymer Network Limited	Developing & commercialising IP	33.3%	1,041	365	3,697	40
Rhindo International Limited	Developing & commercialising IP	25.0%	10	-	-	-

30 June 2014

Jukebox NZ Limited	Developing & commercialising IP	50.0%	78	5	-	(1)
Forage Innovations Limited	Developing & commercialising IP	49.0%	1,094	502	1,343	160
Biopolymer Network Limited	Developing & commercialising IP	33.3%	1,130	494	4,116	113
Rhindo International Limited	Developing & commercialising IP	25.0%	10	-	-	-

Jukebox NZ Limited
Forage Innovations Limited
Biopolymer Network Limited
Rhindo International Limited

Total associate investments

GROUP
2015
2014
\$000 \$000

39	39
249	258
196	178
2	2
486	477

16. DEFERRED TAX ASSET/(LIABILITY)

	Property, plant equipment \$000	Investments- associates \$000	Derivative financial instruments \$000	Employee entitlements \$000	Other provisions \$000	Tax losses \$000	Total \$000
GROUP							
Balance at 01 July 2013	(4,893)	(88)	(2)	2,239	229	-	(2,515)
Charged to statement of comprehensive income	503	(33)	5	(25)	23	-	473
Balance at 30 June 2014	(4,390)	(121)	3	2,214	252	-	(2,042)
Charged to statement of comprehensive income	589	(2)	(17)	231	24	-	825
Balance at 30 June 2015	(3,801)	(123)	(14)	2,445	276	-	(1,217)

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

GROUP

2015
\$000

2014
\$000

17. SHARE CAPITAL & RESERVES

Share capital

Opening balance

17,436

17,436

Issue of ordinary shares

-

-

Closing balance at 30 June

17,436

17,436

Retained earnings

Opening balance

63,325

54,445

Operating profit/(loss) after taxation

4,445

8,880

Closing balance at 30 June

67,770

63,325

Foreign currency translation

Opening balance

(89)

(53)

Foreign currency translation difference for foreign operations

67

(36)

Closing balance at 30 June

(22)

(89)

Ordinary shares (000's)

On issue opening balance

17,436

17,436

Issued for cash

-

-

On issue at closing balance 30 June

17,436

17,436

All issued shares are fully paid and have no par value.

The holders of ordinary shares are entitled to receive dividends as declared from time to time and are entitled to one vote per share at meetings of the Company.

All shares rank equally with regard to the Company's residual assets.

Dividends paid to shareholders represented \$0 per share in 2015 (2014: \$0).

18. CASH FLOW HEDGE RESERVE

Opening balance at 01 July

12

(7)

Transferred to cost of sales

-

-

Revaluations

(63)

19

Closing balance at 30 June

(51)

12

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

19. COMMITMENTS

The following amounts have been committed to by the Group or Parent, but are not recognised in the financial statements:

a) Capital commitments

Property, plant and equipment

b) Operating commitments (excluding leases)

c) Operating lease commitments

Lease commitments under non-cancellable operating leases are as follows:

Not later than one year

Later than one year and not later than five years

Later than five years

d) Operating lease income

Lease income under non-cancellable operating leases are as follows:

Not later than one year

Later than one year and not later than five years

Later than five years

GROUP

2015
\$000

2014
\$000

	35,280	4,888
	395	1,000
	839	941
	938	1,596
	160	245
	1,937	2,782
	629	551
	84	511
	-	-
	713	1,062

Included within capital commitments is \$31.9M for the redevelopment of our Mt Albert site.

The Group received rental income of \$908,000 during the year (2014: \$942,000). Rental income is included within Other income in the Statements of Comprehensive Income.

The Group leases premises and plant and equipment. Operating leases held over properties give the Group the right to renew the lease subject to a redetermination of the lease rental by the lessor. There are no renewal options or options to purchase in respect of plant and equipment held under operating leases.

The Group rents premises. Operating lessees have the rights to renew the lease subject to a redetermination of the lease rental.

20. RECONCILIATION OF OPERATING PROFIT/(LOSS) AFTER TAX WITH CASH FLOW FROM OPERATING ACTIVITIES

Operating profit after tax

Associated entities (profit)

Add/(less) non-cash items:

Depreciation and amortisation

Movement in foreign exchange

Non-cash movements in investments

(Decrease)/increase in future tax liability

(Decrease)/increase in employee entitlement

Add/(less) items classified as investing activities:

(Gain) on sale of property, plant and equipment

Movements in working capital:

Decrease/(increase) in receivables and prepayments

Decrease/(increase) in inventory

Increase/(decrease) in trade payables and accruals

Increase/(decrease) in taxation payable

Net cash flow from operating activities

	4,445	8,880
	(9)	(116)
	4,436	8,764
	9,113	8,817
	10	20
	(5)	(1)
	(825)	(473)
	(1,506)	358
	6,787	8,721
	(10)	(9,001)
	(2,774)	(3,592)
	(28)	126
	505	1,692
	1,831	(616)
	(466)	(2,390)
	10,747	6,094

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

21. RELATED PARTY TRANSACTIONS

The Company is a wholly owned entity of the Crown. The government significantly influences the role of the Company in addition to being a major source of revenue.

The Company enters into transactions with government departments, state-owned enterprises and other Crown entities. Core funding amounting to \$43,103,000 was received from Ministry of Business, Innovation and Employment (a government department) during the year to 30 June 2015. Core funding is disclosed on the face of the Statements of Comprehensive Income. Those transactions that occur within a normal customer / supplier relationship on terms and conditions no more or less favourable than those which it is reasonable to expect the Company would have adopted if dealing with that entity at arm's length in the same circumstances have not been disclosed as related party transactions.

The Company is the ultimate parent of the Group and includes the following subsidiaries and associates: Plant & Food Research (USA) Corporation, CropSeed Limited, Truffle Investment New Zealand Limited, Plant & Food Research Australia Pty Limited, New Zealand Institute for Crop & Food Research International Limited, New Zealand Institute for Crop & Food Research Rosehip Limited, Jukebox NZ Limited, Biopolymer Network Limited, Rhindo International Limited and Forage Innovations Limited.

All members of the Group are considered to be related parties.

	Purchase of services		Due to	
	2015 \$000	2014 \$000	2015 \$000	2014 \$000
Subsidiaries	1,301	1,440	50	166
Associates	-	-	-	-

	Sale of services		Due from	
	2015 \$000	2014 \$000	2015 \$000	2014 \$000
Subsidiaries	627	405	210	186
Associates	1,573	1,482	215	177

For the year ended 30 June 2015, the Group has not impaired or written off any related party receivables (2014: \$0).

a) Related party transactions other than described above:

All related party transactions have been entered into on an arm's length basis.

The company and the Group contracted with parties associated with certain directors during the year. These are as detailed below. These transactions were all at normal commercial rates.

Parties associated with Directors	Nature of the transaction	GROUP	
		2015 \$000	2014 \$000
Kiwi Innovation Network Limited	Services	1	1
The Bio Commerce Centre Limited	Rent	1	1
b) Key management personnel compensation:			
Salaries and other short-term employee benefits		2,350	2,246

Key management personnel include the Board of Directors, the Chief Executive and the other members of the senior executive team.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

22. FINANCIAL INSTRUMENTS

The Group's activities expose it to a variety of financial instrument risks, including market risk, credit risk and liquidity risk. The Group has a series of policies to manage the risks associated with financial instruments and seeks to minimise exposure from financial instruments. These policies do not allow any transactions that are speculative in nature.

Market risk

Fair value interest rate risk

The Group has a policy of ensuring that the Group's exposure to changes in interest rates on borrowings is minimised. Interest rate swaps are entered into to achieve an appropriate level of exposure to meet the Group's policy. Any movement in the interest rate would impact the profit via the interest cost of the overdraft and the movement in the fair value of the interest rate swap derivative.

There were no interest rate swaps as at 30 June 2015.

At 30 June 2015 the Group's exposure to the fair value interest rate risk was limited to its bank deposits which are held at fixed rates of interest.

Cash flow interest rate risk

Cash flow interest rate risk is the risk that the cash flows from a financial instrument will fluctuate because of changes in market interest rates. Investments at variable interest rates expose the Group to cash flow interest rate risk. The Group's investment policy requires a spread of investment maturity dates to limit exposure to short-term interest rate movements. The Group currently has no variable interest rate investments.

Currency risk

Currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate due to changes in foreign exchange rates. The Group purchases goods and services overseas which require it to enter into transactions denominated in foreign currencies. The Group also holds small balances of AUD, EUR and USD at call in order to settle transactions denominated in foreign currencies. As a result of these activities, exposure to currency risk arises.

It is the Group's policy to manage foreign currency risks arising from contractual commitments and liabilities by entering into foreign exchange forward contracts to hedge the foreign currency risk exposure. All of the forward exchange contracts have maturities of less than one year at the balance sheet date.

Sensitivity analysis

As at 30 June 2015, if the 90 day bank bill rate had been 25 basis points higher or lower, with all other variables held constant, the profit for the year would have been \$47,000 (June 2014: \$45,000) higher or lower. This movement is attributable to increased or decreased interest received on short-term deposits.

As at 30 June 2015, if the currency had weakened or strengthened by 10% against the US dollar, with all other variables held constant, the profit for the year would have been \$74,000 higher or lower. This movement is mainly attributable to foreign exchange gains and losses on translation of US dollar-denominated trade receivables and payables.

As at 30 June 2015, if the currency had weakened or strengthened by 10% against the EUR dollar, with all other variables held constant, the profit for the year would have been \$42,000 higher or lower. This movement is mainly attributable to foreign exchange gains and losses on translation of AU dollar-denominated trade receivables and payables.

As at 30 June 2015, if the currency had weakened or strengthened by 10%, with all other variables held constant, the cash flow hedge movement through equity would have been \$160,000 higher if the currency had strengthened or \$195,000 lower if it had weakened.

Other market risk

The Group is not exposed substantial to other market price risk rising from financial instruments.

Credit risk

Credit risk is the risk that a third party will default on its obligations to the Group, causing the Group to incur a loss.

Due to the timing of its cash inflows and outflows, the Group invests surplus cash with registered banks. The Group's investment policy limits the amount of credit exposure to any one institution.

The Group's maximum credit exposure for each class of financial instrument is represented by the total carrying amount of cash and short-term deposits (note 8), net debtors (note 9) and derivative financial assets. There is no collateral held as security against these financial instruments, including those instruments that are overdue or impaired.

Management has a credit policy in place under which each new customer is individually analysed for credit worthiness and assigned a credit limit before the standard payment and delivery terms and conditions are offered. Where available, the Group reviews external ratings and references are obtained. Credit limits are reviewed on a regular basis.

Net receivables includes two customers who represent 34% of the total trade receivables at balance date. The Group is not exposed to any other concentrations of credit risk as surplus cash is invested only with registered banks with specified Standard and Poor's credit ratings.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

22. FINANCIAL INSTRUMENTS (CONTINUED)

Liquidity risk

Liquidity risk is the risk that the Group will encounter difficulty raising liquid funds to meet commitments as they fall due. Prudent liquidity risk management implies maintaining sufficient cash, the availability of funding through an adequate amount of committed credit facilities and the ability to close out market positions. The Group aims to maintain flexibility in funding by keeping committed credit lines available. It is the Group's policy to provide credit and liquidity enhancement only to wholly owned subsidiaries.

The table below analyses the Group's derivative financial instruments and other financial liabilities that will be settled on a gross basis into relevant maturity groupings based on the remaining period at the balance sheet date to the contractual maturity date. The amounts disclosed are the contractual undiscounted cash flows.

	Carrying amount	Contractual cash flow	GROUP 2015		
			Up to 12 months	1-2 years	3 years
Trade and other payables	12,207	12,207	12,207	-	-
	12,207	12,207	12,207	-	-
Forward exchange contracts					
Inflow	-	854	854	-	-
Outflow	(51)	-	-	-	-

	Carrying amount	Contractual cash flow	GROUP 2014		
			Up to 12 months	1-2 years	3 years
Trade and other payables	9,234	9,234	9,234	-	-
	9,234	9,234	9,234	-	-
Forward exchange contracts					
Inflow	12	485	485	-	-
Outflow	-	-	-	-	-

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

22. FINANCIAL INSTRUMENTS (CONTINUED)

Fair value estimation

The group uses various methods in estimating the fair value of a financial instrument.

- The fair value is calculated using quoted prices in active markets (Level 1)
- The fair value is estimated using inputs other than quoted prices included in Level 1 that are observable for the asset or liability either directly (as prices) or indirectly (derived from prices) (Level 2); and
- The fair value is estimated using inputs for the asset or liability that are not based on observable market data (Level 3).

The Group's derivative financial instruments are all level 2 financial instruments and the techniques used to determine their fair values is detailed below.

GROUP

	Level 1 \$000's	Level 2 \$000's	Level 3 \$000's	Total \$000's
30 June 2015				
<i>Assets</i>				
Derivative financial instruments- fair value hedges	-	-	-	-
Total assets	-	-	-	-
<i>Liabilities</i>				
Derivative financial instruments- fair value hedges	-	(51)	-	(51)
Total liabilities	-	(51)	-	(51)
30 June 2014				
<i>Assets</i>				
Derivative financial instruments- fair value hedges	-	12	-	12
Total assets	-	12	-	12
<i>Liabilities</i>				
Derivative financial instruments- fair value hedges	-	-	-	-
Total liabilities	-	-	-	-

Level 2 trading and hedging derivatives comprise forward foreign exchange contracts. These have been fair valued using forward exchange rates that are quoted in an active market. The effects of discounting are generally insignificant for level 2 derivatives.

There have been no transfers between levels of the fair value hierarchy used in measuring the fair value of financial instruments in the period to 30 June 2015.

In the period to 30 June 2015 there were no significant changes in the business or economic circumstances that affect the fair value of the Group's financial assets and financial liabilities.

NOTES TO THE FINANCIAL STATEMENTS (CONTINUED)

for the year ended 30 June 2015

23. CATEGORIES OF FINANCIAL ASSETS AND LIABILITIES

The carrying amounts of financial assets and liabilities in each of the NZ IAS 39 categories are as follows:

	Note	GROUP	
		2015 \$000	2014 \$000
<i>Loans and receivables</i>			
Cash and short-term deposits	(8)	12,004	11,256
Short-term investments		7,500	9,500
Trade and other receivables	(9)	22,783	19,920
Total loans and receivables		42,287	40,676
<i>Available for sale</i>			
Investments - other		166	159
Total financial assets		42,453	40,835
<i>Financial liabilities measured at amortised cost</i>			
Accounts payable and accruals	(10)	12,207	9,234
Mortgage liability		225	242
Total financial liabilities		12,432	9,476

The fair value of the financial assets and liabilities approximate their carrying value.

24. CAPITAL MANAGEMENT

The Company's capital is its equity, which comprises share capital and accumulated funds. Equity is represented by net assets.

The Company is subject to the financial management and accountability provisions of the Crown Research Institutes Act 1992, which imposes restrictions in relation to borrowings, acquisition of securities, issuing guarantees and indemnities and the use of derivatives.

The Company manages its equity as a by-product of prudently managing revenues, expenses, assets, liabilities and general financial dealings to ensure the Company effectively achieves its objectives and purpose, whilst remaining a going concern.

The Group's and Parent's objectives when managing capital are to safeguard the Group's and Parent's ability to continue as a going concern in order to provide returns for shareholders and benefits for other stakeholders and to maintain an optimal capital structure to reduce the cost of capital. The Group and Parent recognises the need to maintain a balance between the higher returns that might be possible with greater gearing and the advantages and security afforded by a sound capital position.

25. CONTINGENCIES

Contingent Liabilities

There were no contingent liabilities known to exist at balance date (June 2014 \$0).

Contingent Assets

There were no contingent assets known to exist at balance date (June 2014 \$0).

26. OTHER SIGNIFICANT ITEMS

The discovery of the vine killing bacteria Psa in New Zealand kiwifruit orchards was a significant event for the kiwifruit industry. The risk is diminishing as the industry recovers, however there remains the potential for an impact on future earnings Plant & Food Research derives from the kiwifruit industry.

PERFORMANCE INDICATORS

for the year ended 30 June 2015

	2015 Actual	2014 Actual
RESEARCH COLLABORATION		
<i>Peer-reviewed publications</i>	303	286
<i>Book chapters</i>	23	11
TECHNOLOGY AND KNOWLEDGE TRANSFER		
<i>Licensing deals of CRI-derived IP</i>		
Licences - new	13	10
Client reports	388	413
Technologies, products and services	104	140
Plant variety rights		
Granted in NZ	5	11
Granted overseas	4	7
Patents		
Granted	12	12
Trademarks		
Registered	1	0
<i>Requests for information from databases and collections</i>	11	9
SCIENCE QUALITY		
International awards	16	17
Invitations for international committees	35	7
Invitations for editorial boards	8	6
Average number of citations per CRI published paper	9.0	8.6
Proportion published papers in top 25 international journals	20%	20%

STATEMENT OF RESPONSIBILITY

for the year ended 30 June 2015

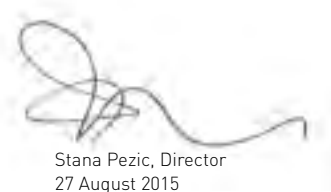
In the financial year ended 30 June 2015, the Board and management of The New Zealand Institute for Plant & Food Research Limited were responsible for:

- the preparation of the financial statements and the judgements used therein.
- establishing and maintaining a system of internal control designed to provide reasonable assurance as to the integrity and reliability of financial and non-financial performance reporting.

In the opinion of the Board and management of The New Zealand Institute for Plant & Food Research Limited, these financial statements fairly reflect the financial position and operations of The New Zealand Institute for Plant & Food Research Limited for the year ended 30 June 2015.



Michael Ahie, Chairman
27 August 2015



Stana Pezic, Director
27 August 2015

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A New Zealand Aid programme, supported by Olivado, will improve the sustainable development of small-holder avocado farmers in Kenya

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Chairman

Greg Gent
Deputy Chair

Andrew von Dadelszen

Colin Dawson

Professor Juliet Gerrard

Stana Pezic

Mark Stuart

CHIEF EXECUTIVE OFFICER

Peter Landon-Lane

SENIOR MANAGEMENT TEAM

Dr Bruce Campbell
Chief Operating Officer

David Hughes
Group General Manager Commercial

Michael James
Chief Financial Officer

Craig Jensen
General Manager Human Resources

Professor Richard Newcomb
Chief Scientist

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PricewaterhouseCoopers on behalf of the Controller
and Auditor General

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ANZ Bank New Zealand Ltd

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