

Primary Growth Partnership Annual Report

1 July 2014 to 30 June 2015



Primary Growth Partnership at a glance

18

Number of programmes currently underway as at 30 June 2015

\$724m

Total committed investment by the Crown and industry as at 30 June 2015

\$6.4b

Estimated contribution to New Zealand's GDP expected from the PGP from 2025

\$4.7b

Estimated additional contribution to New Zealand's GDP expected from the PGP from 2025 if all aspirational goals of PGP programmes are met

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Foreword from Hon Nathan Guy

It's been another highly successful year for the Primary Growth Partnership (PGP) as the importance of innovation and adding value has become even clearer.

As a Government we've set a goal of doubling the value of primary sector exports by 2025. My vision is that we'll be a world leader in producing premium, value-added products that are in huge demand around the world.

The regions will be booming, and the primary industries will be a top career choice for our best and brightest young people.

To achieve all of this, innovation and research will be crucial. This is why the PGP has been well supported by industry and the Government.

There are 18 PGP programmes currently underway covering a broad range of industries, with a total of \$724 million co-invested into cutting-edge programmes.

One great example is 'Pioneering to Precision', a \$10 million programme with Ravensdown. The aim is to improve the use of fertiliser on hill country farms using remote sensing and GPS technology, delivering real economic and environmental benefits.

If successful, this could transform the way fertiliser is applied in farming in New Zealand. It will improve profitability and generate earnings of \$120 million per year by 2030 from additional exports of meat and wool.

There are many other great examples, like Precision Seafood Harvesting which is developing new nets to target fish by size and species.

The PGP enabled improvements to the technology for making mozzarella cheese, which allows it to be produced in six hours, instead of it previously taking six weeks.

And new innovative remote control tree harvesting machines are being developed as a much safer way of harvesting logs from dangerous slopes.

These PGP programmes will help add value and improve overall productivity, which will insulate us from volatile commodity prices. They are also delivering important social and environmental benefits.



As a nation we produce enough food to feed 40 million people and there is only limited scope to increase that volume. Therefore we need to be targeting the wealthiest 40 million individuals across the globe, and the PGP is helping us do that.

A report by the NZIER last year shows the potential benefits of PGP is around \$6.4 billion by 2025 – with the possibility of up to \$11.1 billion if the aspirational stretch of some of the programmes is realised.

Earlier this year we welcomed a report by the Auditor-General into the PGP which found that overall, it is working well and has made improvements from when it was first set up.

It's pleasing to see there is no shortage of public reporting on the progress of the PGP with a detailed website, quarterly report summaries, financial audit reports, a regular newsletter, and an annual expo, to name just a few examples.

This Annual Report is another important way of showcasing and outlining how these important programmes are working.

Regards

A handwritten signature in blue ink that reads "Nathan Guy". The signature is fluid and cursive, with a long horizontal stroke at the end.

Hon Nathan Guy
Primary Industries Minister

Introduction from Martyn Dunne

I am pleased to present the 2014/15 Primary Growth Partnership (PGP) Annual Report.

The primary industries are the engine room of New Zealand's economy. At the Ministry for Primary Industries (MPI), our focus is to maximise export opportunities, improve sector productivity, increase sustainable resource use, and protect from biological risk.

Growing New Zealand's economy depends on the success of the primary industries. The PGP is at the forefront of this, boosting the value, productivity, profitability and sustainability of our primary industries. PGP programmes are delivering real and tangible innovation and benefits for industry and for New Zealand.

Everyone involved with the PGP is committed to New Zealand's long term, sustainable economic growth, with MPI and industry committing approximately \$724 million in 20 PGP programmes over time (18 current and two completed).

PGP programmes are taking smart ideas and smart action, and turning these into smart results, across the breadth of the primary industries. They are each significant in their own right. When you look at the combined achievements across all PGP programmes and what they mean for our economy, consumers and every person working in New Zealand's primary industries, you really do appreciate the magnitude of what the PGP has set out to do, and is well on the way towards achieving.

This past year has seen a number of successes and achievements across the PGP. Examples of these achievements for 2014/15 are provided in this Annual Report, along with case studies on two PGP programmes: Steepland Harvesting and Marbled Grass-fed Beef.

In February 2015, the Office of the Auditor-General (OAG) released an assurance report as part of a performance audit of the PGP. This provided an independent perspective on MPI's administration and implementation of the PGP. The OAG's overall finding is that MPI is administering the PGP effectively, which is positive assurance.

The OAG found that MPI places appropriate emphasis on the accountability of PGP programmes, for



example, through our monitoring and reporting of PGP programmes' progress. This enables strong governance and obligations to be met under PGP programme contracts. The OAG also noted MPI's strong focus on promoting more engagement with and between industry partners, and identifying opportunities to strengthen PGP partnerships.

A key part of my role as MPI's Director-General is making decisions on PGP investments. I would like to acknowledge the contribution of the PGP's independent Investment Advisory Panel (IAP) and the quality advice they provide to assist in this process. In particular I would like to acknowledge the valuable contribution of Panel member Kevin Marshall who will be completing his term with the Investment Advisory Panel this year. Kevin was an inaugural member of the Panel, joining it in August 2009.

I believe the partnership approach between government and industry, enabled by the PGP and guided by the IAP, will help to ensure that New Zealand's outlook and economy remain sound in the long term. MPI is committed to the PGP and to working with industry and the IAP towards growing New Zealand together.

Martyn Dunne
Director-General, MPI

Message from Joanna Perry

I would like to reflect on the journey that the Primary Growth Partnership (PGP) and the Investment Advisory Panel has taken in the six years since the inception of the PGP.

The PGP was a bold move to increase the economic growth and sustainability of the primary and food industries by creating partnerships between the Ministry for Primary Industries and industry to promote and increase private investment in innovation. Its clear focus was for it to be led by the market; to be across the whole value chain; to be more than business as usual; to be a partnership; and most importantly to assist in achieving the Government's Business Growth Agenda.

The Panel, of six business and industry leaders, was set up both to assess proposals and business plans and make recommendations to MPI's Director-General. The Panel's role is also to monitor, review and make recommendations about the ongoing performance of individual PGP programmes.

I, and the Panel as a whole, believe that in the six years since its kick off, the PGP has gone from strength to strength and clearly demonstrated that the initiative has already paid off and will continue to do so. The examples of achievements and benefits being delivered by PGP programmes outlined in this Annual Report show the broad range of initiatives across the PGP.

It is, of course, important to remember that most of the programmes are long term programmes, and a lot of the significant benefits are not expected to be delivered until well into the future. It's also important to remember that the programmes are all beyond business as usual and all involve significant risk. If they didn't then the private investors would have made the investments without the need for the partnership with government. Therefore there will always be aspects of programmes that do not achieve the aspirations of the initial proposals.

One of the original aspects of the PGP was the consideration of 'spillover' benefits. This was not necessarily seen as a major contributor in the initial stages – however I think all of us on the Panel would agree that some of the spillover benefits have already been substantial. In particular we have seen a whole shift in behaviours within the primary sector; real ambition to be innovative and to work with others in the industry to create wins for New Zealand. The collaboration between industry players has been most gratifying – whether it be to solve a common problem,



to reduce duplication of investment, to share innovative ideas or simply to learn from each other. Each of those things can only add to the economic growth and sustainability of our primary industries.

I am confident that the PGP is in good heart. Although New Zealand is often seen as a small player on the world stage, the PGP is enhancing our ability to innovate and commercialise and is both creating a competitive advantage and fuelling growth for our country.

I would like to acknowledge my fellow Panel members. During this year we farewelled Panel members Sharon Hunter and Colin McKenzie and welcomed Barry Brook, Harry Burkhardt and Melissa Clark-Reynolds. Kevin Marshall, one of the inaugural members, finishes his term in October this year, whilst Sir Maarten Wevers and I will continue.

I would like to remind all of those currently involved in programmes, and those looking to be involved, that PGP programmes must push the envelope in terms of innovation, rather than simply improve existing products, processes, services and systems. They must stretch thinking and look for new and better ways to tackle industry challenges and deliver significant benefits. Importantly, they must deliver outcomes for the economy, the environment and society.

A handwritten signature in dark ink, reading 'Joanna Perry'. The signature is fluid and cursive, with a long, sweeping underline.

Joanna Perry
Chair Investment Advisory Panel



Achievements by PGP Programmes

PGP programmes continue to deliver real and tangible benefits, and 2014/15 marked a further successful year for the PGP. The achievements for each programme for 2014/15 are outlined in this section, along with case studies for the Steepland Harvesting and Marbled Grass-fed Beef PGP programmes.

NEW ZEALAND SHEEP INDUSTRY TRANSFORMATION PROJECT (NZSTX)

“The New Zealand Sheep Industry Transformation Project (NZSTX) aims to increase production of market-driven sheep, shifting the balance between New Zealand strong and fine wool production, and using product differentiation to generate better grower returns for fibre, meat and other products, such as leather.”

KEY FACTS:

Programme start: September 2010

Length: 7 years

PGP funding: \$16.8 million

Industry funding: \$16.8 million

Estimated potential economic benefits to NZ: \$250 million per year by 2025



Achievements for the 2014-15 financial year:

- Gained new branded contracts for both finer and stronger fibre, with contracted total fibre volumes exceeding target. Volumes of fibre were higher than last year's volumes across all micron categories.
- Gained new brand partners across a range of micron categories, new business prospects with potential brand partners and continue to receive support from established brand partners.
- Sales of branded Merino meat (under the 'SILERE alpine origin merino' brand) continue to grow steadily.
- The Production Science component of the NZSTX programme is entering into a two year extension to further progress work towards a new genetic test for footrot resistance for the New Zealand fine-wool industry and to further refine the prototype genomic breeding value (gBV).
- The forage trials managed by Lincoln University have been brought to a conclusion, with a final report available on www.perfectsheep.co.nz.
- The programme has developed an improved understanding of the economic proposition for vaccinating fine-wool sheep against Johne's disease.

FARM^{IQ}

“Farm^{IQ}, owned by Silver Fern Farms and Landcorp, aims to create a demand-driven, integrated value chain for red meat that could grow the sector by 50 percent by 2025.

The programme consists of a suite of projects throughout the value chain, from on-farm production systems and genetics, to processing and analysis of market requirements.”

Achievements for the 2014-15 financial year:

- In August 2014, Farm^{IQ} commercially released the Farm^{IQ} Farm Management System, an on-farm software package.
- The Farm Productive Capacity workstream has supported the rollout of the software by assessing how new measuring and monitoring tools can help raise farm productivity.
- The Genetics workstream has developed a system for providing accurate and cost-effective predictions of sheep breeding values for meat quality.
- The programme was announced as winner of the Discovering Gold category of the 2015 Wellington business community annual awards.

KEY FACTS:

Programme start: November 2010

Length: 7 years

PGP funding: \$59 million

Industry funding: \$65 million

Estimated potential economic benefits to NZ: \$1.1 billion per year by 2025



TRANSFORMING THE DAIRY VALUE CHAIN

“DairyNZ and Fonterra are leading a PGP programme aimed at creating new products, increasing on-farm productivity, reducing environmental impacts, and improving agricultural education.”

KEY FACTS:

Programme start: April 2011

Length: 7 years

PGP funding: \$84.6 million

Industry funding: \$85.7 million

Estimated potential economic benefits to NZ: \$2.7 billion per year by 2025

Achievements for the 2014-15 financial year:

- Developed screening tools to reduce the future incidence of embryonic calf death in the national herd. This was achieved through Livestock Improvement Corporation (LIC) investigations of the bovine genome which identified a number of mutations that can result in embryonic calf death.
- Established Farm Data Standards Ltd to administer the Farm Data Code of Practice. The Code enables more effective sharing of farm data. Data standards covering a range of farm management topics have been published and can be applied to other farming sectors.
- Launched a Professional capability and certification framework, co-developed with industry organisations to give farmers confidence in the quality and standard of advice they receive. There are now certified advisors on the ground for accreditation schemes developed by the programme, covering areas such as effluent, nutrient and people management.
- Deployed analytical technology and decision support systems to detect commercial adulteration of milk within Fonterra's Sri Lankan operations. Milk fingerprinting enables Fonterra to measure the quality of millions of individual farm vat samples, in near real time, at a fraction of a cent per analysis.
- Milk fingerprinting is a finalist in two categories of the 2015 NZ Innovators Awards.
- Evidence was found that consumption of dairy protein provides an increase in the rate of muscle activation in the short term. Studies are underway that aim to connect this short term response to longer term mobility benefits.
- In small-scale prototypes the programme has demonstrated new aspects of mozzarella technology which have exceeded the programme's original stretch targets. These are expected to form the basis of future mozzarella products.



HIGH PERFORMANCE MĀNUKA PLANTATIONS

“The value of New Zealand’s mānuka honey industry could grow from an estimated \$75 million in 2010 towards \$1.2 billion per annum following a PGP innovation programme led by Mānuka Research Partnership (NZ) Limited and Comvita Limited.”

Achievements for the 2014-15 financial year:

- Established around 370 hectares of trial mānuka plantations across 13 sites in the North and South Islands including trials on marginal land, irrigated farm land and riparian plantings.
- Some mānuka trial cultivars have, over three seasons, consistently produced nectar with twice the level of dihydroxyacetone (DHA) as general mānuka growing in the same district.
- Controlled experiments conducted over three years have shown that genetics is the main influencer of flowering time and duration, nectar yield and quality. The programme has access to proprietary mānuka genetics and will continue to study the influence of genetics.
- Developed a Field Manual providing guidelines for sampling and monitoring mānuka plantations.
- Completed the first iteration of technical notes, providing information and recommendations for establishing and managing high-performing mānuka plantations.

KEY FACTS:

Programme start: April 2011

Length: 7 years

PGP funding: \$1.4 million

Industry funding: \$1.5 million

Estimated potential net economic benefits to NZ: \$1.2 billion per year by 2028



Image courtesy of Comvita

CLEARVIEW INNOVATIONS

“Ballance Agri-Nutrients is one of New Zealand’s largest nutrient management companies. It is leading the Clearview Innovations PGP programme which could benefit New Zealand with new products, increased on-farm productivity, and improved water quality.”

KEY FACTS:

Programme start: October 2011

Length: 7 years

PGP funding: \$9.8 million

Industry funding: \$9.8 million
Estimated potential economic benefits to NZ: \$64 million per annum by 2025

Achievements for the 2014-15 financial year:

- Key highlights for the Ballance Clearview PGP Programme were the launch of SpreadSmart™ and N-Guru™.
 - » SpreadSmart™ was launched at the Mystery Creek National Fielddays in June 2015. SpreadSmart is a fertiliser topdressing tool, and is now available to North Island farmers through Ballance’s aerial top dressing business Super Air.
 - » N-Guru™ was launched in July 2014. Ballance field consultants can now offer N-Guru™ as part of a farmer’s fertiliser recommendation. N-Guru™ is a model that more accurately predicts pasture responses to nitrogen.
 - » Ballance has delivered training and developed value propositions, pamphlets, and case studies to support the adoption of SpreadSmart™ and N-Guru™.
- A beta version of the nutrient management decision tool MitAgator™ is now complete. A scientific presentation was given at the Fertiliser and Lime Research Centre Workshop (FLRC) in February and presentations have been given at a number of agri-industry forums.
- Fifteen workshops were delivered via a National Nutrient Management Roadshow in collaboration with DairyNZ, Fonterra and Dairy Women’s Network as well as Miraka, Synlait and Tatua (in the appropriate regions). Ballance led the development of a nitrogen-loss framework and consistent industry messaging was agreed for losses and mitigation options for each dimension of that framework.
- The programme developed three patents this financial year.



PRECISION SEAFOOD HARVESTING (PSH)

“Precision Seafood Harvesting (PSH) is a PGP programme that seeks to develop a new wildfish harvesting technology that will result in more precise catches, allowing fish to be landed fresher, in better condition, and of higher value.”

Achievements for the 2014-15 financial year:

- Supreme winners of the 2015 New Zealand Innovators Awards.
- Winners of the 2015 Innovation in Sustainability & Clean-Tech Award.
- Initial results for the post-harvest survivability comparison for juvenile snapper show a significantly improved survival rate for fish harvested using the Modular Harvesting System designs developed by the PSH programme.

KEY FACTS:

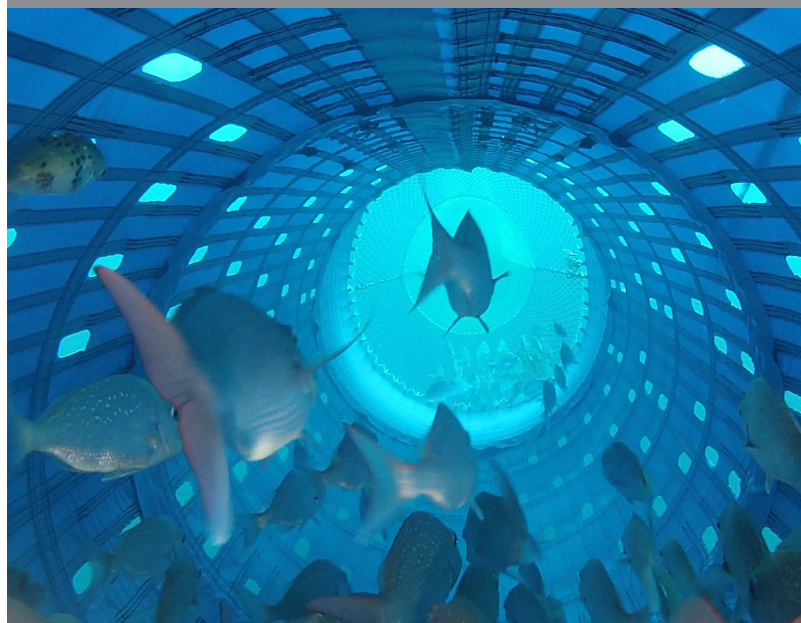
Programme start: April 2012

Length: 6 years

PGP funding: \$24 million

Industry funding: \$24 million

Estimated potential economic benefits to NZ: \$43.6 million per annum by 2025



SHELLFISH: THE NEXT GENERATION, SPATNZ

“SPATnz aims to selectively breed high-value shellfish. Sanford subsidiary Shellfish Production and Technology New Zealand Limited (SPATnz) is co-investing with the Ministry for Primary Industries in this PGP programme.”

KEY FACTS:

Programme start: November 2012

Length: 7 years

PGP funding: \$13 million

Industry funding: \$13 million

Estimated potential economic benefits to NZ: The direct potential benefit to GDP of this programme is approximately \$81 million per annum by 2026. If the technology developed through this programme is adopted more broadly throughout the sector, GDP could increase by \$193 million per annum by 2026.

Achievements for the 2014-15 financial year:

- On 2 April 2015 a world-first Greenshell™ mussel hatchery and laboratory was opened by the Minister for Primary Industries.
- Several batches of Greenshell™ mussel spat have been reared in the new facility as part of developing methods to produce spat at pilot commercial scale.



FOODPLUS

“FoodPlus is generating more value from the red meat carcass. Transforming the local meat industry into a consumer-centric food and healthcare business is a key driver for FoodPlus, which is led by ANZCO Foods.”

Achievements for the 2014-15 financial year:

- In the 2014/15 year, ANZCO and Taranaki Bio Extracts have commercialised eight products from the FoodPlus programme. Five were food products, two were healthcare products and one product was a food ingredient.
- Fourteen products have now been commercialised by ANZCO and Taranaki Bio Extracts over the course of the programme to date.
- All are value added products, with some being taken from material streams that previously went to very low value uses, such as rendering.

KEY FACTS:

Programme start: November 2012

Length: 7 years

PGP funding: \$38.7 million

Industry funding: \$38.7 million

Estimated potential economic benefits to NZ: \$630 million increase in GDP per annum by 2025



Case Study

STEEPLAND HARVESTING

NEW FOREST HARVESTING TECHNOLOGY FOR A SAFER FUTURE

Innovative forestry technology is keeping pace with New Zealand's increasing forest harvest to keep forest industry workers out of harm's way, while increasing productivity and lowering production cost. New equipment is starting to be seen out on the slopes as a result of Future Forests Research Limited's Primary Growth Partnership (PGP) programme with the Ministry for Primary Industries (MPI) called Steepland Harvesting.

Challenges of steep terrain harvesting

Large areas of forest planted in the 1990s are expected to reach harvesting age from 2017 onwards, and as harvesting increasingly moves into these forests on steeper land and in smaller, more isolated holdings, the challenges of maintaining international cost competitiveness and safe operations will mount.

Five years ago the New Zealand forestry sector and MPI identified steep country harvesting as the main bottleneck to achieving greater profitability in forestry. Worker safety is also a major issue. Steep country forests contribute about half of New Zealand's total annual harvest volume and, according to the industry incident reporting scheme, almost 40 percent of forestry fatalities over the last five years.

Steep land harvesting has lower productivity, higher costs and higher risks than harvesting on flat land, mainly due to the higher work requirements and the difficulty of operating machines on steep slopes. Tree felling and breaking out (hooking tree stems to cables) have been identified as the most common tasks involved in serious harm injuries and fatalities.

Harvesting operations on steep terrain need to keep pace with work demands and technology developments to reduce costs and make harvesting safer.

Objectives of the programme

In 2010, Future Forests Research Limited (FFR) developed a business case to form one of the first Primary Growth Partnerships with the MPI, called Steepland Harvesting. The vision of the Steepland Harvesting programme is 'no worker on the slope, no hand on the chainsaw'. This is being achieved by developing innovative harvesting technologies to enable substantial productivity gains and improve worker safety in steep terrain harvesting in New Zealand.

"The programme is an alliance between forest owners, engineering companies and research providers to develop equipment that will reduce logging costs, make harvesting jobs safer, and expand the harvesting equipment manufacturing industry," says Russell Dale, Research Manager for FFR.

"When fully implemented the programme will reduce cable harvesting costs by 25 percent. This will create savings of \$8 per cubic metre of wood produced, resulting in direct economic benefits of over \$100 million by 2016, as well as reducing logging injury rates."

Achievements to date

Steepland Harvesting is in its final year of its six-year PGP programme. Thirty five industry members and the Forest Grower Levy Trust have committed to funding the research. The programme's development work is split into three programmes: mechanisation on steep terrain, increased productivity of cable extraction and development of operational efficiencies. Five years down the track, the main achievements include the following commercial developments for the forest industry:

- The ClimbMAX steep slope harvester;
- The HarvestNav on-board navigation application;
- The Alpine Grapple, a lightweight grapple carriage; and
- The CutoverCam advanced hauler vision system.

ClimbMAX steep slope harvester – a breakthrough in mechanisation on steep terrain

The first output from the Steepland Harvesting programme was the ClimbMAX steep slope harvester. This is a feller-buncher developed by Kelly Logging Ltd and Trinder Engineers Ltd in Nelson and marketed commercially by ClimbMAX Equipment Ltd (see www.climbmax.co.nz). This machine can harvest trees safely and efficiently on slopes up to 45 degrees, eliminating the need for chainsaw operators on the ground.

“In field trials use of the ClimbMAX harvester showed an increase in the volume of logs cut and bunched of 65 tonnes per day – a 26 percent increase in productivity, with a net cost saving of approximately \$3.50 per tonne (10 percent) compared to conventional harvesting methods,” says Keith Raymond, Harvesting Programme Manager at FFR.

The ClimbMAX harvester was commercialised in 2013. Since then four more machines have been sold to customers in Hawke's Bay, Nelson and British Columbia, Canada.

Removing manual tree fellers from hazards has resulted in many contractor operations using mechanical felling, now being accident-free.

HarvestNav – putting a computer in the machine operator's cab

HarvestNav is an on-board navigation and decision support application aimed at improving operator safety. It uses a low-cost tablet computer mounted in the cab of a harvesting machine. The ‘app’ uses Global Positioning System (GPS) and a digital terrain model based on LiDAR-derived Geographic Information System (GIS) data to show detailed terrain slope features, harvest area boundaries and restricted areas.

“HarvestNav enables the machine operator to track their exact location in the harvest block and show the terrain ahead of the machine,” says Keith.

“The ‘app’ provides both safety and operational efficiency benefits and has been released to the forest

industry free of charge to encourage widespread uptake.”

The ‘app’ is available as a download from the Interpine Group Ltd website (see www.interpine.co.nz). So far 30 licences have been issued and 16 units implemented.

Alpine Grapple Carriage – a low cost option for grapple yarding

A new hydraulic grapple carriage, aimed at improving grapple control, has been developed which increases the productivity of cable extraction and eliminates manual breaking out (the process of gathering and hauling logs up slopes). The Alpine Grapple Carriage is made by Alpine Logging Ltd of South Africa. It was field tested in New Zealand and modified to make it more suitable for New Zealand logging conditions.

“As it's non-motorised, the Alpine Grapple has a lower capital cost, is lighter in weight and cheaper to run than conventional motorised grapples,” says Keith.

A FFR study in 2013 showed an increase in productivity of 35 percent through using the Alpine Grapple for haul distances of up to 250 metres compared with manual systems. The cost of extraction was also lower by \$3 per cubic metre.

The Alpine Grapple is available commercially from LogPro Limited, Alpine's local agent (see www.logpro.co.nz). Six units have been sold in New Zealand to date, with seven more on order.

CutoverCam – streaming live video into the yarder cab

Breaking-out in cable logging is one of the most dangerous harvesting tasks, often because the visibility of ground operations from the hauler is limited. A product commercialised by the Steepland Harvesting programme was the CutoverCam, an advanced hauler vision system. This is a camera located on the cutover (an area cleared of trees) and linked by internet protocol and wi-fi technology to a screen in the hauler cab, which streams live video of the hauler operation to the operator.

“Hauler operators no longer need to rely on radio and other signals. The hauler operator now has high resolution video coverage of the breaking out zone, and can control the camera remotely to pan from side-to-side, tilt up and down or zoom in and out to see where personnel are on the cutover before beginning the cable inhaul cycle,” says Keith.

“This product has a very direct safety focus and has the potential to improve the productivity of cable harvesting by reducing delays in positioning cable rigging.”

The first two units have been sold and it is marketed by Cutover Systems Ltd in Rotorua (see www.cutoversystems.com).

Other developments – more products in the pipeline

“Over the next year some really exciting and novel products will change the way steep terrain harvesting will be undertaken in the future,” says Russell.

“Completely new systems are being developed that include remote control and teleoperation (control beyond line-of-sight) of a commercial feller buncher and development of a new prototype bi-ped felling machine.”

Recent focus has been on the installation of a remote control system into a John Deere model 909 feller buncher. The application of remote control to a tracked feller buncher on steep terrain is believed to be a world first, and was reported widely in the news media. The next stage of the project is to build a console to tele-operate the John Deere feller buncher, so the operator can sit in comfort, outside of line-of-sight and operate the machine.

Also, FFR is working with Scion and the University of Canterbury mechatronics programme to develop a sensor guided bi-ped felling machine for steep country. This will move from tree-to-tree without touching the ground, using sophisticated sensing and control technology for semi-autonomous teleoperation of the machine from safe working distances, reducing risk to harvesting workers.



“Our Steepland Harvesting programme continues to demonstrate the productivity, cost and safety advantages of mechanised felling and grapple extraction, and forest owners are starting to adopt these systems more widely, wherever terrain and safety considerations allow,” says Russell.



“The programme has become a catalyst by enabling innovation in all aspects of tree felling and extraction, including the development of more than 25 other traction-winch assisted machines in New Zealand, and over 20 more in development.”

The co-investors are now looking at future opportunities for innovation, beyond the life of the Steepland Harvesting programme, that will continue to increase the productivity of forest harvesting operations and keep forest workers safe.



SEED AND NUTRITIONAL TECHNOLOGY DEVELOPMENT

“Tackling climate change and mitigating the impact of droughts are among the benefits sought by the Seed & Nutritional Technology Development programme to develop innovative forages for New Zealand farms. The programme is led by PGG Wrightson Seeds and Grasslanz Technology.”

KEY FACTS:

Programme start: February 2013

Length: 6 years

PGP funding: \$7.1 million

Industry funding: \$7.5 million

Estimated potential economic benefits to NZ: \$200 million per year by 2025

Achievements for the 2014-15 financial year:

- A Biological Seed Additive (BSA) developed by the programme has shown good performance as a commercial seed treatment to increase dry matter yields in situations where there is disease pressure or drought stress. BSA has improved seedling establishment in 50 percent of trials and shown a significant dry matter yield improvement in a third of all pasture trials.
- The programme has developed the AR-X endophyte that has improved bioactivity and has shown excellent agronomic performance, outperforming more than 100 other entries across eight locations in New Zealand.
- The new hybrid brassica developed by the programme demonstrated improved water-use efficiency, clubroot resistance (100 percent), and improved agronomic performance across a range of regional sites.
- The first commercial seed increase for the programme's new brassica hybrid has been successfully harvested.



WHAI HUA – NEW DAIRY PRODUCTS AND VALUE CHAINS

“Developing immune enhancing dairy products is the key goal of the Whai Hua PGP programme.”

Achievements for the 2014-15 financial year:

- Research results indicated that the target compounds in bovine milk act in a similar way to their counterparts in human milk. Results have been drafted into a scientific paper that will be used to support product claims.
- Preliminary in-vivo efficacy trial results indicated that one of the target compounds was able to suppress the population of a specific pathogenic bacterium in the gut of mice. This is an important finding for future marketing activities.
- An elite herd of 510 cows was assembled to verify compound profiles throughout a full production season. These profiles were shown to be repeatable within and between years.
- Identified sires with high target compound breeding values and good production worth for future matings.
- A spring calving trial that investigated different immunization procedures proved to be acceptable from an animal ethics and welfare perspective.
- Optimal processing specifications have been refined to retain functional activity of compounds at lower temperatures.
- Good progress was made in engaging with potential marketing partners. These engagements have been very useful in identifying the information that will be necessary for future commercialisation.

KEY FACTS:

Programme start: March 2013

Length: 3 years

PGP funding: \$1.9 million

Industry funding: \$1.9 million

Estimated potential economic benefits to NZ: \$8.6 million per annum by 2021



RED MEAT PROFIT PARTNERSHIP

“A consortium of agri-businesses and the government have partnered up to invest in a \$64 million programme to drive sustainable, long-term profits for New Zealand’s red meat sector.”

KEY FACTS:

Programme start: November 2013

Length: 7 years

PGP funding: \$32.1 million

Industry funding: \$32.1 million

Estimated potential economic benefits to NZ: By 2025, up to \$880 million per annum in additional onfarm revenue, of which up to \$194 million per annum will be additional on-farm before tax profit.

Achievements for the 2014-15 financial year:

- Farmer segmentation research, which will be used to ensure that the programme meets farmer needs, has been completed.
- 72 TeenAg clubs are now operating through New Zealand.
- Two new hubs were launched within the Rural Business Network.
- Trialling of Information Technology night-schooling for farmers is now underway.



PIONEERING TO PRECISION

“The Pioneering to Precision programme seeks to improve fertiliser practice on hill country farms through remote sensing of the nutrient status of the farms and precision application of fertiliser.”

Achievements for the 2014-15 financial year:

- Encouraging preliminary results have been received which relate pasture nutrient levels to sensing data obtained by the programme.
- 9 500 soil and plant tissue samples were collected in line with expectations with the programme close to half way in terms of the field validation programme.
- Four new research farms are entering into the programme during the year. These farms are located in the Wairarapa, Nelson, Canterbury and Otago regions which add to the existing regions of Hawkes Bay, Waikato, and Wanganui-Manawatu.
- A second aircraft was equipped with generation two computer assisted technology, enabling more precise differential aerial fertiliser applications to hill country and adding to the commercial service that Ravensdown launched in August 2014.

KEY FACTS:

Programme start: October 2013

Length: 7 years

PGP funding: \$5.2 million

Industry funding: \$5.2 million

Estimated potential economic benefits to NZ: The programme is expected to generate additional export earnings of \$120 million per annum by 2030 and contribute a net economic benefit of \$734 million to the New Zealand economy over the period 2020 to 2050



LIFESTYLE WINES

“The programme is the largest research and development effort ever undertaken by New Zealand’s wine industry. It’s designed to position New Zealand as number 1 in the world for high quality, lower alcohol and lower calorie ‘lifestyle’ wines. It aims to capitalise on the domestic and international market demand for these wines.”

KEY FACTS:

Programme start: March 2014

Length: 7 years

PGP funding: \$8.1 million

Industry funding: \$8.8 million

Estimated potential economic benefits to NZ: The programme aims to deliver economic benefits of \$285 million per annum by the end of 2023

Achievements for the 2014-15 financial year:

- Developed a conceptual framework to show how consumers respond to non-sensory characteristics of NZ Lifestyle Wines.
- Completed Consumer Focus Groups in Sydney, New York and London.
- Completed a detailed analysis of the Australian market for lower alcohol wine.
- All vineyard trials have been harvested and result analysis is underway.
- Over 150 trial wines have been processed and are progressing to finished wines.



NEW ZEALAND AVOCADOS GO GLOBAL

“The New Zealand Avocados Go Global programme began in June 2014 with five key objectives: market entry and growth; consistent and sustainable supply; efficient supply chain; products from waste; and information transfer and adoption. “

Achievements for the 2014-15 financial year:

- Collaborative promotional and marketing strategies are supporting market growth in priority Asian markets, which is reflected in record export volumes.
- Orchard performance benchmarking is allowing the targeted delivery of best practice information while at the same time enhancing industry reporting.
- Industry working group and research outcomes are now available on the NZ Avocado website and being delivered to growers at field days.
- Research into industry systems is identifying common challenges and options to drive sustainable efficiency across the supply chain.
- Workshops to identify the needs of stakeholders are helping to direct the requirements for industry IT systems, reporting and information management.

KEY FACTS:

Programme start: June 2014

Length: 5 years

PGP funding: \$4.3 million

Industry funding: \$4.3 million

Estimated potential economic benefits to NZ: The Go Global programme's vision is to equip the industry with the tools to triple productivity to 12 tonnes per hectare and quadruple industry returns to \$280 million per annum by 2023



Image courtesy of New Zealand Avocado

New Programmes in 2014/15

PASSION2PROFIT

“The Passion2Profit programme, which started in June 2015, aims to grow and capture the full value available to New Zealand by collaboratively positioning farm-raised venison in new markets as a premium non-seasonal meat, and by better aligning supply with demand.”

KEY FACTS:

Programme start: June 2015

Length: 7 years

PGP funding: \$7.4 million

Industry funding: \$8 million

Estimated potential economic benefits to NZ: The programme aims to deliver economic benefits of up to \$56 million a year in additional industry revenue by 2022

Achievements since 1 June 2015 include:

- Early work around non-seasonal sales of Cervena Venison in Europe has shown good demand with the Venison Marketing Group giving consideration to further expansion of the Cervena Venison concept.
- Passion2Profits Clean Bill Of Health Awareness programme achieved its aims of increasing awareness of health issues impacting on profitability and engaging with veterinarians.



TARGETING NEW WEALTH WITH HIGH HEALTH

“Targeting New Wealth with High Health looks to reach existing and emerging markets with a new class of premium lamb products with improved health qualities – including lower levels of saturated fat, and higher levels of polyunsaturated fat and healthy omega-3 oils. The contract for this programme was signed by all parties in June, enabling the programme to get underway.”

KEY FACTS:

Programme start: July 2015

Length: 7 years

PGP funding: \$12.5 million

Industry funding: \$12.5 million

Estimated potential economic benefits to NZ: Up to \$400 million over 25 years



Case Study

MARBLED GRASS-FED BEEF

Increasing consumer demand for better quality and naturally produced food products, combined with an increasing emphasis on food security provides an exciting opportunity for New Zealand to supply the best grass-fed beef in the world.



Marbling score grading – chart showing intra-muscular fat grading for Grass-fed Wagyu

Background

Wagyu beef is recognised worldwide for its high marbling characteristics and quality. However, internationally, high quality beef is predominantly produced from cattle housed in feedlots for extended periods and fed a diet of corn and other grains. This gives New Zealand an ideal opportunity to supply the best grass-fed beef in the world.

Marbled Grass-fed Beef is a 7-year, \$23 million PGP programme which started in August 2012. MPI has committed \$11 million under the PGP with \$12 Million to be funded from the co-investors – Firstlight Foods Ltd, Brownrigg Agriculture Ltd and Firstlight Wagyu (NZ) Ltd.

Predominantly, New Zealand produces low value commodity manufacturing beef, destined for further processing. On farm, cattle are commonly used to control pasture surpluses and to manage poor quality pastures rather than to produce premium beef. The resulting low quality commodity product sold means that farmers remain 'price takers' rather than 'brand marketers'.

The Marbled Grass-Fed Beef PGP programme, in combination with Wagyu genetics from Brownrigg Agriculture, and supply chain and direct-to-consumer marketing expertise from Firstlight Foods, provides an excellent opportunity to create a sustainable, high-value offering of grass-fed Wagyu beef in the market place.

Starting initially in New Zealand, five international market locations will be targeted with relationships and resources established to provide a Go-direct 'B to C' model. This connection with the customer provides valuable two-way communication for the supply chain, important feedback on consumer requirements and improved margins to share across the supply chain.

The programme is focused on crossing Wagyu with both Angus and dairy genetics to enable rapid growth of calf numbers. The sustainable supply of calves, in increasing numbers to meet the growing market demand for the product, will be a key enabler of the programme's success. Early analysis of crossing Wagyu genetics with dairy breeds has provided encouraging results in both a shorter growing cycle and high inheritance of marbling characteristics. The ease of

calving and high-value calf has seen steadily growing interest from dairy farmers over the past two years.



A fully finished F1 Wagyu kiwi cross steer



Product display of Grass-fed Wagyu in a top end retail store in Los Angeles

Progress to date

Over 180 farmers are now involved in the programme with interest in matings this year exceeding expectations. Although the historically high commodity beef price has been challenging in regard to comparative returns, farmers are starting to see the value in securing steadily increasing fixed pricing during a volatile period for commodity pricing across industries. The average

age of cattle at slaughter has been steadily reducing while maintaining, and more recently increasing, the overall meat quality. The marketing of this high-quality grass-fed beef via the Firstlight Go-Direct offices in market ensures maximum value is retained and shared through the value chain.

A successful promotion with a major United Kingdom retailer in late 2014 resulted in a significant commercial contract of Wagyu burgers for the 2015 summer. In the United Arab Emirates, sales are underway through the company-managed distribution facility and retail outlet. Investment in the USA market also commenced this year.

What partnering with the PGP has meant for the co-investors

Partnering with the PGP has enabled the co-investors to proceed with confidence in developing an integrated value-chain for high quality Grass-fed Wagyu beef. Something the farmer shareholders can be proud of and profit from as well.

David Brownrigg, Brownrigg Agriculture joint Managing Director, says that “the Grass-fed Wagyu programme builds on New Zealand’s natural advantage in grass-fed livestock systems at a time when such natural production is sought by the world’s most discerning beef consumers. The PGP is enabling the supply chain building blocks to be put in place for a high value and uniquely New Zealand gourmet food product.”

Gerard Hickey, Firstlight Food’s Managing Director, notes that being involved in the PGP provides confidence to all stakeholders.

“This 7-year programme encourages growth and the long-term investment view necessary to take on the challenges involved,” he says. “The outcomes we are pursuing are transformational. This combination of factors makes for an exciting initiative that we are proud to be involved in.”

REPORT ON THE PGP PORTFOLIO

Governance

The Investment Advisory Panel

The independent Investment Advisory Panel (IAP) comprises six members, including the Chair. It provides expert advice to MPI on the allocation of PGP co-investments and on the progress of each PGP programme. Decisions on PGP investment are made by the Director-General of MPI.

The members of the IAP are:

- Joanna Perry (Chair)
- Kevin Marshall
- Sir Maarten Weavers
- Melissa Clark-Reynolds
- Barry Brook
- Harry Burkhardt

The tenures of Sharon Hunter and Colin McKenzie ended on 31 December 2014. Melissa Clark-Reynolds, Barry Brook and Harry Burkhardt joined the Panel on 1 February 2015. This brought the IAP back up to its full complement of six members, after Jamie Tuuta resigned from the IAP in April 2014.

The IAP met eleven times in the 2014/15 year, totalling eleven days.

Office of the Auditor-General's performance audit

In February 2015, the Office of the Auditor-General (OAG) released an assurance report as part of a performance audit of the PGP. This provided an independent perspective on MPI's administration and implementation of the PGP.

The OAG's overall finding is that MPI is administering the PGP effectively.

The OAG complimented MPI's management of the PGP in a number of areas. For example, it noted that MPI is protecting the public's investment in PGP programmes effectively. It also noted that MPI takes a tailored approach towards setting up and managing partnerships

with industry, which appropriately reflects the diverse nature of the work and people involved in programmes, and fosters trust.

The OAG found that MPI's monitoring and reporting of the progress of PGP programmes enables effective governance. For example, it found that MPI places appropriate emphasis on the accountability of PGP programmes and is prepared to hold industry partners to account for meeting their obligations under PGP contracts.

The OAG noted MPI's strong focus on promoting more engagement with, and between, industry partners, and identifying opportunities to strengthen PGP partnerships.

The OAG made three recommendations to help MPI further improve the transparency and accountability of the PGP, which MPI accepted and has implemented. These are:

- Using a consistent format for quarterly report summaries of PGP programme progress on the MPI website;
- Improving aspects of current documentation of discussions and decisions by the PGP's independent Investment Advisory Panel; and
- Ensuring MPI's work to improve monitoring of the PGP programme portfolio results in reliable tracking and evaluation of long term outcomes and economic benefits.

The OAG's performance audit report provides additional assurance that MPI is administering the PGP well, and its recommendations have enabled MPI to further increase the effectiveness of the PGP.

Independent Progress Reviews

All PGP programmes must have at least one full external progress review during their lifetime to assess their progress towards the programme's goals. These are usually completed approximately halfway through a programme's delivery.

During the 2014/15 year five progress reviews were completed:

- New Dairy Products and Value Chains – Whai Hua;
- Seed and Nutritional Technology Development – PGG Wrightson Seeds;
- Clearview – Ballance Agri-Nutrients Ltd;
- Transforming the Dairy Value Chain – DairyNZ/ Fonterra; and
- Integrated Value Chain for Red Meat – FarmIQ.

These reports confirmed that the programmes are being well managed and are on track to deliver outcomes.

Most of the progress review reports included minor recommendations from the reviewers, such as improvements to reporting. In most cases these recommendations were accepted and adopted by the programmes.

Reports of the review findings are published on MPI's website as they become available.

Programme evaluations

After the completion of each PGP programme an independent evaluation of the programme is commissioned. During the year two programme evaluations were completed, for the Stump to Pump and the STIMBR programmes.

The evaluation report on the STIMBR programme showed that the programme enabled the forestry industry to make significant progress in seeking alternative treatments for methyl bromide and the developing technologies to reduce emissions.

The evaluation report on the Stump to Pump programme showed that the programme successfully completed an analysis of the technical and economic feasibility of

biofuel production in New Zealand using forest residues as a feedstock.

Comprehensive summaries of these evaluation reports are published on MPI's website.

Financial Audits

Industry co-investors must keep appropriate financial records and make them available for audit on request at any time.

Each programme is financially audited at least once during its operation, either by MPI's audit function or external auditors. The overall administration of the PGP is also subject to MPI's regular internal audit programme.

Seven programmes were audited during the year:

- Pioneering to Precision – Ravensdown Fertiliser Co-op;
- Foodplus – ANZCO;
- Stump to Pump – Norske Skog Tasman/Z Energy;
- New Dairy Products and Value Chains – Whai Hua;
- Marbled Grass-fed Beef – Grass-fed Wagyu Ltd;
- Precision Seafood Harvesting – PSH; and
- Seed and Nutritional Technology Development – PGG Wrightson Seeds.

No major issues were identified by these audits. In some instances minor recommendations were made by the auditors and these were all accepted by the programmes.

The audit reports are published on MPI's website.

PGP Finances

The Portfolio

The 2014/15 year started with 17 programmes underway and one programme completed (in June 2014). Through the year two new programmes were contracted, *Passion to Profit* and *Targeting New Wealth with High Health*. The *Stump to Pump* programme was completed during the year.

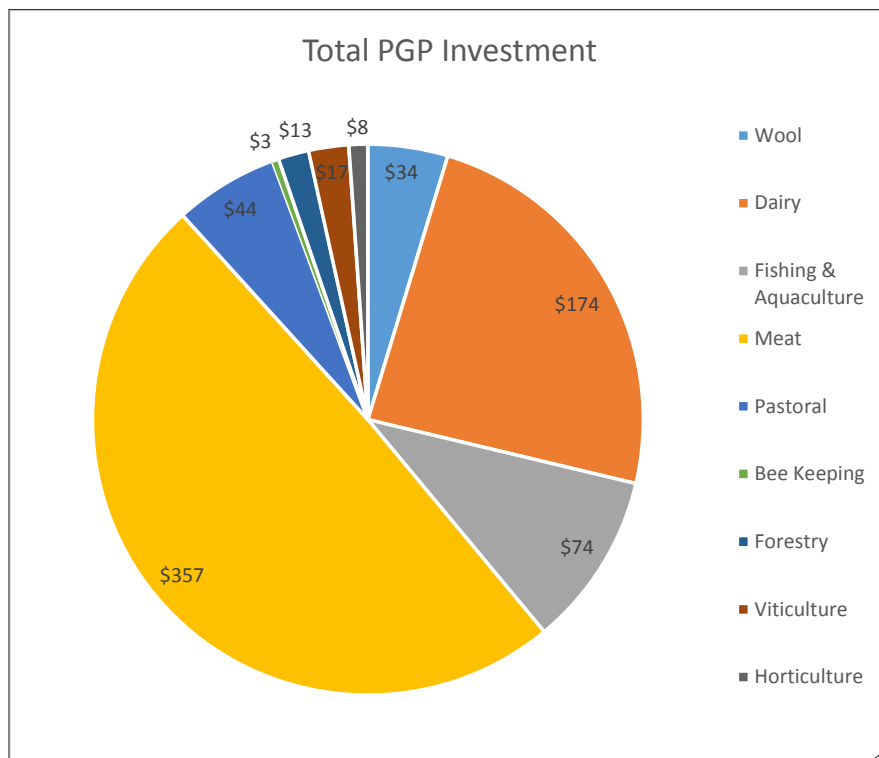
As at 30 June 2015 the PGP Portfolio has 18 programmes underway and two completed. The programmes vary in length from three to seven years.

Committed Funding

As at 30 June 2015 MPI and industry partners have committed \$724 million to 20 contracted PGP programmes, of which the Crown's PGP commitment is \$344 million.

The total investment distributed by sector is shown in the chart below.

20 Contracted Programmes by Sector totalling \$724 million



Funding Paid Out

During the year \$38.5 million PGP funding was paid out to programmes. Crown funding paid out to the programmes up to 30 June 2015 was \$151 million.

Programme	Committed Funding		PGP Investment Paid Out	
	PGP	Industry	2014/15 Financial Year	Total programme to 30 June 2015
Innovative Steep-land Tree Harvesting	3 262 500	3 262 500	675 525	2 372 073
NZSTX – NZ Sheep Industry Transformation	16 770 000	16 770 000	2 254 956	13 947 582
Farm ^{IQ}	59 342 000	91 387 000	8 858 376	46 460 752
Transforming the Dairy Value Chain	84 610 000	85 660 000	9 574 673	48 268 550
High Performance Manuka Plantations	1 400 000	1 487 768	194 330	505 207
STIMBR (Ended June 2014)	1 186 000	1 465 204	161 840	1 184 031
Clearview Innovations	9 750 000	9 750 000	827 934	6 603 042
Precision Seafood Harvesting	24 021 610	24 023 080	3 290 561	7 557 852
Shellfish – The Next Generation.	13 032 452	13 032 452	2 880 203	5 566 611
FoodPlus – Redefining Meat Horizons	38 708 579	38 708 579	1 883 453	5 334 296
Seed & Nutritional Technology Development	7 145 169	7 482 169	1 057 091	2 419 155
Marbled Grass-fed Beef	11 046 562	12 301 466	1 091 244	2 339 375
New Dairy Products and Value Chains	1 947 000	1 947 000	841 664	1 331 287
Stump to Pump (Ended September 2014)	1 810 586	1 810 586	688 844	1 810 586
Red Meat Profit Partnership (RMPP)	32 154 636	32 154 636	2 104 706	2 510 012
Pioneering to Precision	5 174 000	5 174 000	750 013	1 463 233
Lifestyle Wines	8 125 766	8 843 847	1 082 591	1 082 591
NZ Avocados Go Global	4 281 402	4 281 402	295 863	295 863
NZ Deer Industry Passion2Profit	7 392 000	7 992 000	0	0
Targeting New Wealth with High Health	12 500 000	12 500 000	0	0
Totals	343 660 262	380 033 689	38 513 876	151 052 097

2014/15 Audit

The PGP was audited as part of the annual external audit of MPI's financial statements, non-financial performance information, and schedules of non-departmental activities. The auditors found that the PGP met the audit requirements.

