Ministry for Primary Industries
Manatū Ahu Matua

Primary Growth Partnership

Annual Report

2016/17

Growing and Protecting New Zealand

Primary Growth Partnership at a glance

16

Number of programmes underway as at 30 June 2017

6

Number of completed PGP programmes

$759m

Total committed investment by the Ministry for Primary Industries and industry across the life of the 22 PGP programmes

$6.4b

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

60+

Number of organisations involved across the PGP

Contents

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About the Primary Growth Partnership – business-led, market-driven primary industry innovation

The primary industries remain the engine room of New Zealand's economy, contributing more than $38 billion in exports annually.

The Primary Growth Partnership (PGP) is the Ministry for Primary Industries' (MPI's) flagship investment programme. It enables partnerships between MPI and New Zealand's food, beverage, fibre and forestry industries. The aim is growing New Zealand through boosting value, productivity, profitability and sustainability across our primary industries.

As at 30 June 2017, there were more than 60 organisations involved in the PGP programme portfolio. Everyone involved with the PGP is committed to New Zealand's long-term, sustainable prosperity, with MPI and industry currently committing around $759 million over the life of the 22 PGP programmes currently in the portfolio. This is in addition to a significant amount of time, collaboration, expertise, knowledge and effort.

PGP programmes span New Zealand's food, beverage, fibre and forestry industries. The PGP is accelerating change and the combined, collaborative effort is making a difference to our economy. The PGP is independently estimated to contribute around $6.4 billion to New Zealand's GDP from 2025. This represents an estimated 32:1 return on government's investment.

PGP programmes must push the envelope in terms of innovation, rather than simply improving what New Zealand organisations already do. They must stretch thinking and look for newer and better ways of achieving outcomes for the environment, the economy and society.

PGP programmes are delivering value-added products and services, cutting-edge science, research and development, and new technology. What's more, they're building capacity and capability throughout the primary industries; they're helping to protect our environment; they're creating jobs; and they're keeping workers safe.

Investing in PGP programmes provides the opportunity for the primary industries to carry out ambitious, and often risky, innovation programmes that will deliver significant long-term growth. The investment and risk would be too high for an organisation to bear on its own.

As this Annual Report shows, PGP programmes continue to deliver real and tangible benefits for New Zealand's primary industries.

Inside the purpose-built operator's cabin for the tele-operated forest harvester, developed by the Steepland Harvesting PGP programme.

Foreword from Hon Damien O'Connor

I am pleased to introduce the Primary Growth Partnership (PGP) Annual Report for 2016/17.

As Minister of Agriculture, one of my key focuses is ensuring visibility and transparency of the great work being carried out across New Zealand's primary industries.

This report is one of many ways we can get the word out about the work happening around the country through PGP programmes.

The PGP represents a huge investment by the public. As such, an important focus is ensuring this investment is delivering robust outcomes, and that appropriate investments are being made to deliver long-term benefits for New Zealand.

Throughout the year, PGP programmes have made good progress in a number of areas, and their achievements have been profiled publically.

This includes the first harvest of high-value Greenshell™ mussels from a purpose-built hatchery as part of the SPATNZ PGP programme, led by Sanford Ltd.

This is a major breakthrough for the mussel industry because it will mean less reliance on collecting wild spat, which can be highly variable in quality and quantity.

A recent success story is the New Zealand Avocados Go Global PGP programme which aims to triple productivity to 12 tonnes per hectare and quadruple returns to $280 million by 2023.

This programme is tackling the issue of irregular bearing of fruit, the biggest challenge currently facing the industry, and the early signs are very promising.

The avocado industry announced record returns this 2016-17 season with a total crop value of close to $200 million – up from $70 million four years earlier.

Another PGP programme called The Omega Lamb Project has launched Te Mana Lamb™ in a commercial trial throughout New Zealand. This programme aims to create the tastiest, healthiest lamb in the world, and it is now available in a number of top restaurants throughout the country. It was also launched into the Hong Kong market and has attracted glowing reviews.

This report provides many more examples of how PGP programmes are driving innovation in the primary sector, and delivering economic, social and environmental benefits.

The benefits delivered across the PGP portfolio have been enlightening, and we must focus on ensuring programmes deliver innovation activities that benefit New Zealand.

Regards

Hon Damien O'Connor
Minister of Agriculture

Introduction from Martyn Dunne

It is my pleasure to present the 2016/17 Annual Report for the Primary Growth Partnership (PGP).

As this Annual Report attests, it has been another very successful year across the PGP portfolio. There have been many important achievements including the launch of new value-added products, delivery of scientific breakthroughs, and implementation of a range of initiatives aimed at building productivity, profitability and sustainability across New Zealand's food, fibre and forestry industries.

As at 30 June 2017, there were 16 PGP programmes underway, and six completed. These programmes represent around $759 million combined investment committed by MPI and industry partners over the life of the programmes. There are more than 60 organisations involved across PGP programmes.

As at 30 June 2017, there were six proposals which had been approved to progress to business case development.

Welcoming the Sheep – Horizon Three PGP programme

In late 2016 we officially welcomed the Sheep – Horizon Three PGP programme led by Spring Sheep Dairy NZ Limited Partnership to the PGP programme portfolio. Global demand for sheep milk and sheep milk products is growing, which provides New Zealand with greater potential for expansion. The Sheep – Horizon Three PGP programme aims to build a high value and sustainable sheep dairy industry in New Zealand.

Sheep – Horizon Three is creating a fit-for-purpose sheep milk farming system for New Zealand through developing a high performance dairy sheep flock, undertaking market research to determine the market segments that have the greatest profit potential and how to access those markets successfully, and development of new value-added products.

This programme is consumer-led in all aspects of the value chain, from pasture to plate, and will ensure any system is commercially viable, environmentally sustainable and replicable by all New Zealand farmers involved in sheep milk farming. You'll find further information about this PGP programme, including its achievements to date, in this PGP Annual Report.

PGP programmes completed in 2016/17

During 2016/17, four PGP programmes were completed. These were:

- the Whai Hua PGP progamme, led by Wairarapa Moana ki Pouakani Incorporation, Miraka Ltd and Kanematsu New Zealand Ltd, that developed dairy wellness products for health conscious consumers in New Zealand and Asia
- Steepland Harvesting, led by Forest Growers Research Limited (formerly called Future Forests Research Limited), that developed a range of forestry innovations to increase the productivity of forest operations on steep slopes while improving worker safety
- Farm^{IQ}, led by Silver Fern Farms, Landcorp Farming Ltd and Tru-Test Ltd, developed a better understanding of all the factors that make a difference to meat quality, to more consistently deliver great eating experiences for consumers and also lift returns for all parties in the value chain
- The New Zealand Sheep Industry Transformation Project (NZSTX), led by The New Zealand Merino Company, has improved returns for New Zealand's fine and mid-micron sheep wool industry. It has increased the production of market-driven sheep, shifting the balance between New Zealand strong and fine wool production and used product differentiation to generate better grower returns for fibre, meat and other products. It also improved forage, genetic and animal health outcomes for sheep.

Shaping New Zealand's food and fibre future

In November 2016 MPI held the *Shaping New Zealand's Food and Fibre Future Conference*. This conference brought together those working in our food, beverage, fibre and forestry industries, related businesses, media and others to learn about the major trends, developments and challenges facing

these important industries. It also considered how these industries can prepare for the challenges and opportunities that the next 10 to 20 years may bring.

The PGP was front and centre at the conference in the form of the annual PGP Expo, which provided the opportunity to learn more about current PGP programmes, experience – and taste – some of the cutting-edge innovations being delivered by programmes, celebrate achievements and network.

MPI is holding a *Food and Fibre Innovation Conference* on 30 November 2017, themed 'Innovation – from vision to action'. The conference focuses on all aspects of how a business engages across its supply chain, for example, from how it uses inputs, through to how products are processed and consumed or used.

The conference will also discuss the critical role innovation can play in addressing our barriers to adding value and exporting higher value products, for example packaging and distribution, as well as financing and resourcing innovation, and building an ongoing innovation culture.

MPI's intent for the conference is to encourage, celebrate, and catalyse collaboration and innovation across the food, fibre and forestry industries. This includes a broader view of innovation and collaboration, including business models and market innovation. Naturally, given the focus of the conference on innovation, the 2017 PGP Expo will form part of this conference too, this time as an extended lunch event rather than late in the afternoon as in previous years.

Events also were held by a number of PGP programmes during the year to demonstrate and celebrate their progress and achievements. These included Steepland Harvesting, Transforming the Dairy Value Chain and the Red Meat Profit Partnership. Also, the Omega Lamb programme introduced its new TE MANA LAMB™ product to chefs from Auckland, Wellington, Christchurch and Central Otago as well as media, MPI staff and others at an event in Queenstown in late January 2017. TE MANA LAMB™ was also launched in Hong Kong in May 2017 by Prime Minister Rt Hon Bill English.

Innovation on show

The Mystery Creek Fieldays was a highlight of the year. We had a PGP presence on the MPI site, and a number of PGP partners also showcased the products or services developed under their programmes. For example, a new high yield, drought and aphid tolerant brassica called Pallaton Raphno, developed by PGG Wrightson Seeds, under the Seed and Nutritional Technology Development PGP programme, was displayed at the Fieldays. The High Performance Mānuka Plantations PGP programme held a number of free seminars to provide landowners with key information to create sustainable new revenue from on-farm mānuka plantations. With the help and support of our PGP partners from the red meat PGP programmes, we held a unique event focused on showcasing the high-end, quality red meat products they've developed.

NZ Avocado held an event at Parliament in early July 2017 to celebrate the New Zealand Avocado industry's progress toward reaching its goal of quadrupling industry returns through its New Zealand Avocados Go Global PGP programme. In the 2016/17 season the industry reached almost $200 million, well on its way towards its target of $280 million per annum by 2023.

PGP programmes have been regularly recognised at the New Zealand Innovation Awards, with five awards won since 2014.

You will see many more examples of PGP programme achievements in this PGP Annual Report.

MPI's ongoing commitment to PGP

MPI's role continues to be growing and protecting New Zealand. In time we want New Zealand to be the most trusted source of high value natural products in the world. The PGP fits well within this ethos. It aims to sustainably grow New Zealand by enabling partnerships between MPI and New Zealand's food, beverage, fibre and forestry industries to tackle an issue or progress opportunities.

I hope you enjoy reading about all of the PGP programme achievements for 2016/17 in this annual report.

Martyn Dunne
Director-General, MPI

Message from John Parker

Chair, Investment Advisory Panel

My 14 months as Chair of the Primary Growth Partnership (PGP) Investment Advisory Panel has given me a reasonable understanding of PGP programmes including their progress, achievements, challenges and trajectories. It has also enabled me – and indeed my fellow Panel members in conjunction with MPI staff, to see some pattern to what makes some programmes work more effectively than others. This knowledge allows better programme design and governance.

The Ministry for Primary Industries (MPI) and PGP programme partners keep investing time, expertise and funding into programmes, and their optimism for meeting programme objectives and making a positive contribution for the primary industries, and for New Zealand, is praise worthy. Also apparent is the positive progress and outcomes being achieved as a result of the partnership enabled by the PGP. Many programmes bring together those who have not worked together previously – either because there has not been the impetus to, or because they may have been competitors or working in different industries. In a number of programmes there has been a growing realisation that working together will achieve better outcomes for the individual companies, and especially for New Zealand, than if each worked alone. An unintended but very positive outcome in many programmes.

The fundamental point of PGP investment is that it enables MPI and industry to address issues or progress opportunities together – to pool resources and take on challenges and risks that each would not normally risk alone. The outcome has been very positive.

PGP provides a good formula for enabling innovation. Both MPI and industry are putting in funds and both want the best value for money. As you'll see from this PGP Annual Report, and previous ones, PGP programmes continue to deliver benefits across the value chain. It is not simply just the 60 or so organisations involved in PGP programmes that gain benefits from the shared investment. For example, New Zealand red meat and dairy farmers, fine and strong wool growers, the avocado industry, processors and others are benefiting from sharing of best practice across their sectors to lift productivity and profitability; the environment is benefiting from new technologies, initiatives and approaches that are reducing environmental impacts; and consumers are getting new premium products.

Also important are the unanticipated benefits of PGP programmes for the organisations leading PGP programmes. For many, their PGP programme has led to permanent research or development facilities where little such activity previously took place or was minimal. The PGP transformed confidence in the worth of innovation and has also led to the application of such activity to other areas of the business.

There continues to be interest in new PGP programmes in the PGP pipeline. They cover an increasingly diverse range of innovative primary industry ideas. Increasingly it is being appreciated in the wider industry that applications for PGP investment are not limited to established primary industry players. The fact is that any New Zealand organisation may apply for investment provided they are aimed at increasing the economic growth and sustainability of New Zealand's food, beverage, fibre and forestry industries, even if the sector they work in is represented by an existing PGP programme or programmes.

MPI and the Investment Advisory Panel seeks innovation anywhere and everywhere in the chain from production to market. We particularly encourage applications that have a strong or primary focus on the market end of the chain, or at least aim to lessen impediments to getting innovative added value products to the market.

I continue to be impressed by the breadth and depth of PGP programmes and the dedication from those wanting to see these programmes succeed. PGP is a long-term investment in our primary industries, so the benefits will be both over and above what the partners will gain during their programmes, and they

will be felt long after. The innovations enabled by PGP programmes now will serve New Zealand well for the future.

John Parker
Chair, Investment Advisory Panel

Brad Siebert, Biosecurity and Programme Manager for New Zealand Avocado (left), and Bob Major, independent chair for the New Zealand Avocados Go Global Programme Steering Group. New Zealand Avocados Go Global is a great example of a PGP programme connecting a sector, to share best practice and lift productivity and profitability.

Achievements in 2016/17 by current Primary Growth Partnership programmes

Rob Mitchell, Communications Manager for the Transforming the Dairy Value Chain PGP programme (left) and Andrew Fletcher, General Manager External R&D and Portfolio at Fonterra, at the 2016 PGP Expo in Wellington.

CLEARVIEW INNOVATIONS

Ballance Agri-Nutrients is one of New Zealand's largest nutrient management companies. It partners with MPI in the Clearview Innovations PGP programme which is benefiting New Zealand through developing new nutrient and nutrient management products which help farmers increase on-farm productivity, reduce nutrient losses to the environment and improve water quality.

Achievements for the 2016/17 financial year:

- Ballance Agri-Nutrients focused on farmer extension programmes to promote N-Guru™ and SpreadSmart™, and advanced commercialisation of MitAgator™ .
- SpreadSmart™ is an award winning technology for topdressing planes that allows pilots to focus on flying the aircraft while ensuring the fertiliser is applied at the optimum rate, in the right place and avoids environmentally sensitive areas. It was described independently as a "well-designed and rounded solution that cleverly combines positioning, GPS and aviation technology" to improve pilot safety. Customer feedback and reviews show SpreadSmart™ technology is now the standard for all fertiliser applications. A promotion programme for SpreadSmart™ has led to big uptake by farmers in the Wairarapa and King Country.
- The programme developed video case studies to highlight the economic benefits of using N-Guru™. Ballance Agri-Nutrients and the Lakes Primary Producers Collective used these to improve nutrient management in Rotorua. (N-Guru™ is a decision support model that more accurately predicts pasture responses to nitrogen).
- The preferred Route to Market for MitAgator™ has been determined and the Build phase is commencing. (MitAgator™ develops risks maps for individual farms that identify areas where loss of P, N, sediment and bacterial contaminants are more likely to occur). This world-first model spatially represents Nitrogen, Phosphorous, Sediment and E.Coli loss at farm scale. It generates critical information and maps to improve understanding of how to manage farm nutrient losses and helps to prepare farm environment plans, required by some councils.
- MitAgator™ is used by a cross-industry planning group in Southland to support farmers "recalibrating" their farming operation to new regional council nutrient limits. Insights and lessons will be applied in other regions.
- 30 nutrient management workshops were run, reaching over 550 farmers and rural professionals to provide them with practical tools and the confidence to respond to policy changes. The regional workshops, endorsed by DairyNZ, Tatua, the Dairy Women's Network and Fonterra were delivered with regional council and farmer co-presenters, as well as via e-learning modules.

KEY FACTS:

Programme start: October 2011

Length: 7 years

PGP funding: $9.75 million

Industry funding: $9.75 million

Commercial partner: Ballance Agri-Nutrients Ltd

Estimated potential economic benefits to NZ: The latest independent projections estimate the programme will deliver $55 million per annum in economic benefits by 2025

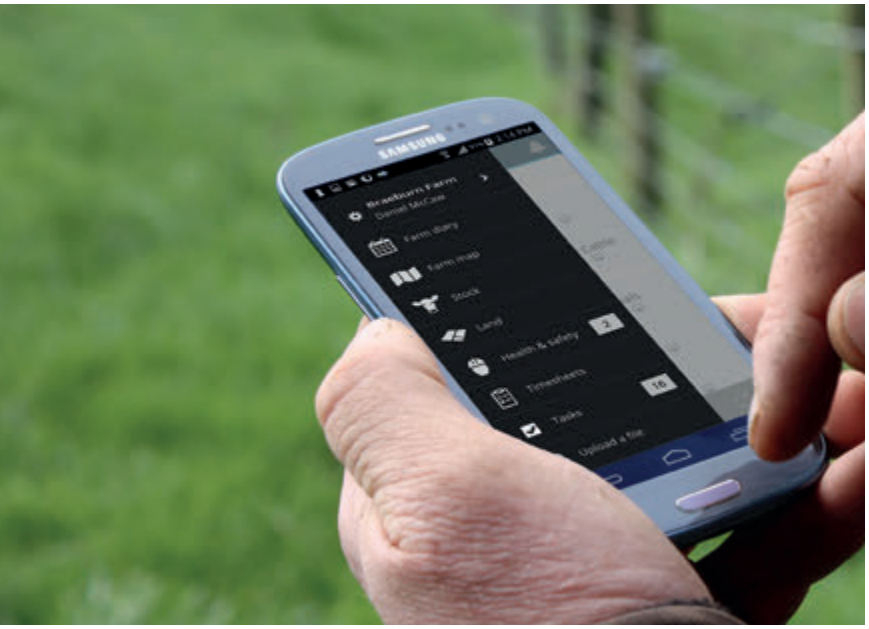
SpreadSmart™ was the winner of the NZ Spatial Excellence Award for Innovation & Commercialisation 2016.

FARM[IQ]
Completed programme

Farm[IQ], owned by Silver Fern Farms and Landcorp, aimed to create a demand-driven, integrated value chain for red meat that could grow the sector by 50 percent by 2025. The programme consisted 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 2016/17 financial year:

- In May 2017 the commercial entity Farm[IQ] Systems Ltd. took on its first additional shareholder. Veterinary Enterprises Limited operates in 25 locations across New Zealand and use the Farm[IQ] software for grazing management and livestock advisory services. Their purchase broadens the ownership of Farm[IQ] and supports the company's position as the central information hub for the pastoral sector.
- The Farm[IQ] software now supports more than 5.9 million stock units being run on 1.4m effective hectares.
- In April 2017, Silver Fern Farms released the findings of the Lamb Eating Quality project work undertaken through the Farm[IQ] programme. More than 3,200 consumer taste tests were conducted on over 23,000 samples of lamb, both in New Zealand and the USA. The work showed that the eating quality of New Zealand lamb is generally good and the results will be used to ensure that this standard is maintained as farmers breed for increased productivity traits.
- Silver Fern Farms have achieved premium value-add sales of $68 million for the 12 months ending June 2017, which is built on several years of double-digit growth as a result of the marketing work undertaken through the Farm[IQ] programme.
- Farm[IQ]'s software development capability was called on to help run a pilot for the Sri Lankan Government, which not only assisted with trade relations but also demonstrated the adaptability of the Farm[IQ] software platform.
- Following proof of concept work in the early part of the Farm[IQ] programme the use of Genotyping by Sequencing (GBS) technology is now expanding rapidly. The New Zealand deer industry switched entirely to GBS this past year and some 38,000 deer samples have been genotyped.
- The programme formally finished on 30 June and is now in closedown phase completing the programme's final report.



Farm[IQ] provides information at farmers' fingertips.

KEY FACTS:

Programme start: November 2010

Programme completed: June 2017

PGP funding: $59.34 million*

Industry funding: $91.39 million*

Commercial partners: Silver Fern Farms,Landcorp and Tru-Test Ltd

Estimated potential economic benefits to NZ: $593 million per year by 2025

*The final programme cost and PGP investment were still being compiled at the date of publishing of this annual report

FOODPLUS

FoodPlus is generating more value from the red meat carcase and developing new and innovative uses for lower value parts of the animal carcase. There are three streams in the programme, focussing on food products, ingredients and healthcare.

Achievements for the 2016/17 financial year:

- ANZCO Foods developed two key prototype products for use in retail food service, working closely with the customer and their end-consumers. The products are currently being trialled.
- ANZCO joint venture company, Taranaki Bio-Extracts, developed a gel stock ingredient for food products that has good eating qualities. It is developed from grass-fed stock so will be ideal for paleo and natural diets.
- The FoodPlus PGP programme, led by ANZCO Foods, has enabled the creation of twelve new jobs following the recent introduction of a plant at Taranaki Bio Extracts (TBE). TBE is a joint venture involving ANZCO Foods and Taranaki By Products. The new plant and associated products are creating exciting opportunities and enabling TBE to attract people to Taranaki from outside the region.
- ANZCO's Biotissues unit has achieved all relevant international accreditations allowing it to deal with a wide range of markets and customers. The products developed under FoodPlus have reached a scale of business that now requires ANZCO to develop a purpose-built facility.
- As a result of increased demand two more ANZCO sites are now collecting blood and undertaking primary processing for products developed in the FoodPlus programme.
- ANZCO has taken full ownership of the blood company Bovogen that was previously a joint venture business. Bovogen has introduced ANZCO to a range of new product and business opportunities for the FoodPlus programme.

KEY FACTS:

Programme start: November 2012

Length: 7 years

PGP funding: $29.10 million

Industry funding: $29.10 million

Commercial partner: ANZCO Foods Ltd

Estimated potential economic benefits to NZ: Approximately $200 million increase in GDP per annum by 2025

Food technologists at Taranaki Bio Extracts are developing a range of culinary ingredients in the FoodPlus PGP programme.

HIGH PERFORMANCE MĀNUKA PLANTATIONS

Demand for mānuka honey and products is growing. The industry is constrained by supply issues, including the unpredictability of honey yield and quality across growing regions, mānuka blocks and seasons.

This PGP programme focuses on moving mānuka honey production for medical use from wild harvest to science-based farming of mānuka plantations. Combining improved genetics with optimum husbandry practices could enable significant gains for New Zealand's mānuka honey industry.

Achievements for the 2016/17 financial year:

- Mānuka Farming New Zealand (the commercial arm of Mānuka Research Partnership (NZ) Limited) is providing a commercial consultancy to land owners wishing to plant mānuka for medical grade mānuka honey which includes expertise from beekeepers and forestry and financial experts.
- An eco-sourcing service is being developed and trialled by Mānuka Farming New Zealand to complement the existing high performing mānuka cultivar range. The nectar sampling protocol developed in the programme is part of this service.
- Sales targets were met for high performing mānuka seedlings for planting in 2016 and 2017.
- Honey was harvested from the four main trial plantations in 2016/17. However, no honey was graded as mānuka honey, due to unfavourable weather affecting flowering and bee activity, and immature plantations not yet dominating nectar sourced from surrounding pasture species.
- A predictive tool for plantation mānuka has been developed and is being tested. It is a decision support tool that can deliver detailed reports on the performance of potential mānuka plantations.
- Mānuka Farming New Zealand had a stand at the Central and National Fieldays, held seminars involving industry and research experts, and attended by iwi, regional councils and the farming community.
- An independent progress review of the programme found that good progress has been made. The high quality information from the programme is helping guide more informed investment in plantation mānuka. The reviewer made recommendations to help the programme meet its goals, and all have been accepted. This includes re-estimating the long term benefits anticipated by the programme.

Flowering mānuka

KEY FACTS:

Programme start: March 2011

Length: 7 years

PGP funding: $1.40 million

Industry funding: $1.58 million

Commercial partner: Mānuka Research Partnership (NZ) Limited (MRPL)

Estimated potential economic benefits to NZ: Lifting the mānuka honey industry by an additional $1.125 billion per year by 2028

LIGHTER WINES

The Lighter Wines PGP 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 one in the world for naturally produced, high quality, lower alcohol and lower calorie 'lighter' wines. It aims to capitalise on the domestic and international market demand for these wines.

Achievements for the 2016/17 financial year:

- The programme has continued to undertake and complete research into the production and markets of lighter wines, with over 90 research papers and reports completed to date.
- World leading research has shown the impact of alcohol levels on the sensory characteristics of wine and this is guiding the considerations by winemakers of lighter wines.
- The winery companies involved with the programme have continued to increase production of lighter wines using the methods developed or refined by the programme. This saw an increase in the number of commercial releases of lighter wines that contributed to a growing domestic lighter wine category that now exceeds $33 million p.a.
- The quality of the lighter wines produced has continued to improve, which was reflected in an increasing proportion of the lighter wines produced receiving medals and awards. Two of the wineries received awards at the 2016 New Zealand Food Awards for their 2016 lighter wines:
  - VNO Lighter, Business Innovation Award
  - Villa Maria Lighter Rosé, Beverage Award
- Market research and monitoring of export markets continues to show significant and growing consumer demand for lighter wines in a number of markets.
- A financial audit and progress review were undertaken that identified good financial management and progress being made.

Stoneleigh™ Marlborough's Lighter Sauvignon Blanc.

KEY FACTS:

Programme start: March 2014

Length: 7 years

PGP funding: $8.13 million

Industry funding: $8.84 million

Commercial partner: NZ Winegrowers and 18 contributing wineries

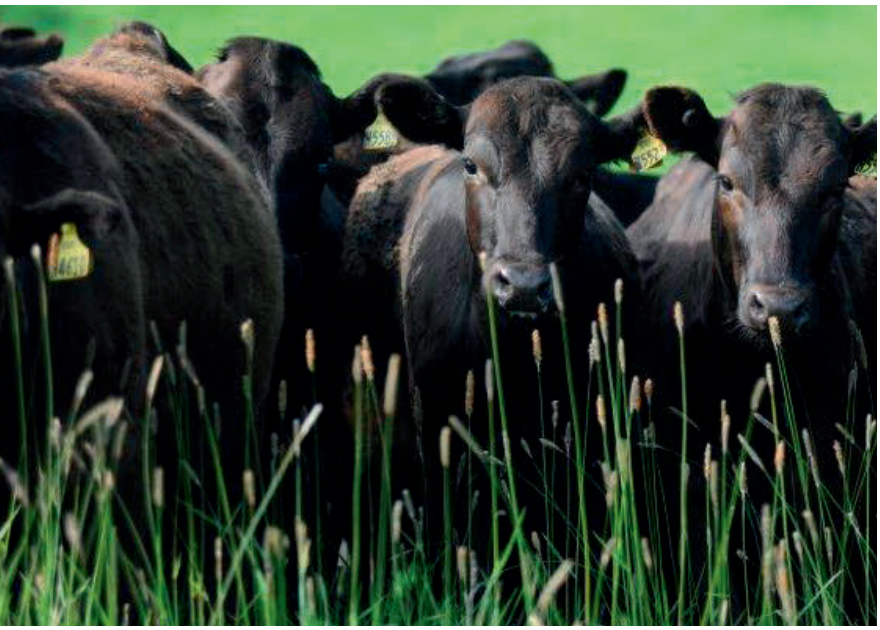
Estimated potential economic benefits to NZ: $285 million per annum by the end of 2023

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 marbled grass-fed beef in the world.

Achievements for the 2016/17 financial year:

- Mating numbers for the 2016 calendar year were over 32,000, up from 25,000 the previous year. Dairy matings accounted for over 80 percent of these.
- Securing the long-term supply of Wagyu x Dairy calves received a boost in 2016 with the signing of an agreement with Livestock Improvement Corporation for the supply of calves from the dairy industry.
- The wagyu model continued to deliver significant calf premiums to breeders from the dairy industry.
- Year round supply of animals for processing was maintained.
- Farmer returns have continued to exceed prime steer prices despite a historically high beef schedule.
- The new retail range of products was successfully launched in the New Zealand market with a corresponding lift in sales.
- The total number of farms in the programme grew to 298. Of the 298 farms 49 farms are Producer Group shareholders with 8 new shareholders having joined in 2017 and an additional 48 farms are viewed as potential shareholders. The remaining 201 farms are dairy related operations mainly in the Waikato, lower North Island and Canterbury regions. The geographic spread of Producer Group shareholders and potential shareholders is provided below. The South Island now represents a third of farm numbers in the programme.
- A Regional Producer Group Hub has now been established in Canterbury and another is coming together in Southland, adding to those existing in the Lower North Island, Central North Island, the East Coast and Northland.
- An initial USA retail range has been developed and value-added sales are increasing.



KEY FACTS:

Programme start: August 2012

Length: 7 years

PGP funding: $11.05 million

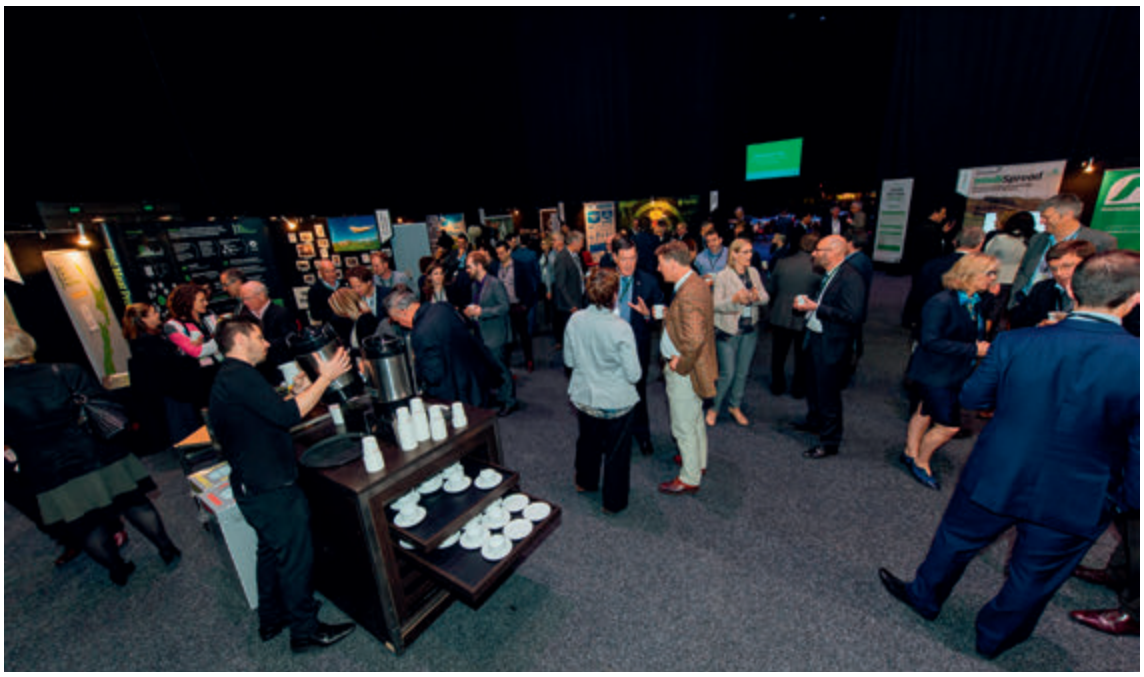
Industry funding: $12.30 million

Commercial partners: Firstlight Foods Ltd, Brownrigg Agriculture Group Ltd

Estimated potential economic benefits to NZ: $95 million per year by 2025

The Marbled Grass-fed Beef PGP programme aims to supply the best marbled grass-fed beef in the world.

CASE STUDY:
Market success through innovation



A scene from the 2016 PGP Expo. PGP Expos are a key way of bringing together like-minded people passionate about innovation, and seeing and tasting some of the innovative products on offer.

Due to our relatively small population compared with many other countries, and our isolated location on the edge of the South Pacific, New Zealand has for many years relied on its own ingenuity and self-sufficiency to supply food and resources. Much of our future prosperity as a nation is underpinned by the success of our primary industries, but our natural resources alone won't guarantee our future prosperity – New Zealand needs to continue to innovate in a sustainable way to ensure our people, animals and environment flourish well into the future.

The Primary Growth Partnership (PGP) has enabled significant advancement of innovation across New Zealand's primary industries. Science, research and development have played an important part in PGP programmes. These are leading to new breakthroughs across the value chain, from pasture to plate, with many driven by what markets are demanding.

Steve Penno, PGP Manager at the Ministry for Primary Industries (MPI), says a number of PGP programmes have a market component – researching what consumers and markets want, and using this intelligence as a basis for developing new innovative products.

"The PGP aims to grow the value of primary industries," says Steve. "At its core PGP is boosting the productivity, profitability and sustainability across the different sectors in our primary industries, and new innovative products form a key part of this."

"By taking a market or consumer-led approach, PGP programmes are developing a range of new and innovative products. Combined with their consumer research, this shows what will appeal to markets. Products developed by PGP programmes range from new tools, services and products for farmers and growers, through to new premium food and beverage products with key points of differentiation."

A number of PGP programmes are already seeing market success domestically and overseas. For example, the Sheep – Horizon Three PGP programme has launched a range of premium chewable calcium tablets for kids, which places New Zealand sheep milk square in the high value pharmacy category, while at the same time telling a uniquely New Zealand story.

"A key emphasis of the Sheep – Horizon Three programme is to be consumer-led in all aspects of the value chain," says Nick Hammond, Chief Operating Officer of Spring Sheep Milk Co., the company leading the programme. "To successfully create a sustainable sheep milking industry delivering high-value products with multi-market appeal, a consumer-led approach is critical. This will also help to avoid over-exposure to any one market or getting caught in the volatility of commodity pricing."

In addition to consumer research in markets such as Korea and Taiwan, Spring Sheep Milk Co. wanted to delve a little deeper, to get a first-hand look into the types of products consumers prefer and what influences their choices.

"We called this our 'personal shopper experience', where we spent time with consumers to observe their shopping habits and understand why they'd choose one product over another," says Scottie Chapman, Chief Executive of Spring Sheep Milk Co. "This was a really effective way of getting better insights into consumer behaviour, and wouldn't have been possible without PGP investment.

"We found there's a vast difference in opinions and viewpoints in the Korean market from what we had initially thought. Importantly, it showed that we shouldn't underestimate the importance of food safety and country of origin."

The most recent achievement in the programme was in late July 2017, when Spring Sheep Milk Co. and Vietnamese pharmaceutical company Viet Ha Pharma Corp signed a Distribution Agreement for New Zealand sheep milk products developed under the Sheep – Horizon Three PGP programme.

The Distribution Agreement will see nutritional New Zealand sheep milk products imported into Vietnam, and provide New Zealand with a first mover advantage into this lucrative market of 90 million people.

Nguyen Minh Son, General Director of Viet Ha Pharma Corp (left), and Scottie Chapman, Chief Executive of Spring Sheep Milk Co., at the signing of the Distribution Agreement.

"We're aiming to launch into the Vietnamese market in November 2017, with our range of calcium tablets and a probiotic milk drink," says Scottie. "Key to this will be ensuring consumers know about the digestibility benefits of sheep milk, and providing them with a dairy alternative."

The Omega Lamb PGP programme, led by Alliance Group and a group of 50 high country farmers at Headwaters New Zealand, launched TE MANA LAMB™ earlier this year in selected high end restaurants in New Zealand and Hong Kong. TE MANA LAMB™ is rich in polyunsaturated and healthy Omega-3 fats. The Omega Lamb programme had recent success with award-winning food home delivery company, My Food Bag, offering TE MANA LAMB™ to its customers, and a win at the 2017 Innovation in Food and Beverage Category.

"We're constantly scouring the market for top quality, locally produced ingredients to help New Zealanders put great meals on the table," says Nadia Lim, co-founder and dietitian at My Food Bag. "TE MANA LAMB™ is tender, delicious and a great option for a healthy meal."

TE MANA LAMB™

"The Omega Lamb programme has been identifying and understanding target consumers in New Zealand and other western markets, and 'new wealth' in markets such as China, India and Brazil," says Mike Tate, General Manager of the Omega Lamb programme. "This was backed up by multiple taste panels, which included leading New Zealand chefs. These clearly demonstrated the support for TE MANA LAMB™."

The Transforming the Dairy Value Chain PGP programme, led by commercial partners including DairyNZ and Fonterra, has enabled a number of significant outcomes for the dairy industry from paddock through to production, including the development of new, cutting-edge products.

Andrew Fletcher, General Manager External R&D and Portfolio at Fonterra, says there have been a large number of wins for the dairy industry, as a result of the Transforming the Dairy Value Chain PGP programme.

"This programme has enabled us to accelerate our thinking, and develop innovative and value-added products," says Andrew. "These include supporting the scientific research that led to the development of quick-service mozzarella used in Pizza Huts around the country and now topping half the pizzas in China. This mozzarella is produced in six hours, a fraction of the traditional six weeks – thanks to product advances enabled by the Transforming the Dairy Value Chain PGP programme."

Under this PGP programme, Fonterra's research on the cognition benefits of gangliosides has provided a point of difference for its Anmum range of infant formula. Gangliosides are complex lipids in human breast milk believed to aid cognitive development in new-borns and toddlers. This research earned Fonterra the 2016 Innovation in Food and Beverage Award at the New Zealand Innovation Awards.

The programme has also supported the science that led to new advances in UHT beverages and whipping creams. For example, it researched how to ensure cream is able to remain stable in liquid form throughout the supply chain, be easily and quickly whipped to incorporate a large volume of air, and then remain stable in the form of attractive cake decorations for more than 24 hours.

Fonterra's General Manager, Nutrition, Angela Rowan with the 2016 NZ Innovators Award for Food and Beverage for the co-op's research into paediatric nutrition.

"The PGP programme has enabled us to build a multi-organisational team that has brought together expertise

in material science and polymer physics alongside our more traditional strengths in dairy chemistry and food engineering," says Andrew.

"Value-add products developed on the back of science undertaken by Transforming the Dairy Value Chain are now being exported, with the support of Fonterra's 56 chefs working in around 50 countries as part of its Anchor Food Professionals team. These chefs, some from Michelin Star restaurants, partner with local chefs in-market to showcase key products, and how they can benefit a business.

"Recently, Fonterra won the 2017 ExportNZ Supreme Award for Auckland and Waikato for its food service vision and strategy. Science enabled by Transforming the Dairy Value Chain has been a core component in the development of many of the products that define this strategy."

Steve Penno says PGP investment doesn't just focus on enabling food and beverage products.

"PGP programmes are developing a range of commercial products to help on-farm, such as the Farm^{IQ} Farm Management System, an online farm information hub that connects farmers more directly with their processor and consumers, as well as helping them to drive farm performance.

"Two other PGP programmes, Pioneering to Precision, led by Ravensdown Fertiliser Co-op Limited, and Clearview Innovations led by Ballance Agri-Nutrients Ltd, are developing products to improve productivity on-farm and reduce fertiliser wastage and losses to the environment. For example the Clearview Innovations PGP programme is developing, MitAgator^{TM}, a decision support tool to help farmers reduce nutrient and sediment runoff into water ways. The Pioneering to Precision PGP programme seeks to improve fertiliser practice on hill country farms through remote sensing of the nutrient status of the farms, to determine where nutrients should be targeted. GPS-guided aircraft can then deliver fertiliser to targeted areas of the farm.

"A further example is a new brassica, developed by PGG Wrightson Seeds under its Seed and Nutritional Technology Development PGP programme. It's called Pallaton Raphno, and was developed to enable New Zealand farmers to grow forage in increasingly challenging environments."

Pallaton Raphno's traits include high forage yields (allowing for multiple grazing) and drought and aphid tolerance.

"PGP programmes are developing value-added commercial products, with key points of differentiation, and researching and tapping into opportunities where there is likely to be market demand," says Steve.

"The joint investment in time, effort and funding from MPI and industry partners enabled by PGP is providing the catalyst for the primary industries to extend past business usual, into innovation that otherwise would not have happened. This will have long term benefits for our primary industries and the New Zealand economy."

PGP programmes are developing products to improve productivity on-farm, reduce fertiliser wastage and losses to the environment.

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. This is a five year programme with a vision that by 2023 an integrated New Zealand avocado industry will deliver NZ$280 million annually in net sales and have tripled productivity to 12 tonnes per hectare.

Achievements for the 2016/17 financial year:

- New Zealand's avocado industry has achieved its best season ever reaching a record breaking industry value of over $200 million from 7.9 million trays – well on track to delivering the 2023 targets of the New Zealand Avocados Go Global programme. Industry yields are the highest on record with industry Orchard Gate Returns also increasing by 60 percent compared to the previous season.
- The industry continues to see greater numbers of best performing orchards with survey's showing that 70 percent of growers have changed orchard practises over the past two years as a result of new information. This is evidenced by the more than 800 avocado growers now attending industry field days, workshops and training events every year.
- The programme and its supply chain partners continue to investigate enhancements to industry export compliance systems and Information Technology solutions to manage industry data, communications and the many commercial relationships across the industry. Collaborative working groups have been formed across industry to improve both pre– and post-harvest quality systems and shape industry research. Orchard performance benchmarking is also helping to target industry communications to specific growers and regions.
- The industry is now working more closely with exporters, allowing better market insights and assisting to develop strong digital marketing programmes across priority Asian markets. The development of local language websites, social media promotions and the creation of targeted collateral and campaigns has resulted in significant visibility across all priority markets. The New Zealand market has continued to perform, with increased per-tray values compared to previous similar volume seasons, supported by engagement with marketers, retailers and consumers. Digital advertising now reaches more than 1 million consumers per month, driving over 10,000 people per month to the industry website for delicious recipes and education on avocados.
- An independent progress review of the New Zealand Avocados Go Global programme conducted during the year concluded that the programme has made a major contribution to the industry allowing it to achieve a step change in the way the industry operates, by becoming more trusting, collaborative and coordinated with a correspondingly greater public profile.

KEY FACTS:

Programme start: June 2014

Length: 5 years

PGP funding: $4.28 million

Industry funding: $4.28 million

Commercial partner: Avocado Industry Council

Estimated potential economic benefits to NZ: Equipping the industry with the tools to triple productivity to 12 tonnes per hectare and quadruple industry returns to $280 million per annum by 2023

Collaborative industry field days and dedicated working groups of growers and rural professionals are proving to be a valuable approach for developing and communicating best practice across industry.

OMEGA LAMB

This PGP programme aims to add $400 million to New Zealand's red meat sector by taking a new approach to naturally breeding, raising, processing and marketing premium New Zealand lamb. The Omega Lamb programme targets premium markets with a new type of lamb that has higher levels of polyunsaturated (good) fats and Omega-3 fatty acids – producing healthier sheep, and healthier, tastier, more succulent meat.

Achievements for the 2016/17 financial year:

- The first product from the programme, TE MANA LAMB™, was launched in market trials with 17 New Zealand restaurants and 14 Hong Kong restaurants. TE MANA LAMB™ is achieving a significant premium to standard New Zealand lamb.
- Critical acclaim for TE MANA LAMB™ from leading chefs clearly positions it as a "hero" product from the lamb industry. A TE MANA LAMB™ dish won the silver medal in the Culinary Olympics in Germany in October 2016.
- The differentiating characteristics of TE MANA LAMB™ that the market is identifying include a delicacy and lightness in mouth feel and a mild aroma. The product has outstanding succulence, tenderness and flavour.
- An on-pack "Source of Omega-3" claim has been validated for key high value lamb cuts.
- Direct to consumer retail packs with an Omega-3 source label claim have been developed and are in market evaluations in association with the award-winning home delivery service My Food Bag.
- Farm systems targets, resulting in low pH, high intramuscular fat and Omega-3 composition, have been met and 32,000 animals produced – exceeding the programme's target.
- 79 new rams have been progeny tested for Omega-3 and other consumer characteristics and breeding values for consumer traits calculated for over 10,000 breeding animals.
- Analysis of over 10,000 ewe records has confirmed that breeding objectives incorporating "good fats" is synergistic with breeding "high condition" ewes better able to thrive and produce in hill and high country.
- A core 17 farmer pilot group has been established and is working closely toward shared programme goals and delivering efficient production systems.
- 800 rams were bred to Omega Lamb programme specifications and mated on-farm to produce lambs for 2018.
- On-farm and in-plant individual traceability has been established.
- On-farm assurance for antibiotic free, grass fed, GMO free product has been established.
- In plant, on-line measurement of key quality attributes (pH, intramuscular fat and Omega-3) are installed and calibration is in progress.

KEY FACTS:

Programme start: July 2015

Length: 7 years

PGP funding: $12.50 million

Industry funding: $12.50 million

Commercial partners: Alliance Group and Headwaters New Zealand

Estimated potential economic benefits to NZ: $400 million NPV (net present value)

TE MANA LAMB™ was the centrepiece of the New Zealand Culinary Olympics team's main dish, which won a silver medal in the coveted live hot kitchen competition in Germany last year.

PASSION2PROFIT

The Passion2Profit programme 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, lifting productivity and by better aligning supply and demand.

Achievements for the 2016/17 financial year:

- The collaborative marketing effort to promote Cervena™ venison in non-seasonal markets is showing signs of success. The second year of a trial in Belgium and the Netherlands, which included Silver Fern Farms, Alliance and Firstlight Foods, has led to sales of chilled venison during the European spring and summer that achieved average premiums of $3.70/kg over frozen product. This trial has been extended for a third year and will include a fourth company, Duncan New Zealand.
- Silver Fern Farms and Alliance have also commenced trials in the German food service channel over the northern hemisphere summer, and work is also continuing in China as part of new market development activity.
- The single standard for farm quality assurance for deer farming, which has been integrated into the Red Meat Profit Partnership Farm Assurance Programme, was implemented and is a requirement to supply deer for the Cervena™ programme.
- The success of the Advance Parties (on-farm practice improvements) has continued, with the number of established Advance Parties growing to 25 and having involvement from over 250 deer farmers. The results of a survey in 2016 of Advance Party members showed that the longer they had been a member of an Advance Party, the more likely they were to make a change to their on-farm practice.
- Regional Workshops also commenced during the 2016-17 financial year, with over 300 attendees across 11 workshops led by an Advance Party in partnership with the local branch of the NZ Deer Farmers Association. These have allowed the learning from the Advance Parties to be extended to a wider audience within the deer farming community.

Lindsay Patton, Farm Manager at Orari Gorge Station in South Canterbury.

KEY FACTS:

Programme start: June 2015

Length: 7 years

PGP funding: $7.39 million

Industry funding: $7.99 million

Commercial partners: Deer Industry New Zealand, New Zealand Deer Farmers Association, Alliance Group, Duncan New Zealand Ltd, Firstlight Foods, Mountain River Venison and Silver Fern Farms

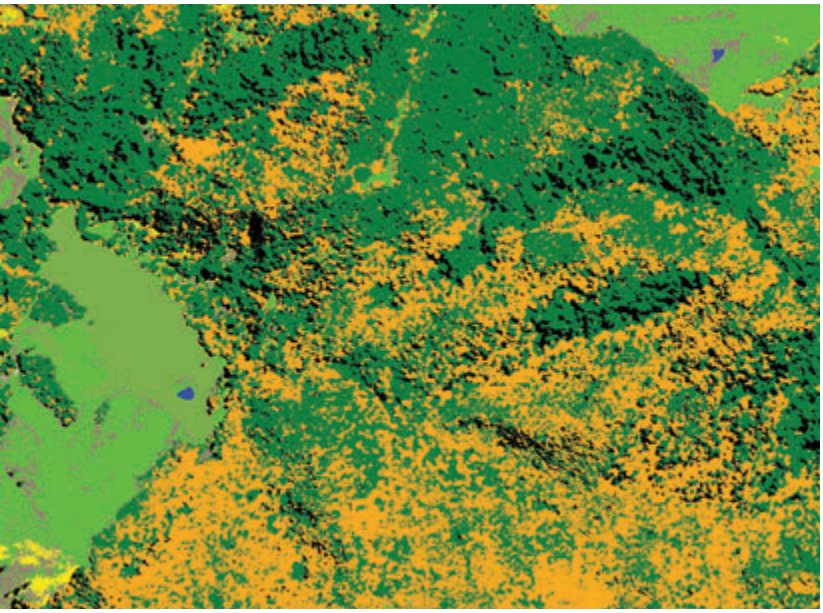
Estimated potential economic benefits to NZ:
The programme aims to deliver economic benefits of up to $56 million a year in additional industry revenue by 2022

PIONEERING TO PRECISION

As a farmer-owned co-operative, Ravensdown is here to enable smarter farming for a better New Zealand. It strives to achieve this by providing products, expertise and technology to help farmers reduce environmental impacts and optimise value from the land. The Pioneering to Precision PGP programme seeks to improve fertiliser practice on hill country farms through remote sensing of the nutrient status of farms, enabling improved decisions and application of fertiliser with precision technology.

Achievements for the 2016/17 financial year:

- The programme has assembled the most comprehensive dataset taken in New Zealand for the purpose of developing remote sensing technology to identify nutrient requirements across New Zealand hill country farms. This dataset includes 8,052 soil and 7,280 plant tissues samples analysed for nutrient content.
- Results correlating pasture nutrient levels to remote sensing data suggest very robust calibrations are achievable. Calibrations between underlying soil fertility and remote sensing data are now the focus of the programme with these calibrations undergoing validation in the field.
- The programme has developed leading decision support software capable of handling soil fertility predictions at the high resolution that remote sensing is able to achieve, and incorporating this information to produce tailored fertiliser recommendations for hill country farms. The software output is currently being evaluated and refined on the programme's focus farms.
- Additional focus farms, Moana Station (Waikouaiti) and Bog Roy Station (North Otago) were incorporated into the programme. These farms joined Patitapu Station (Wairarapa) and Ohorea Station (Raetihi) in demonstrating how these new precision tools can be successfully integrated and add significant value into their farm businesses.
- An independent technical review of the programme was conducted by international experts. The review concluded there was great potential to increase the profitability of New Zealand hill farms through the development of robust remote sensing algorithms to predict soil fertility (and ultimately fertiliser recommendations). The review said "The project team has gathered an impressive and relevant dataset and made good progress in modelling and explaining the variation within it." Recommendations for further development and validation of algorithms were also made and these have been incorporated into the programme.



KEY FACTS:

Programme start: October 2013

Length: 7 years

PGP funding: $5.18 million

Industry funding: $5.18 million

Commercial partner: Ravensdown Fertiliser Co-op Ltd

Estimated potential economic benefits to NZ: Additional export earnings of $120 million per annum by 2030 and a net economic contribution of $734 million to New Zealand's economy from 2020 to 2050

Remote scanning technology developed by the Pioneering to Precision PGP programme precisely identifies effective areas of vegetation on farms in one fly-over. For example, in the map shown, pasture is identified light green.

PRECISION SEAFOOD HARVESTING

Precision Seafood Harvesting (PSH) is a collaboration between three of New Zealand's largest fishing companies, Moana NZ, Sealord and Sanford. These companies share a desire to improve the sustainability performance of commercial fishing methods. Their investment into PSH technologies is intended to deliver better quality seafood and reduce the impact that the harvesting of wild caught fish has on unintended catch such as juvenile fish and by-catch species by increasing overall survivability of any interaction with the Modular Harvest System (MHS) nets developed by the programme.

Achievements for the 2016/17 financial year:

- New light weight, high strength materials successfully incorporated into the Modular Harvest System (MHS) construction. These new construction materials offer significant advantages in terms of ease of use by the crews, durability and reduced repairs and maintenance over the older PVC construction.
- Installation of at-sea fish handling systems for inshore vessels to improve the survival opportunity for unwanted inshore species being returned to sea. The first installation was on-board the Sanford vessel "Ana" and this has been showcased with its inclusion as a part of the recent Seafood NZ video for innovation in the seafood sector.
- Price premiums achieved for limited consumer and high end restaurant trial quantities of "Tiaki" fish at the highest quality level for fresh fish and equivalent to line caught fish quality specifications. Limited supplies of whole Tiaki fish are being made available in the Auckland Seafood Market.
- Development of equipment, methods and protocols required to validate the sustainability performance of the MHS for regulatory purposes. PSH has broken new ground, not just in the development of technology, but also in the steps required for regulatory approval. Many of the methods and protocols being used to measure PSH performance had to be created from scratch and approved in their own right.
- Successful validation trials of the deepwater MHS designs. In June 2017 PSH passed a significant milestone for the programme when it completed the validation testing for the larger design MHS intended for use on deepwater species (such as hoki).
- Inshore validation trials have been completed and the validation process for the smaller design MHS intended for use on inshore species (such as snapper) is underway.
- Continued growth of technology uptake in numbers of new vessels and scope of technology applications in existing test vessels. While PSH is growing the number of vessels that have use of the new technologies it is also expanding the level of understanding within the more experienced test crews of how to make the best use of the new technologies. This secondary "R&D" phase is gaining in momentum as crew expectations for fish quality and optimal handling systems are raised.

KEY FACTS:

Programme start: April 2012

Length: 7 years

PGP funding: $24.02 million

Industry funding: $24.02 million

Commercial partners: Moana New Zealand, Sanford and the Sealord Group

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

A "fish eye" view of the Plant and Food Research science team from the Modular Harvest System.

RED MEAT PROFIT PARTNERSHIP (RMPP)

RMPP's objective is to improve knowledge sharing among sheep and beef farmers to support best practice, drive sustainable productivity improvements and deliver higher on-farm profitability. RMPP brings together nine industry partners that are investing alongside the Ministry for Primary Industries. Projects focus on farmer-centred extension design, supported by people and capability development, and data and systems.

Achievements for the 2016/17 financial year:

- The extension design pilot's positive first year evaluation of over 70 farm businesses showed that successful on-farm change happens when: farm teams are connected in small groups supported by trusted experts who provide confidence to action ideas; and effective measuring and monitoring is established to inform better decisions. These results confirmed RMPP's extension model. Farmers, rural professionals and industry influencers workshopped RMPP's proposed national extension system based on this model, which is now nearing launch.
- The Knowledge Hub, which will support farmer adoption of new knowledge and technology, is being developed. The creation of interactive learning modules began following user-trials.
- RMPP trials for the electronic version of the Animal Status Declaration (eASD) involving suppliers and a processor began proving efficiency gains and improved data accuracy.
- RMPP workshops for rural professionals explored the need for resources and training to equip the sector for future growth. Facilitation training to support the national extension rollout began.
- RMPP-commissioned education resources to increase awareness and interest in agricultural career opportunities were taken-up by over 80 secondary schools.
- About 380 women participated in Understanding Your Farming Business workshops equipping them to contribute to farm business management.
- RMPP launched a series of computer courses called Getting Started and Using Farm Data to help farmers gain and improve their IT skills.
- Over 100 TeenAg Clubs, with over 2000 members, is a secondary school version of Young Farmers that is part-funded by RMPP.
- The NZ Farm Assurance Programme (NZFAP) is in full implementation mode with 12 companies due to start with the programme by the end of 2017.
- NZFAP was launched to support the Red Meat Story designed to maximise product returns through high customer confidence in the New Zealand supply chain.
- Nine core Key Performance Indicators (KPIs) have been agreed on by industry as being important for farming businesses. How these KPIs are calculated has also been agreed on so that when people are comparing KPIs, they will be using the same calculations.

KEY FACTS:

Programme start: November 2013

Length: 7 years

PGP funding: $32.15 million

Industry funding: $32.15 million

Commercial partners: Alliance Group, ANZ Bank, ANZCO, Beef + Lamb New Zealand, Blue Sky Meats, Greenlea Premier Meats, Progressive Meats, Rabobank, and Silver Fern Farms.

Estimated potential economic benefits to NZ:
By 2025, red meat farming will be earning up to $880 million per annum more revenue and $194 million per annum additional on-farm profit, before tax

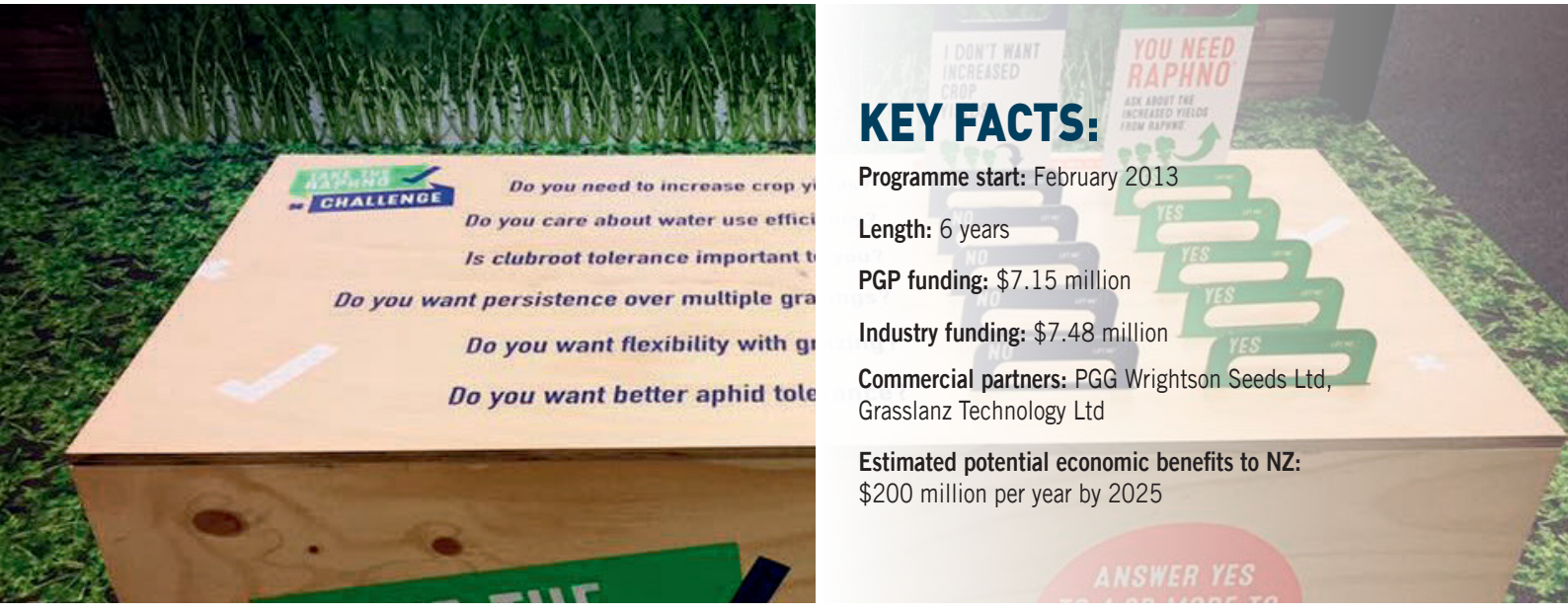
Driving sustainable productivity improvements to deliver higher on-farm profitability is the key objective of RMPP.

SEED AND NUTRITIONAL TECHNOLOGY DEVELOPMENT

Tackling climate change, mitigating the impact of droughts and pests, and improving animal health and productivity are among the benefits sought by the Seed and Nutritional Technology Development programme through the delivery of innovative forages for New Zealand farms. The programme is led by PGG Wrightson Seeds and Grasslanz Technology.

Achievements for the 2016/17 financial year:

- Pest resistance trials have shown better pest tolerance and resistance for perennial ryegrass plants containing AR501 endophyte, and grazing trials have continued to provide strong animal performance results without any adverse animal health problems demonstrating the safety of this endophyte.
- PGP endophytes have demonstrated a reduction in facial eczema spore counts by over 30 percent under field conditions. Larger field plots have been established for further monitoring of the ability to reduce facial eczema and successfully deliver a product.
- Progress on traits that should improve feed conversion efficiency and reduce nitrogen emissions from ruminants has continued with promising results. Material was sown for field trials to determine the quantity, seasonal variation and type of the key compound produced to enable these benefits.
- A pre-commercial release of Pallaton Raphno was undertaken with 1,200 hectares planted across New Zealand. Further results from trials and larger scale plantings have continued to demonstrate improved pest and disease resistance, water use efficiency, yield, persistence and overall productivity improvements. Full commercial release is scheduled for 2018.



KEY FACTS:

Programme start: February 2013

Length: 6 years

PGP funding: $7.15 million

Industry funding: $7.48 million

Commercial partners: PGG Wrightson Seeds Ltd, Grasslanz Technology Ltd

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

Pallaton Raphno site at the Mystery Creek Fieldays in June 2017.

SHEEP – HORIZON THREE

Sheep – Horizon Three aims to build a high value and sustainable New Zealand sheep dairy industry by taking a market-led approach to improving all parts of the value chain.

Achievements for the 2016/17 financial year:

- Market insights work was undertaken in a number of potential markets where New Zealand sheep milk could possibly build a strong category. This has identified some potential markets for more detailed investigation and also shaped the direction of new product development, farming systems and genetic selection.
- The development of high value products using sheep milk is key to bringing the benefits of sheep milk to life. Alongside regular market insights feedback, a number of technologies and product formats were tested using sheep milk. The first generation of chewable calcium tablets was completed during the year and launched to market in 2017.
- Building a collaborative industry is going to be key to New Zealand having a sustainable, scalable sheep milking industry which is globally competitive. The first 'Farm Open Day' was held during this year with over 100 attendees who over two days learnt about all aspects of running a sheep milking operation from the farm team themselves. This was followed up at the Sheep Milking Conference where a number of technical papers were presented relating to research and trials undertaken during the year.
- Creating a farming system suitable for the recently available imported high performance dairy genetics is one of the key challenges facing the industry. During this year a number of trials were conducted around the use of hybrid indoor/pasture systems to understand the economic, environmental and animal health considerations of this potential model in New Zealand.

KEY FACTS:

Programme start: July 2016

Length: 6 years

PGP funding: $12.56 million

Industry funding: $18.83 million

Commercial partner: Spring Sheep Dairy NZ Limited Partnership

Estimated potential economic benefits to NZ:
The programme's financial goal is $200 million annual gross revenue for New Zealand's sheep dairy industry by 2030. The programme's aspirational target is annual gross revenue of $700 million by 2030

Sheep – Horizon Three aims to build a high value and sustainable New Zealand sheep dairy industry by taking a market-led approach to improving all parts of the value chain.

SPATNZ

Sanford is co-investing with MPI in this programme which is using hatchery-based selective breeding to generate a consistent supply of high quality Greenshell™ mussels (GSM). The ultimate objective is to increase commercial returns and to enable the growth of markets. Increased spat supply and the implementation of selective breeding will be a breakthrough for New Zealand's aquaculture industry, providing increased economic returns and facilitating industry growth.

Achievements for the 2016/17 financial year:

- Hatchery expansion and fit out, the construction of nursery ponds and connection to an ozone water treatment plant were completed.
- The hatchery exceeded performance targets and consecutive batches of larvae reared were larger than all previous ones.
- A cohort of about 100 mussel families was established marking the most successful run in the selective breeding programme.
- The number of ready-to-settle larvae grown achieved a new record, a significant milestone in the programme's development, as larval rearing had been the key bottleneck to achieving target scale.
- The greater volume of larvae grown enabled the settling of faster growing larvae which tend to perform better through the production phases.
- GSM from the first batch spawned in the hatchery reached harvest size after performing well through all stages of the farming process.
- Informal comparisons with wild spat showed that hatchery bred spat grew more quickly to harvest size, and exhibited more consistency in size.
- Methods have been developed so far to produce mussel spat at one third of target scale, and research toward tripling this to reach target scale is well under way.

Algae bags full of mussel food at the SPATNZ hatchery.

KEY FACTS:

Programme start: November 2012

Length: 7 years

PGP funding: $13.03 million

Industry funding: $13.03 million

Commercial partner: Sanford Ltd

Estimated potential economic benefits to NZ:
By 2026 the programme could increase GDP by up to $81 million per annum. If the technology developed is adopted throughout the industry, $193 million per annum in additional GDP could be achieved

CASE STUDY:
SPATNZ: Reliably breeding next-generation shellfish

The New Zealand mussel industry needed a hatchery

The Greenshell™ mussel (Perna canaliculus) is unique to New Zealand, and the mainstay of our aquaculture industry. World demand for quality seafood is growing rapidly and our mussel industry has an unprecedented opportunity for growth. Standing in the way is an uncertain supply of juveniles – mussel farmers still gather their baby mussels, called "spat", from the sea. Most of the spat is collected off 90 Mile Beach and trucked to farms around the country.

Zane Charman from Sanford Ltd manages New Zealand's biggest mussel farming operation, and has to live with the uncertainty. "We're not sure what spat is going to wash up on the beach – when it's going to turn up, how much of it there will be, and how well it will perform on our farms."

As the industry partner in the SPATNZ PGP programme, Sanford recognised the need for a mussel hatchery to underpin industry growth and unlock the full potential of a wonderful product through selective breeding.

Ted Culley has led innovation in Sanford's mussel business for 20 years, and knew it had to be done. "We were pretty much the only industry that didn't use selectively bred stock to produce our animals. We relied totally on wild spat so we were at ground zero in terms of breeding a better animal for production."

Hatchery spat production is now a reality

Now nearly five years into the PGP programme, large scale production of hatchery spat has become a reality. The Nelson operation headed up by Programme Manager, Rodney Roberts, was very aware of the challenges that had to be overcome.

"Going into the programme we knew that it was possible to grow mussels in captivity but there were still major challenges in getting the consistency and scale required to make it a commercial reality."

SPATNZ has been operating in a purpose-built hatchery for two years and has made great strides in developing large scale production methods.

"We've come such a long way in the hatchery over the last two years. We've been regularly hitting new records for batch sizes, and our consistency in the last year has been particularly pleasing," says Rodney.

SPATNZ's production cycle begins with a monthly spawning that results in about three billion developing embryos. Rearing the mussels through their next three weeks as microscopic swimming larvae has been the trickiest part of hatchery production. Greenshell™ mussel larvae are incredibly sensitive creatures and require highly specialised staff to care for the mussels and produce their microalgal food.

The mussel food comprises half a dozen strains of microalgae cultured in colourful bioreactors that conjure up images of science fiction labs. SPATNZ's algae unit churns out nearly a billion cells a second around the clock and is a critical ingredient of hatchery success.

Algae bags at the SPATNZ hatchery

There are still big challenges and opportunities in both the hatchery and at sea. The spat leave the hatchery at just 1 mm long, and remain very vulnerable for several months on spat farms at sea.

"There is a big opportunity to increase the output from the hatchery by improving survival of the spat at sea. With the hatchery going so well lately, we're putting

more of our research effort into that early sea-based phase of the production cycle," says Rodney.

Selective breeding brings gains and opportunity

With hatchery production comes the opportunity to implement selective breeding. Ongoing development of the selective breeding programme run by SPATNZ and the Cawthron Institute is a major part of the PGP programme.

Cohorts of mussel families are produced each year with parents chosen to accentuate traits of interest to farmers, processors and consumers.

"Starting from ground zero can be an advantage in breeding. We have the huge natural variation present in wild populations to choose from, so really big gains can be made in early generations," explains Rodney.

That certainly looks to be true based on the performance of the hatchery mussels. The first mussels reared in the hatchery have already reached harvest size and performed very well at all steps in the farming process.

Phil Hawke, Harvest Co-ordinator for Sanford is very impressed. "What I have seen around the Sounds since the hatchery has come on line is amazing. The hatchery mussels have grown much more quickly and are much more uniform than wild mussels."

Selection to date has focussed on key production and product traits, but there is also great interest in new opportunities like breeding mussels specialised for their anti-inflammatory activity. Now that the hatchery platform is laid, the possibilities are wide open.

Gary Hooper, CEO of Aquaculture New Zealand agrees. "The hatchery spat is a game changer. It will take the mussel industry to places it has never had the opportunity to go before."

Spawning mussels

Hatchery spat on a rope

STEEPLAND HARVESTING
Completed programme

The Steepland Harvesting PGP programme aimed to ensure harvesting operations on steep terrain kept pace with New Zealand's increasing forest harvest by developing innovative forestry technology to keep forest industry workers out of harm's way, while increasing productivity and lowering production costs.

Achievements for the 2016/17 financial year:

- The first output from the Steepland Harvesting programme was the ClimbMAX Steep Slope Harvester, now marketed commercially by ClimbMAX Equipment Ltd. To date, eleven units have been sold (three in New Zealand, seven to British Columbia, Canada, and one in the United States).
- The second commercial output from the programme was the Alpine Grapple Carriage – a light weight, low cost option for grapple yarding. This grapple carriage was designed in South Africa. It was tested in New Zealand and modified to make it more suited to New Zealand harvesting conditions. To date 13 units have been sold in New Zealand, and plans are afoot to manufacture this product in New Zealand.
- Four other products have been commercialised during the year: the HarvestNav on-board navigation system; the teleoperation control system for the John Deere 909 feller buncher; the remote control system for a mobile tail hold machine, called Cab Assist Backline; and the new model CutoverCam hauler vision system, which streams high resolution live video of the log extraction operation into the hauler cab.
- Three other products were developed to prototype stage during the year: the Skyshifter innovative tail hold carriage for dynamic skyline shifting; the Doherty automatic quick coupler attachment for rapid switching between a log processor and a loading grapple; and the "Stick Insect", a sensor guided bi-ped felling machine.
- During the year, three field demonstrations were held to showcase the commercial outputs of the Steepland Harvesting programme to the forest industry, with over 200 participants. The first demonstration was in Whanganui as part of the NZ Farm Forestry Association national conference in April. The second was part of the HarvestTECH 2017 Conference in Rotorua, and the final demonstration was in Nelson in August.
- The commercialisation team has assisted the commercial partners of the teleoperation products and the CutoverCam in establishing a new start-up company, called Applied Teleoperation Ltd, to market these products to the industry.
- The Steepland Harvesting programme has been a successful catalyst for the emergence of other technologies, such as winch-assisted harvesters, new remote-controlled grapples, and other camera vision systems, as industry innovators seek to change operating techniques, improve safety and reduce the cost of steep terrain harvesting.

KEY FACTS:

Programme start: November 2010

Programme completed: June 2017

PGP funding: $3.68 million

Industry funding: $3.92 million

Commercial partner: Future Forest Research Ltd

Estimated potential economic benefits to NZ: $113.1 million per year by 2019.

CutoverCam developer, Dr Paul Milliken, of Applied Teleoperation Ltd (right), demonstrates the CutoverCam at the HarvestTECH 2017 field demonstration in June.

THE NEW ZEALAND SHEEP INDUSTRY TRANSFORMATION PROJECT (NZSTX)

Completed programme

The aim of NZSTX was 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.

Achievements for the 2016/17 financial year:

- The focus of the seventh (and final) year of NZSTX has been on the Production Science component of the programme, particularly its world-first research into a new genetic test for footrot resistance for the New Zealand fine-wool industry (FeetFirst). In June 2017, the programme announced the successful development of the genomic breeding value (gBV) for footrot resistance in fine-wool sheep.
- The fine-wool central progeny test (CPT) – a cornerstone project for NZSTX – has entered its fifth breeding season. Since 2013, 190 fine-wool sires have been progeny-tested in the CPT for the full range of production and management traits. The performance of the CPT progeny is a core part of the FeetFirst dataset and the gBV for footrot resistance would not have been possible without this resource.
- The Production Science team has continued to work closely with fine-wool ram breeders to increase the uptake of estimated breeding value (EBV) technology. This has been a critical third pillar of the programme's genetic improvement work, alongside the FeetFirst and CPT projects. As a direct result of NZSTX investment, the number of fine-wool ram breeders in New Zealand using EBVs has increased from 4 to 20 studs (from 20 percent of fine-wool rams sold to 90 percent) since the start of NZSTX.
- In addition, the final year of the Production Science component of NZSTX has included projects across forage, nutrition, lamb survival and ewe health.
- The New Zealand Merino Company (NZM) has continued to enjoy growth in new brand partners and uses of fine-wool as a result of NZSTX investment in innovation and product differentiation through the fibre component of the NZSTX programme in its first five years. The benefits of this to New Zealand sheep farmers continue to be immense, with high-value contracts being offered to growers this season for increased volumes and longer timeframes.
- The SILERE alpine origin merino programme, originally a joint venture between NZM and Silver Fern Farms as part of the 'Meat and Other' component of NZSTX, is now a joint venture between NZM and Alliance Group. SILERE, in conjunction with other brands in Alliance Group's premium meat portfolio (including other PGP-supported programmes such as the Omega Lamb programme), will implement a 'best in season' strategy, to mitigate supply issues and provide for the hospitality sector's demand for seasonal produce.

Merino hoggets from Bog Roy Station in Omarama.

KEY FACTS:

Programme start: September 2010

Programme completed: June 2017

PGP funding: $16.77 million*

Industry funding: $16.77 million*

Commercial partner: The New Zealand Merino Company Ltd

Estimated potential economic benefits to NZ:
At least $250 million a year in economic benefits by 2025

*The final programme cost and PGP investment were still being compiled at the date of publishing of this annual report.

TRANSFORMING THE DAIRY VALUE CHAIN (TDVC)

This PGP programme has transformed the dairy industry in three key areas: its projects are helping to protect the environment through raising the bar for farmers and also the professionals and organisations that support them; it has established a pipeline of smart, talented rural leaders and support staff, building capability and knowledge behind the farm gate and beyond; and the science and R&D it supports have enabled the creation of new value-add dairy products.

Achievements for the 2016/17 financial year:

- Every dairying region now has its own riparian planning guide; more than 9500 farms (83 percent of industry) have a budget in place to track nitrogen use and loss; and significant non-compliance for effluent discharge is down to 5.2 percent, a new record low.
- Thirty people graduated from the pilot Massey University Greenhouse Gases Course, an initiative supported by the TDVC PGP programme to assist rural professionals support industry objectives for cutting emissions. Getting more rural professionals into the course is a key commitment in the Dairy Action for Climate Change plan.
- The Dairy Farm Systems Certification programme had its first 12 graduates, all of whom will be able to use Whole Farm Assessments to help farmers realise greater gains ($50,000 a season on average) from their businesses. The training is being adapted for the sheep and beef industry.
- Major Māori farmer Ngai Tahu Farming signed up to deliver the GoodYarn mental health programme, making it the 19th organisation to adopt the training for its staff. Health Pitstops are delivered by nursing students at Farm Source stores as part of a plan to create a sustainable programme beyond the life of TDVC.
- Fonterra announced plans to build a $240 million mozzarella plant at Clandeboye – the biggest food service capital investment in New Zealand dairy history. This decision was supported by science backed by TDVC.
- Fonterra won the NZ Innovators Award for research into paediatric nutrition. It's the fourth win in four years and the third for a project supported by TDVC.
- An expert panel of the globe's best dairy scientists praised Fonterra's food structure science and the public/private partnership model that supports it. They urge the co-op to replicate the success of mozzarella in other categories, including beverages and cream cheeses.
- Six large kiwifruit packhouses will use near-infrared spectroscopy on their grading lines. The technology was developed with support from TDVC and will help to optimise value from better storage.

KEY FACTS:

Programme start: April 2011

Length: 7 years

PGP funding: $84.61 million

Industry funding: $85.66 million

Commercial partners: Fonterra, DairyNZ Ltd, Livestock Improvement Corporation (LIC), Synlait Ltd, Zespri Ltd, Landcorp Farming Ltd, Fertiliser Association of New Zealand, Agriculture Services Ltd, New Zealand Federation of Young Farmers Clubs Inc

Estimated potential economic benefits to NZ: $2.7 billion per year by 2020

The Transforming the Dairy Value Chain programme has won a number of New Zealand innovation awards over the past few years.

WHAI HUA
Completed programme

Developing immune enhancing dairy products was the key goal of the Whai Hua PGP programme.

Achievements for the 2016/17 financial year:

- A new skim milk powder (SMP) processing method which retains the functional activity of the natural target compound has been provisionally patented. This process has significant spin-off opportunities in the form of other food products with high bioactive levels.
- Two commercial validation runs using the new method resulted in more than 85 percent retention of the target compound during pasteurisation and more than 70 percent in the final SMP product.
- The programme identified target markets and customers for specific products to support market development and future commercialisation activities.
- A collaborative agreement to undertake an evaluation of the target SMP product has been signed with a major international company.
- The Whai Hua partners are investing in further functionality/efficacy research to support marketing initiatives in the product areas.

Tanker truck from Whai Hua programme partner Miraka Ltd.

KEY FACTS:

Programme start: March 2013

Programme completed: December 2016

PGP funding paid: $2.04 million

Industry funding paid: $2.08 million

Total programme cost: $4.12 million

Commercial partners: Wairarapa Moana ki Pouakani Incorporation, Miraka Ltd, Kanematsu New Zealand Ltd

Estimated potential economic benefits to NZ: $5 million to $16.6 million per year in economic benefits to New Zealand by 2021.

W³: WOOL UNLEASHED

The W³: Wool Unleashed PGP programme aims to drive fundamental change in the way strong wool is produced, marketed and sold, delivering premiums for New Zealand's strong wool sector. These premiums come from applying a customer-led approach to wool production and processing, to develop products that align with customer preferences.

Achievements for the 2016/17 financial year:

- New wool contracts secured, averaging 37 percent above the current market rate.
- Second year of contracts confirmed with strong wool brands Best Wool Carpets, Dixie Group Carpets, Prestige Carpets and Glerups shoes, using the forward contract business model.
- First prototypes for an innovative new use of wool have been sufficiently tested for a licence agreement with a US-based company in preparation for launch next year. Further prototypes delivered for testing.
- Development of an industry engagement project to ascertain new uses and users for strong wool continues.
- Initial samples created for an Australian company looking for a sustainable component for their product. Production prototype material is in development.
- Continuing to explore opportunities in industry for collaborations and key partnerships to help develop on-farm tools for growers which align with consumer standards.
- Wool accreditation programme and industry guidelines proceeding to an international formalised standard. The programme is continually adding or updating standards as identified.
- New insights gathered in existing and potential markets to help drive the approach for product development.
- A business case is being developed around an innovative propellant hub which will bring together a market empathy and strategy design package offering for the New Zealand Merino Company and the wider primary Industries.
- The Waka Aotearoa group, a collaboration of New Zealand's leading farming organisations, continue to actively lead the adoption of W³: Wool Unleashed initiatives in the wider primary industries with a new focus on environment, water and animal welfare.

Strong wool grower, Duncraigen farm.

KEY FACTS:

Programme start: February 2016

Length: 7 years

PGP funding: $11.05 million

Industry funding: $11.05 million

Commercial partner: The New Zealand Merino Company Ltd

Estimated potential economic benefits to NZ: Cumulative economic benefits for New Zealand's economy of up to $335 million by 2025

REPORT ON THE PRIMARY GROWTH PARTNERSHIP (PGP) PORTFOLIO

The independent PGP Investment Advisory Panel

The independent Investment Advisory Panel (IAP) comprises six members, including the Chair. It provides expert advice to the Ministry for Primary Industries (MPI) on PGP investment 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:

- John Parker (Chair)
- Barry Brook (Deputy Chair)
- Sir Maarten Wevers
- Melissa Clark-Reynolds
- Harry Burkhardt
- Steve Smith.

Sir Maarten Wevers was reappointed for a second term, commencing on 1 October 2016.

The IAP met nine times in the 2016/17 year, totalling nine days.

Independent progress reviews

All PGP programmes must have at least one full independent 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.

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

During the 2016/17 year, progress reviews were completed for the High Performance Mānuka Plantations, Precision Seafood Harvesting, Pioneering to Precision, Lighter Wines and New Zealand Avocados Go Global PGP programmes. All reviews confirm that the programmes are being well managed and are on track to deliver their respective outcomes.

Programme evaluations

After the completion of each PGP programme an independent evaluation of the programme is commissioned. The Whai Hua programme was completed in December 2016 and an independent evaluation was undertaken.

Three additional PGP programmes were completed in June 2017 and independent evaluations begun in the first quarter of 2017/18.

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 lifetime, 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.

Three programmes were audited during the year:

- Passion2Profit
- Omega Lamb
- Lighter Wines (formerly Lifestyle Wines).

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

The audit reports are published on the relevant programme page on **MPI's website**.

PGP FINANCES

The portfolio

The 2016/17 year started with 19 programmes underway and two programmes completed. During the 2016/17 year the Sheep – Horizon Three programme joined the PGP portfolio. This programme is led by the Spring Sheep Dairy NZ Limited Partnership.

In 2016/17 four programmes were completed. The Whai Hua PGP programme finished in December 2016, followed by Farm^{IQ}, The New Zealand Sheep Industry Transformation Project (NZSTX) and Steepland Harvesting, which all finished on 30 June 2017.

As at 1 July 2017 the PGP Portfolio has 16 programmes underway and six completed. The programmes vary in length from three to seven years.

PGP programmes must demonstrate that they are beyond business as usual, and have the potential to deliver significant economic and non-economic benefits. PGP programmes are therefore ambitious, often high-risk, and required to adapt over their lifetime to respond appropriately to new knowledge, challenges and opportunities.

Programmes utilise the 'fast-fail' approach. This means all projects or workstreams have set stages at which any failures or risks are assessed for impact. If a project or workstream is deemed unlikely to succeed then it is stopped, and any relevant lessons are applied to the remaining ones.

New proposal template

A more concise PGP programme proposal template was introduced during 2016/17. MPI's customer engagement work has shown this new template has been well received by applicants applying for PGP investment.

Committed funding

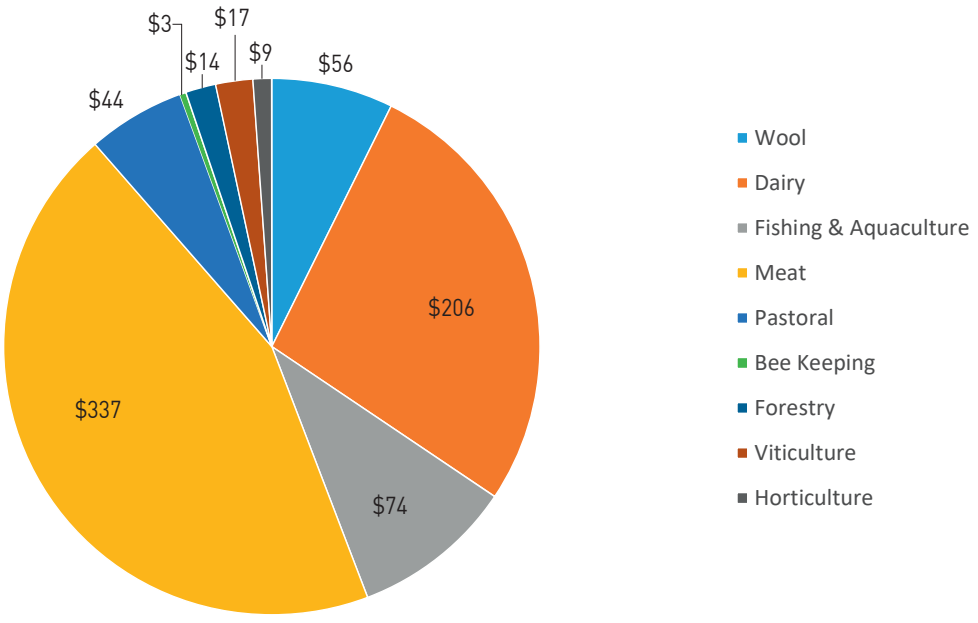
As at 30 June 2017, MPI and industry partners committed $759 million over time to 22 contracted PGP programmes, of which the Crown's PGP commitment is $358 million.

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

Funding Paid Out

During the year $39 million of PGP funding was paid out to all PGP programmes. Total Crown funding paid to all programmes up to 30 June 2017 was $235 million.

Total PGP Investment (in millions)
22 contracted programmes by sector totalling $759 million



PGP PROGRAMME FINANCIAL SUMMARY

Programme	Committed Funding		PGP Investment Paid	
	PGP	Industry	2016/17 Financial Year	Total Programme to 30 June 2017
Clearview Innovations	9,750,000	9,750,000	887,000	8,027,727
Farm^{IQ} (ended June 2017)*	59,342,000	91,387,000	5,895,249	58,702,823
FoodPlus	29,100,000	29,100,000	1,719,093	9,090,472
High Performance Mānuka Plantations	1,400,000	1,487,768	413,545	1,280,523
Lighter Wines	8,125,766	8,843,847	1,052,242	3,482,947
Marbled Grass-fed Beef	11,046,562	12,301,466	1,902,133	5,676,916
New Zealand Avocados Go Global	4,281,402	4,281,402	803,248	1,689,838
Omega Lamb	12,500,000	12,500,000	3,174,683	4,903,877
Passion2Profit	7,392,000	7,992,000	792,583	1,402,636
Pioneering to Precision	5,175,000	5,175,000	383,659	3,141,571
Precision Seafood Harvesting	24,021,610	24,023,080	3,596,395	15,974,326
Red Meat Profit Partnership (RMPP)	32,154,636	32,154,636	3,606,883	9,925,200
Seed & Nutritional Technology Development	7,145,169	7,482,169	950,357	4,653,010
Sheep – Horizon Three	12,556,607	18,834,910	1,200,632	1,200,632
SPATNZ	13,032,452	13,032,452	1,479,879	8,435,708
Steepland Harvesting (ended June 2017)*	3,682,500	3,906,396	439,956	3,473,397
STIMBR (ended June 2014)	1,186,000	1,465,204	0	1,184,031
Stump to Pump (ended September 2014)	1,810,586	1,810,586	0	1,810,586
The New Zealand Sheep Industry Transformation Project (NZSTX) (ended June 2017)*	16,770,000	16,770,000	938,487	16,440,777
Transforming the Dairy Value Chain	84,610,000	85,660,000	8,527,547	71,419,368
Whai Hua (ended December 2016)	2,041,000	2,089,000	355,180	2,036,301
W^3: Wool Unleashed	11,049,000	11,049,000	1,144,328	1,499,002
Totals	358,172,290	401,095,916	39,263,080	235,451,666

*This PGP programme is currently completing its wrap up and final reporting. Therefore, the committed investment from industry may differ from the actual amount paid during the life of the programme.

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New Zealand Government

September 2017