



Primary Growth Partnership Annual Report

1 July 2017
to 30 June 2018



Primary Growth Partnership at a glance

15

Number of programmes underway as at 30 June 2018

7

Number of completed PGP programmes as at 30 June 2018*

\$726m

Approximate total committed investment by the Ministry for Primary Industries and industry across the life of the 22 PGP programmes as at 30 June 2018

\$6.4b

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

60+

Number of organisations involved across the PGP

* Note: two new PGP programmes were launched during the development of this Annual Report – Caprine Innovations New Zealand and Hāpi – Brewing Success. This increases the total committed investment by the Ministry for Primary Industries and industry to approximately \$795 million across the life of the 24 PGP programmes.

Contents

About the Primary Growth Partnership	3
Foreword from Hon Damien O'Connor, Minister of Agriculture	4
Introduction from Martyn Dunne, Director-General MPI	5
Message from John Parker, Chair, Investment Advisory Panel	7
Achievements by Primary Growth Partnership programmes in 2017/18	8
Clearview Innovations	9
FoodPlus	10
High Performance Mānuka Plantations	11
Lighter Wines	12
Marbled Grass-fed Beef	13
New Zealand Avocados Go Global	14
Omega Lamb	15
Passion2Profit	16
Pioneering to Precision	17
Precision Seafood Harvesting	18
Red Meat Profit Partnership (RMPP)	19
Seed and Nutritional Technology Development	20
Sheep – Horizon Three	21
SPATNZ	22
Transforming the Dairy Value Chain	23
W ³ : Wool Unleashed	24
Report on the PGP portfolio	25
PGP finances	27
PGP programme financial summary	28

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Paul Sutherland Photography

About the Primary Growth Partnership

Business-led, market-driven primary industry innovation

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

There are more than 60 companies involved in the PGP. Everyone involved is committed to New Zealand's long-term, sustainable prosperity, with MPI and industry committing around \$756 million over the life of the 22 PGP programmes in the portfolio as at 30 June 2018. This is in addition to a significant amount of time, expertise, knowledge and effort.

The PGP is accelerating change within New Zealand's food, beverage, fibre and forestry industries 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 strive 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 primary industry organisations to partner with MPI to carry out ambitious, and often risky, innovation programmes that 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 will show, PGP programmes continue to deliver real and tangible benefits for New Zealand's primary industries, and New Zealand as a whole.



Foreword from Hon Damien O'Connor

I'm pleased to introduce the Primary Growth Partnership (PGP) Annual Report for 2017/18.

A highlight for 2017/18 was attending the celebration of the Steepland Harvesting PGP programme, which delivered new technology to the forest industry to make harvesting more efficient and productive, and keep our forest workers safer.

Another, more recent, stand-out for me was the Caprine Innovations New Zealand (CAPRINZ) PGP programme, that aims to tap into the high-value, New Zealand goat milk infant formula industry. It's a good example of shifting from volume to value, or more specifically shifting from producing commodities exposed by the tyranny of distance from our international marketplaces towards enabling a farming model that produces high-value products and delivers environmental benefits. Importantly, it will see farmers get more for what they're doing now and keep the benefits from the programme in New Zealand.

The PGP represents a huge public investment. As Minister of Agriculture, it's my role to ensure this investment is both in the public's interest and achieving good outcomes for the New Zealand taxpayer. For this reason, I announced an independent review of the PGP in late 2017.

This review, completed in mid-2018, found the partnerships were a worthwhile public investment – but that demand from larger applicants had tailed off, there had been consistent under-spending and the programme suffered from a lack of long-term strategy.

Recently I announced the new Sustainable Food & Fibre Futures (SFF Futures) programme to grow New Zealand's food and fibre sectors strategically and sustainably to support a thriving economy. With \$40 million a year available, it takes the best parts of the PGP and another Ministry for Primary Industries' investment programme, the Sustainable Farming Fund, and allows a single gateway for farmers and growers to help our vital primary sectors move more quickly into the value-added space.

This aligns with the work of the Primary Sector Council, which is taking a good look ahead at the opportunities for our primary sectors, and the current challenges to overcome, and will help direct a strategic path forward for each sector.

The food and fibre industries are the backbone of New Zealand's economy, delivering more than \$42 billion in export revenue last year. Our challenge, and opportunity, is to extract more value from these industries in a way that sustains the natural resources we depend upon. SFF Futures lets us do this.

This report provides many examples of achievements of PGP programmes during 2017/18. These, along with SFF Futures programmes, will deliver economic, social and environmental benefits for all New Zealanders.

Hon Damien O'Connor
Minister of Agriculture



Introduction from Martyn Dunne

It is my pleasure to present the 2017/18 Annual Report for the Primary Growth Partnership (PGP). As you will see in this annual report, it has been a busy and successful year across the PGP programme portfolio.

As this annual report attests, there have been a number of important achievements delivered by PGP programmes that have advanced New Zealand's innovation, shared information, skills and expertise across numerous primary sectors and delivered a range of other benefits.

Programme completed in 2017/18

The Transforming the Dairy Value Chain PGP programme, our largest programme, finished in January 2018. This \$170 million, seven-year PGP programme was described by a panel of international dairy experts as world-leading. It said the programme accelerated thinking and promoted game-changing research, innovation and input into new, higher-return dairy products, gene technology, capability-building and improved data standards and connectivity. They concluded these advances would not have been possible without the combined effort of farmers, industry partners, scientists, researchers and government enabled by the PGP programme.

New PGP programmes launched

While this annual report focuses on the 2017/18 financial year, two new PGP programmes launched during development of this annual report.

On 21 August 2018, we welcomed the new Caprine Innovations New Zealand (CAPRINZ) PGP programme. CAPRINZ is a five-year, \$29.65 million PGP programme between the Ministry for Primary Industries (MPI) and Dairy Goat Co-operative (NZ) Ltd.

The programme's end goals include improving the health and well-being of families, and delivering a range of other benefits such as growing research and farming capability and increasing export revenue across the New Zealand dairy goat milk industry to \$400 million per annum by 2023.

On 10 October 2018, we also welcomed Hāpi – Brewing Success, a \$13.25 million, seven-year PGP programme with Hāpi Research Ltd, a joint venture between Garage Project and Freestyle Farms.

This new programme aims to grow the super-premium hop and craft beer market in New Zealand and overseas. This includes sharing information across industry and creating a unique New Zealand style of craft beer – like a beer version of Sauvignon Blanc wine – to elevate New Zealand hops and craft beer to sustainable global brands that command premium pricing.

Further information about these programmes is available on the MPI website.

Independent review of the PGP

During 2017/18, an independent review of the PGP was carried out. The review focused on areas such as outcomes and economic benefits to date from PGP programmes, and identified a number of the PGP's strengths and some areas for improvement. A report of findings from the review was released on 21 August 2018 on the MPI website.

The independent review found that the PGP has a unique combination of eligibility criteria, rules and an operating philosophy ideally suited towards transformation or longer-term step changes; it supports the right conditions for future innovation investment, such as collaboration, capability building and culture change; it locks in public benefits such as

intellectual property, and affords greater accountability for public investment; and it has already returned more than the government's investment through benefits such as enabling innovation activities and capability, creating new jobs and increasing the value of our products and exports.

The review made a number of recommendations, aimed at ensuring future innovation and benefits continue.

Sustainable Food and Fibre Futures (SFF Futures)

On 27 October 2018, we launched the new Sustainable Food & Fibre Futures (SFF Futures) programme, a new programme announced by the Minister of Agriculture Hon Damien O'Connor in August 2018.

SFF Futures is a new future-focused investment programme that replaces the PGP and the Sustainable Farming Fund. However, it takes the best components from these successful programmes.

SFF Futures provides a single gateway for applications for applied research and development projects in the food and fibre sectors, which both simplifies the process for applicants and enables MPI to identify the most suitable option to provide investment.

It also enables a wider breadth in the size and scope of programmes and projects MPI can invest in.

MPI will continue with existing commitments to current PGP programmes and SFF projects. While they already deliver economic, environmental, social, and cultural benefits, SFF Futures will place more emphasis on the environment and value to New Zealand.

This will be the last time I introduce the PGP annual report as Director-General of MPI. It has been a pleasure to work with many of our primary industry partners and stakeholders, and to see first-hand their passion for innovation and making a difference for our primary industries and for New Zealand.

I hope you enjoy reading this annual report.



Martyn Dunne, CNZM





Message from John Parker Chair, Investment Advisory Panel

Primary Growth Partnership programmes continue to deliver good outcomes across a number of New Zealand's primary industries.

The Investment Advisory Panel (IAP) believes the PGP is an effective, successful model, which has delivered economic, environmental, social and other benefits for New Zealand. This was backed up by the independent review of the PGP undertaken earlier this year. It supports the IAP's view that the PGP continues to be a worthwhile public investment. The review particularly noted the strong governance in place, including the IAP, to ensure PGP programmes have the best-possible opportunity for success.

The PGP has evolved over time, and has benefited from a number of improvements to areas such as governance and monitoring, and transparency. From the IAP's perspective, the PGP has enabled a breadth of positive outcomes for New Zealand, which would simply have not been possible without it. This includes developing new services and value-added products; building a culture of innovation within New Zealand organisations; boosting research capacity and capability; enabling collaboration, including between those who compete in the marketplace; and building the foundations for our primary industries and New Zealand's economy to prosper in the future.

Recently we welcomed two new PGP programmes: Caprine Innovations New Zealand (CAPRINZ) and Hāpi – Brewing Success. CAPRINZ will tap into the lucrative goat milk infant formula industry, and Hāpi – Brewing Success aims to develop super-premium hops and uniquely New Zealand craft beer for top tier markets.

An important component in both of these programmes is enabling collaboration and information-sharing across their respective industries to produce high-value products that stand out in the marketplace, and ensure the benefits are widely shared. Both recognise the importance of making improvements across value chains and boosting access to good knowledge, expertise and experience across their respective industries.

This year we bid farewell to Melissa Clark-Reynolds. I'd like to acknowledge her time and valuable contribution to the IAP. I would also like to welcome our newest director and governance expert Zoe Attwood.

Recently, the Minister of Agriculture Hon Damien O'Connor announced the development of a new investment programme called Sustainable Food & Fibre Futures (SFF Futures). This will be a combination of the PGP and the Sustainable Farming Fund. We are pleased SFF Futures will retain important parts of the PGP, as these have proven to be an effective formula for primary industry innovation.

Looking to the future, the IAP will remain involved with providing advice and recommendations to MPI on current PGP investment and future investment through SFF Futures, and we will continue our monitoring function.

The IAP is committed towards doing its part to ensure the success and sustainability of the primary industries.

A handwritten signature in black ink, appearing to read 'John Parker', written in a cursive style.

John Parker
Chair, Investment Advisory Panel



**Achievements by
Primary Growth
Partnership programmes
in 2017/18**

Clearview Innovations

Clearview Innovations, led by Ballance Agri-Nutrients, is developing new soil nutrient products and management services that are helping farmers increase on-farm productivity, reduce nutrient losses to the environment and improve water quality.

Achievements for the 2017/18 financial year

- MitAgator™ was launched. This world-first modelling software develops risk maps and generates critical information for individual farms that identify areas where loss of phosphorous, nitrogen, sediment and bacterial contaminants such as *E.Coli* are more likely to occur. MitAgator™ improves the farmer's understanding of how to mitigate nutrient losses and helps with the preparation of farm environment plans which are required by some councils.
- Another product launched was SpreadSmart™ which enables fast automated hopper closure on top-dressing aircraft, improves pilot safety and safeguards sensitive areas and waterways; and N-Guru™ which, used in conjunction with soil testing, is a decision-making tool that can identify which areas of a farm will produce a greater response to nitrogen than others.
- Ballance's extension programme continued to introduce farmers to products developed by the programme, so they can achieve the environment and productivity these products enable.
- The programme is working with farmers, industry organisations and regional council employees in Southland to understand the critical success factors needed for environmentally sustainable catchment management.
- Nutrient management workshops were run in the dairy industry to provide practical tools and the confidence to respond to policy changes. These workshops included content on loss factors and mitigations for nitrogen as well as phosphate and sediment.
- Fifteen podcasts, six videos and two e-learning modules were developed to support awareness of the programme's products and services, and best practice nutrient management.
- Ballance employee Rebecca Hyde, a 2017 Nuffield Scholar, published her report "Effective Industry Collaboration for Environmental Gains".

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: \$348 million per annum by 2025. The programme aims to deliver economic benefits of up to \$56 million a year in additional industry revenue by 2022.



Ballance Farm Sustainability Regional Manager Christina Finlayson and farmer Rick Burke using MitAgator™ launched in June 2018.

FoodPlus

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

Achievements for the 2017/18 financial year

- ANZCO Food and Solutions worked with a new customer to develop finished products for sale through the customer's food outlets. The product is also being tested in retail convenience stores.
- ANZCO developed a number of pet treat products, sold to a pet food company for export to overseas markets.
- At ANZCO's joint venture company Taranaki Bio-Extracts (TBE), a research and development programme has led to a new process which delivers a high value product and also recovers protein (a source of nitrogen) that would otherwise go to waste. The FoodPlus programme demonstrated the feasibility of the new process at pilot scale, and TBE is nearing completion of a full-scale plant outside this PGP programme.
- ANZCO's Biotissues unit built and commissioned a purpose-built clean room facility. This allows ANZCO to develop products for customers who require product development and manufacturing to be completed in a highly controlled environment.
- Serum products have been a major focus in 2018. Market intelligence undertaken by the programme indicates there are significant opportunities for these products. Packaging and formulation variations with stringent quality control checks are required by customers for these products.

Key facts

Programme start: November 2012

Length: 7 years

PGP funding: \$29.1 million

Industry funding: \$29.1 million

Commercial partner: ANZCO Foods Ltd

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

Product development in the recently commissioned Biotissues cleanroom facility.



High Performance Mānuka plantations

This PGP programme focuses on meeting the increasing demand for mānuka honey and its products, by moving production from wild harvest to science-based farming of plantations. Combining improved genetics with optimum husbandry practices could enable significant gains for New Zealand's mānuka honey industry.

Achievements for the 2017/18 financial year

- Mānuka Farming NZ Limited (the commercial arm of Mānuka Research Partnership (NZ) Limited) is now providing a consultancy service to landowners wishing to plant mānuka for honey production. This consultancy includes site assessments, plantation establishment and monitoring services as well as recommendations on the most suitable mānuka cultivars to plant for optimum honey production, including eco-sourcing where appropriate.
- Mānuka Farming NZ Limited now employs four full-time staff, two of which were directly involved in the research work and management of the PGP programme.
- Honey samples taken from the largest mānuka plantation trial site (Tutira, north of Napier) at the end of the mānuka flowering period met the MPI standard for monofloral mānuka honey. Accredited laboratory projections predict UMF® values of UMF®14 to UMF®28 if the honey was stored. UMF® values exceeding UMF®10 are required for mānuka honey for medical use.
- A predictive tool for plantation mānuka has been developed and partially validated. It is a decision support tool that can deliver detailed reports on the performance of potential mānuka plantations.
- A PhD in Ecology was achieved through a thesis on the "Companion Biota Associated with Mānuka (*Leptospermum scoparium*)". This is the second of two PhDs completed during the programme.

Key facts

Programme start: March 2011

Length: 7 years

PGP funding: \$1.40 million

Industry funding: \$1.58 million

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

Estimated potential net 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.

Achievements for the 2017/18 financial year

- The programme has continued to undertake and complete research into the production and markets of lighter wines, with over 120 research papers and reports completed to date.
- The quality of the lighter wines produced has continued to improve, with a number of lighter wines again receiving medals in the lower-alcohol and open categories of competitions. At the prestigious New York International Wine Competition, a trade-only judging panel awarded two New Zealand lower alcohol wines produced by Pernod Ricard:
 - Brancott Estate Flight Song 2017 Pinot Grigio was awarded "double gold".
 - Brancott Estate Flight Song 2017 Sauvignon Blanc was awarded "gold" (wines are sold as Brancott Estate Flight in all regions except the United States).
- Market research and monitoring of export markets continues to show significant and growing consumer demand for lighter wines in a number of markets. Engagement with retailers in the key export markets has the programme ready to undertake product launches in these markets over the 2018/19 year.
- As this is a new category within the traditional wine market, the programme has developed key messaging and branding "NZLighter" to protect New Zealand's lead position.

Key facts

Programme start: March 2014

Length: 7 years

PGP funding: \$8.13 million

Industry funding: \$8.84 million

Commercial partners: NZ Winegrowers and 18 contributing wineries

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

NZ Lighter Wines – aiming for all of the flavour and quality that consumers expect, at roughly 25 percent less alcohol by volume.



Marbled Grass-fed Beef

Brownrigg Agriculture and Firstlight Foods are leading a PGP programme that aims to meet increasing consumer demand for better quality and naturally produced food products, by supplying the best marbled grass-fed beef in the world.

Achievements for the 2017/18 financial year

- Mating numbers for the 2017 calendar year were over 49,000, up from 30,000 the previous year. Dairy matings accounted for over 90 percent of these.
- Six farmer fact sheets were developed and published. These captured the results of research undertaken during the programme and put them into practical guides on how they can be implemented on-farm.
- The Wagyu model continued to deliver significant calf premiums to breeders from the dairy industry.
- All year round supply of animals for processing was maintained.
- Farmer returns continued to exceed prime steer prices, despite a historically high beef schedule.
- The total number of farms involved reached 350, with these spread across New Zealand. A growing portion of these, approximately 40 percent, are in the South Island and processing capability was established there in late 2017.
- Retail distribution in New Zealand and the USA increased significantly.

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.



New Zealand Avocados Go Global

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

Achievements for the 2017/18 financial year

- The New Zealand avocados industry produced 4 million trays in 2017/18, exporting 57 percent, selling 38 percent in the New Zealand market and processing 5 percent. Growers received record orchard gate returns and industry collaboration was fundamental to the achievement of this growth.
- The New Zealand domestic market achieved a record total value of \$45 million and is on track to deliver the \$75 million New Zealand market goal of the industry's five year plan by 2023.
- NZ Avocado continued to reinforce the nutrient properties of New Zealand grown avocados through social media activity. Significant growth occurred on NZ Avocado social media platforms in Australia, South Korea, Japan, Singapore and Thailand. NZ Avocado now has 81,000 combined followers on social media across all markets.
- South Korea became the largest export market for New Zealand avocados in Asia. Korean consumers are responding positively to new avocado recipes created for NZ Avocado social media.
- The approval of market access to China will see growing export volumes and returns for New Zealand avocado growers. In 2017, NZ Avocado commissioned research in China to explore who the current purchase groups of imported avocados in China are, and their key drivers for purchase.
- Over 1000 hectares of dairy and dry stock farms in Northland have been converted to avocado orchards over the past three years, and some of these orchards are expecting their first crops in the coming season. High returns are allowing orchardists in the Bay of Plenty to invest in rejuvenating orchards and employ elements of industry best practice.
- AvoHub Orchard Diary was released and will significantly automate the compliance requirements of the Official Assurance Programme for China.

Key facts

Programme start: June 2014

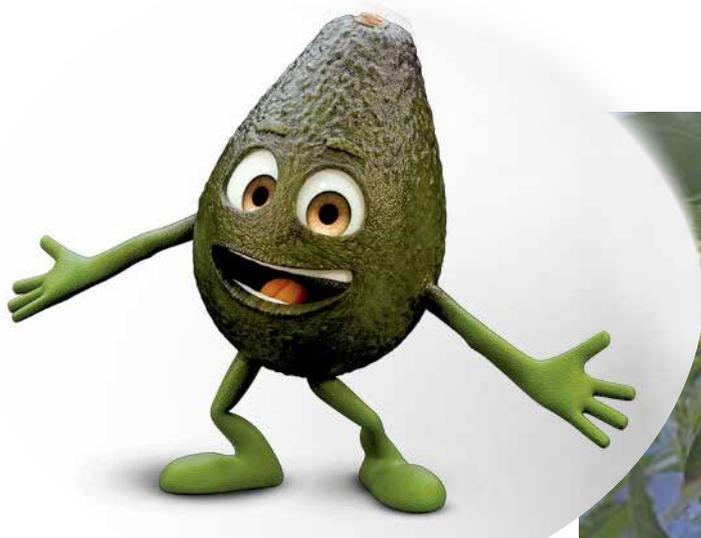
Length: 5 years

PGP funding: \$4.28 million

Industry funding: \$4.28 million

Commercial partner: NZ Avocado

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.



Newly developed grower story videos, recipe content, avocado tips and tricks and competitions are reaching around 350,000 users in New Zealand per month.

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 meat.

Achievements for the 2017/18 financial year

- A second production season of commercial chicory-fed Omega lambs is now complete, with all lambs produced to exacting management standards and are fully traceable.
- More than 48,000 Omega lambs slaughtered in 2017/18 to full chicory specification.
- Ram selection and mating for 2018/19 production has been completed. Rams were selected using breeding values for hill county performance, intramuscular fat and Omega-3.
- Analysis of hyperspectral quality measurements on lambs processed at the Smithfield plant confirm overall consistency and favourable quality of Omega/chicory-fed lambs compared to concurrent Alliance general kill including: fat cover, intramuscular fat, Omega-3 and pH values.
- The dataset is being used to identify key on-farm actions to continue to improve quality and consistency.
- Market development was progressed by the High Health Alliance (HHA) in Germany, Dubai, southern New Zealand and Australia, and agreements with existing distributors are being reviewed.
- Very positive *Cuisine Magazine* and *Country Calendar* features on the programme and continued enthusiastic response to the product from top chefs and restaurants.
- A range of relationships are being developed with innovative New Zealand food companies to utilise all parts of the differentiated Omega lamb carcass and produce a range of branded consumer-ready products.

Key facts

Programme start: July 2015

Length: 7 years

PGP funding: \$12.5 million

Industry funding: \$12.5 million

Commercial partners: Alliance Group and Headwaters New Zealand

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



The Omega Lamb programme featured on *Hyundai Country Calendar* Episode 13 – Super Sheep in June 2018.

Passion2Profit

The Passion2Profit PGP programme aims to grow and capture the full value of New Zealand farm-raised venison through its positioning in new markets as a premium non-seasonal meat, lifting productivity and better aligning supply and demand.

Achievements for the 2017/18 financial year

- Continued collaborative market development activity undertaken by four companies in Europe under the Cervena™ brand saw an increase in the volumes of chilled venison being sold in non-seasonal markets.
- The number of Advance Parties (on-farm practice improvements) has been maintained at 25 with the involvement of approximately 15 percent of all deer farmers who collectively farm about 25 percent of the country's deer.
- Experiences gained from Advance Parties have continued to be shared and leveraged through 12 regional workshops held throughout New Zealand during the year.
- 31 Deer Facts – publications about farming best practices – have now been produced and continue to be well-received by farmers with deer, and others with interests in the deer industry.
- The Deer Annual Health Review, and the Environmental Management Code of Practice, were released to support improvements in deer animal welfare and productivity and the environmental sustainability of deer farming.
- A survey of deer farmers recorded a significant increase in the use of key management practices over the past three years, and increased numbers expecting to expand their deer numbers in the next five years.

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.



Young deer on improved pasture in Mid-Canterbury. Increased returns are being achieved through improving feeding regimes for deer.

Pioneering to Precision

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 2017/18 financial year

- Very promising results were achieved from the first full year of testing remote-sensing algorithms used to predict soil fertility on hill country farms. The algorithms were developed in the first four years of the programme using a comprehensive dataset (13,000 soil and 7000 pasture samples) assembled across New Zealand hill country.
- Shortly after the end of the 2018 financial year, the programme was extended to encompass more geographic areas so that the scope of remote sensing soil fertility predictions apply to 90 percent of New Zealand hill country. To achieve this, new additional funding was made available by Ravensdown and the Ministry for Primary Industries on a 60:40 basis to enable the North Canterbury and Southland regions to be modelled and tested.
- In a further vote of confidence in hyperspectral sensing as an emerging technology, Ravensdown announced that it will be extending its own research into the applicability of the technology for flatter, more intensively managed pastures.
- Two further farms were also included into the programme's focus farm network bringing the total number of farms in the network to six. The additional focus farms are Puketiti Station (Waikato) and Tangihanga Station (Gisborne) which join Moana Station (Waikouaiti), Bog Roy Station (North Otago), 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.
- Fertiliser applications using the sophisticated IntelliSpread® fertiliser application system continues to increase greatly, with it being utilised over 66,000 hectares of New Zealand hill country. Within this 66,000 hectares, 14 percent of the land was able to be precisely excluded from receiving fertiliser because it was ineffective, culturally sensitive or environmentally vulnerable.

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.



The results of the remote scanning technology developed by this PGP programme are used to create fertiliser application maps that are sent to aircraft with computer controlled hopper doors.

Precision Seafood Harvesting

Precision Seafood Harvesting (PSH) is a collaboration between three of New Zealand's largest fishing companies, Moana NZ, Sealord and Sanford. 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 2017/18 financial year

- The Modular Harvest System was approved for use in the deepwater fisheries for hake, hoki and ling. This now allows for the commercial rollout of the MHS across the deepwater fleet, which will result in greater realisation of the operational efficiency, fish quality and value improvements.
- Development of the application for use of the MHS in inshore fisheries is underway and due for submission prior to the end of the programme.
- Continued improvement in the composition, configuration and performance of the MHS in different fishing environments.
- Ongoing development of the on-board handling systems to complement the MHS and further improve the quality and value of fish harvested.
- Completion of the standard operating procedures and safety guidelines for using the MHS.

Key facts

Programme start: April 2012

Length: 7 years

PGP funding: \$26.3 million

Industry funding: \$26.3 million

Commercial partners: Aotearoa Fisheries Limited, 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 aims to drive sustainable productivity improvements to deliver higher on-farm profitability in the sheep and beef sector. The programme helps farmers make positive changes by creating an environment where they learn from each other, share what works, and access professional advice, technical expertise, training, information and talent.

Achievements for the 2017/18 financial year

- The RMPP Action Network was launched. Based on sector research and a pilot programme, the RMPP Action Network is made up of farmer-led action groups of 7–9 farm businesses supported by trained facilitators to guide and help them identify experts who can help them achieve business goals. A total of 140 groups have registered.
- The New Zealand Farm Assurance Programme (NZFAP) developed by RMPP, which is now being used by 15 meat processing companies, underpins the Taste Pure Nature Origin brand. Further work is currently underway to include standards covering environmental, animal welfare, biosecurity and people wellness.
- The electronic Animal Status Declaration (eASD) pilot continued. Farmers complete the form online before sending animals for processing, making the process faster, easier and more accurate. Twenty-four meat plants are committed to using eASD and 767 farmers are registered.
- More than 30 organisations including two meat companies are now involved in DataLinker which simplifies and standardises data transfer between businesses (map data, benchmarking, livestock genetics, red meat, and pasture).
- Over 800 women have completed the “Understanding your Farming Business” workshops, supporting women to become critical farming partners by building their knowledge, skills and confidence.
- The roll-out of online learning modules continued providing practical information to help farmers make more informed decisions. There are currently thirteen learning modules available on the Beef + Lamb New Zealand Knowledge Hub.
- Sixteen key performance indicators (KPIs) are now available linked to Beef + Lamb New Zealand Economic Service data, enabling measurement and benchmarking against similar farming systems.
- The “Future Focus” programme was launched to bring together farming partners and provide training to help them achieve their business goals and aspirations.
- RMPP has continued to help the industry attract talent through initiatives in primary and secondary schools, as well as helping tertiary students establish industry networks.

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, up to \$880 million per annum in additional on-farm revenue, of which up to \$194 million per annum will be additional on-farm before tax profit.



Driving sustainable productivity improvements to deliver higher on-farm profitability in the sheep and beef sector 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 delivery of innovative forages for New Zealand farms. The programme is led by PGG Wrightson Seeds and Grasslanz Technology.

Achievements for the 2017/18 financial year

- Pest resistance trials have continued to show better pest tolerance and resistance for perennial ryegrass plants containing AR501 endophyte. Grazing trials have continued to provide strong animal performance results without any adverse animal health problems, demonstrating the safety of this endophyte.
- Endophytes developed by the programme have continued to demonstrate a reduction in facial eczema spore counts by over 30 percent under field conditions. Several new endophytes have also been identified that could provide stronger bioactivity against facial eczema.
- The first field trial for the feed conversion efficiency project has shown that improvements in animal productivity and reductions in nitrogen emissions from ruminants can be achieved.
- Pallaton raphanobrassica developed by the programme has been fully commercialised, with more than 4500 hectares planted across New Zealand delivering pasture (dry matter yield) and animal (live-weight gain) productivity gains.
- More than 3000 hectares of firefly kale has been planted as part of the pre-commercial release, and is delivering improvements in yield relative to other kale products.
- An external review of the potential economic benefits the programme could deliver has determined that Pallaton and Firefly are forecasted to deliver economic benefits well in excess of the investment in the programme – in the range of \$61–\$75 million per annum by 2025.
- Successful development and commercialisation of all the technologies and products also have the potential to deliver economic benefits that exceed the original forecasts by 2030 – \$203–\$339 million per annum. The majority of these benefits will occur on-farm.

Key facts

Programme start: January 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 raphanobrassica crop in Marlborough being grazed 18 January 2018 (far left) and the re-growth on 21 February 2018 (left).

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 2017/18 financial year

- Market insights work focused on the exploration of key categories this year, with further studies showing that the features and benefits of New Zealand sheep milk are a great fit with consumer needs. This shaped and refined the programme's proposition development and go-to-market strategies for its target markets.
- The development of high value products that are "clean label" and deliver great taste and texture is critical to realising the opportunities for New Zealand sheep milk. A new range of tablets was developed and launched to market alongside the development of a new advanced milk powder.
- Creating a farming system that is globally competitive while being environmentally, socially and economically sustainable is one of the key challenges to the scalability of the industry. The focus this year was on trialling a number of farming system aspects (including nutrition models) capable of increasing the milk volume prior to the arrival of imported genetics (available for first milking in the 2018/2019 season). The new system delivered milk volume increases across the flock from around 120L/ewe to 200L/ewe – a significant increase without the benefit of a genetic shift.
- The programme set up two pilot farm models to begin in mid-2018 to test and demonstrate potential farming systems with the use of imported genetics:
 - **Hybrid Pilot Farm** – set up to milk high performance sheep in a New Zealand context by providing some indoor cover while also using a pasture system during suitable times of the year.
 - **Outdoor Pilot Farm (Bovine-to-Ovine Conversion)** – this farm seeks to take an obsolete cow milking site and convert it to a sheep milking site. The farm runs the sheep fully outdoors using genetic lines suitable to outdoor conditions.

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

The SPATNZ PGP programme is developing hatchery production and selective breeding to lift New Zealand's Greenshell™ mussel industry to a new level. This industry currently relies on spat (baby mussels) collected from the sea, creating uncertainty and constraining expansion. The programme's hatchery and breeding capability is creating the development of high-performing mussel strains bred for specific traits (e.g. anti-inflammatory activity); the ability to increase spat supply; and adaptation to future challenges such as climate change and ocean acidification.

Achievements for the 2017/18 financial year

- Selective breeding was continuously improved with successful cohorts of about 100 families established in each of 2017 and 2018.
- An independent expert review of the selective breeding programme was supportive of both past research and the programme's future direction, and provided useful suggestions for improvements.
- Growth monitoring of a wide range of Pelorus Sound sites showed that selected hatchery mussels grow much more quickly than wild mussels. This growth benefit is evident across the whole range from poor to good growing sites, indicating the benefits of selective breeding will be widely applicable.
- Hatchery mussels became a significant part of the commercial crop for the first time.
- Mussel factory staff reported that hatchery mussels appeared to be more efficient for processing than wild mussels due to their cleaner shells and greater product consistency.

Key facts

Programme start: November 2012

Length: 7 years

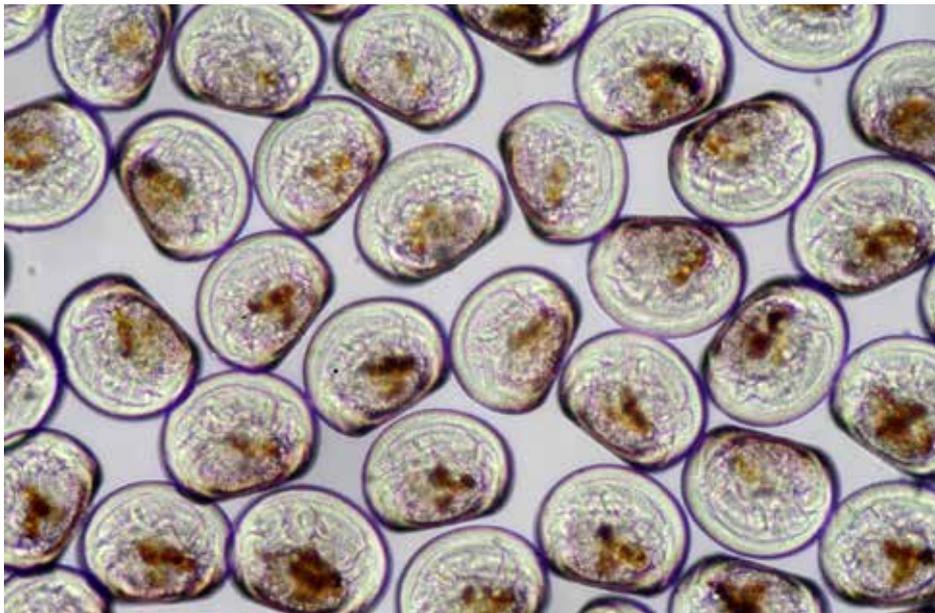
PGP funding: \$13.03 million

Industry funding: \$13.03 million

Commercial partner: Sanford Ltd

Estimated potential economic benefits to NZ: By 2026 up to \$81 million in new GDP per annum. If the technology developed is adopted throughout the industry, up to \$200 million in additional GDP could be achieved.

Swimming mussels: Larvae about one-tenth of a millimeter long, five days old.



Transforming the Dairy Value Chain

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 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 2017/18 financial year

The investment period for the programme has now concluded, although some projects are continuing with further costs borne by the industry investors. Highlights from the final four months of the programme include:

- Five patent applications filed, four scientific publications developed, two presentations given at scientific conferences and eight industry workshops undertaken.
- The certification of the 200th Nutrient Management Advisor in November 2017 and the launch of an audit programme to ensure the quality and credibility of the work of certified advisors.
- Publication of key findings from the precision dairy project about the adoption of precision agriculture technologies and imperatives for the future development of these technologies.
- Creation of a new non-profit entity to be the custodian of the award-winning GoodYarn farmer health and mental wellness initiative. A successful pilot for delivery of Health Pit Stops through a partnership between nursing institutes and Fonterra FarmSource stores led to a decision to scale up this initiative and deploy nationwide.
- NZ Young Farmers reported an increase in the transition of people from the TeenAg programme to full membership – 160 in 2017 and it is expecting more than 200 in 2018.
- Data analytics built on the milk fingerprinting platform were used to establish the fat evaluation index – a metric that is now provided to all Fonterra suppliers on a daily basis to provide feedback on the fat quality of their milk, enabling them to make better-informed decisions on the use of supplementary feeds.
- Development of four new product and process equipment prototypes that have the potential to make significant processing improvements for Fonterra. These will be tested and further developed as part of Fonterra's internal innovation processes.

Key facts

Programme start: April 2011

Length: 7 years

PGP funding: \$81.1 million

Industry funding: \$81.7 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.



2018 Young Farmer of the Year grand finalists. From left, Logan Wallace, Josh Cozens, Cameron Black, Sarah Perriam (host), Daniel Bradbury, Patrick Crawshaw, Will Taylor and Andrew Wiffen.



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 2017/18 financial year

- Strong wool contracts were secured at significant premiums above the average market rate for the year.
- Contracts were confirmed with strong wool brands such as Brockway Carpets, Best Wool Carpets, Dixie Group Carpets, Prestige Carpets, Swanndri, and Glerups shoes, all using the forward contract business model.
- US insulation company Havelock Wool also signed a forward contract for New Zealand strong wool, aligning their premium product with high-end, conscious consumers.
- Prototypes have been developed for several other exciting new uses of wool within the health and wellness space, women's fashion and the pet industry.
- Universities across New Zealand collaborated in a wool innovation project targeting new uses and users for strong wool.
- A key project was the development of Vanguard, a gathering of worldwide wool industry thought leaders. Its focus is to amplify opportunities by addressing how wool can be part of the solution for global issues such as plastic pollution.
- The ZQ Wool accreditation programme and industry standards are now credited as an internationally recognised standard. The programme continues to update standards as new improvements and technologies are identified.
- The strong wool grower base has increased further, with more growers recognising the value in supplying direct to brands through the long-term, forward contract model.
- New resources were employed in sales, creative, strategic and on-farm production science to support and drive the programme in all areas.

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.



Strong wool before processing into Havelock Wool insulation.

Report on the PGP portfolio



The independent PGP Investment Advisory Panel (IAP)

The independent IAP provides expert advice to the Ministry for Primary Industries (MPI) on Primary Growth Partnership (PGP) investment and on the progress of each PGP programme. Decisions on PGP investment are made by the Director-General of MPI.

As at 30 June 2018, the members of the IAP were:

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

The IAP usually comprises six members, including the Chair. Melissa Clark-Reynolds ended her tenure on the IAP on 31 January 2018, and following this annual reporting period, professional director Zoe Attwood was appointed to the IAP.

The IAP met nine times in the 2017/18 year.

Independent progress reviews

All PGP programmes must have at least one full independent progress review during their lifetimes 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 2017/18 year, a progress review was completed for the Red Meat Profit Partnership (RMPP). RMPP's review highlighted some important successes of the programme for the meat industry and provided recommendations for improvement which have been actioned.

Also completed was an independent review of the economic benefits of the Seed and Nutritional Technology Development programme. The review concluded that successful development and commercialisation of all the programme's technologies and products have the potential to

deliver economic benefits of between \$203 million to \$339 million per annum by 2030. The majority of these benefits will occur on-farm and the quantum of the benefits will be determined by the level of uptake of the new products.

Programme evaluations

After the completion of each PGP programme, MPI commissions an independent evaluation of the programme. Two programmes were completed on 30 June 2017, the Farm^{IQ} programme and the New Zealand Sheep Industry Transformation Project (NZSTX). At the time of writing, the independent evaluation of Farm^{IQ} had been completed and the evaluation of NZSTX is nearing completion. Once completed, end of programme evaluation reports are published on MPI's website.

The Transforming the Dairy Value Chain PGP programme was completed 31 January 2018 and an independent evaluation is underway. A final report developed by the programme outlining its achievements and lessons is available on the MPI website.

Financial audits

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

Each programme is financially audited at least once during its 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.

One programme was audited during the year:

- W³:Wool Unleashed

No major issues were identified and recommendations made by the auditors were fully accepted and implemented by the programme.

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

PGP finances

The portfolio

As at 30 June 2018, there were seven completed PGP programmes and 15 active programmes.

The programmes vary in length from three to seven years.

The Transforming the Dairy Value Chain programme, the largest PGP programme, was completed on 31 January 2018.

Committed funding

As at 30 June 2018, MPI and industry partners committed approximately \$756 million over time to 22 contracted PGP programmes, of which the Crown’s PGP commitment was \$357 million.

Two new PGP programmes were launched during the development of this annual report – Caprine Innovations New Zealand and Hāpi – Brewing Success. This increases the total committed investment by MPI and industry to approximately \$799 million across of the life of the 24 PGP programmes.

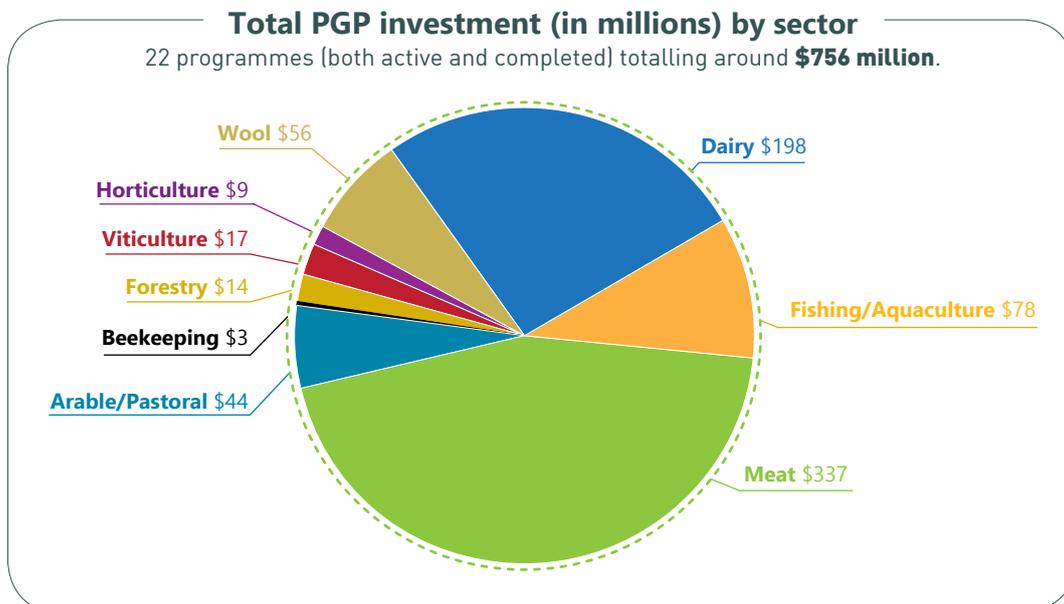
PGP programmes must demonstrate that they are beyond business as usual, and have the potential to deliver significant economic and non-economic benefits. PGP programmes are therefore ambitious, often high-risk, and required to adapt over their lifetime to respond appropriately to new knowledge, challenges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

Programmes utilise the “fast-fail” approach. This means all projects or work streams with PGP programmes have set stages at which any failures or risks are assessed for impact. If a project or work stream is deemed unlikely to succeed then it is stopped, and any relevant lessons are applied to the remaining ones.

Funding paid out

During the year \$37 million of PGP investment was paid out to PGP programmes. Total Crown funding paid out to the programmes up to 30 June 2018 was \$273 million.

The chart below shows total MPI and industry investment by sector.



PGP programme financial summary

PROGRAMME	COMMITTED FUNDING		PGP INVESTMENT PAID OUT	
	PGP	INDUSTRY	2017/18 FINANCIAL YEAR	TOTAL PROGRAMME TO 30 JUNE 2018
Clearview Innovations	9,750,000	9,750,000	1,120,084	9,147,811
Farm IQ (ended June 2017)	59,342,000	91,387,000	639,177	59,342,000
FoodPlus	29,100,000	29,100,000	2,137,942	11,228,414
High Performance Manuka Plantations	1,400,000	1,487,768	136,977	1,417,500
Lighter Wines	8,125,766	8,843,847	1,782,114	5,265,061
Marbled Grass-fed Beef	11,046,563	12,300,321	2,152,180	7,829,096
New Zealand Avocados Go Global	4,281,402	4,281,402	1,108,976	2,798,814
Omega Lamb	12,500,000	12,500,000	1,828,663	6,732,540
Passion2Profit	7,392,000	7,992,000	1,043,831	2,446,468
Pioneering to Precision	5,175,000	5,175,000	764,964	3,906,535
Precision Seafood Harvesting	26,310,000	26,310,000	3,911,319	19,885,645
Red Meat Profit Partnership (RMPP)	32,154,636	32,154,636	4,691,193	14,616,393
Seed and Nutritional Technology Development	7,145,169	7,482,169	1,266,123	5,919,133
Sheep – Horizon Three	12,556,607	18,834,910	1,981,665	3,182,297
SPATnz	13,032,452	13,032,452	1,196,349	9,632,058
Steepland Harvesting (ended June 2017)	3,682,500	3,906,396	209,103	3,682,500
STIMBR (ended June 2014)	1,186,000	1,465,204	–	1,184,031
Stump to Pump (ended September 2014)	1,810,586	1,810,586	–	1,810,586
The New Zealand Sheep Industry Transformation Project (NZSTX) (ended June 2017)*	16,770,000	16,770,000	155,418	16,466,080
Transforming the Dairy Value Chain (ended January 2018)**	81,100,000	81,700,000	9,684,762	81,104,136
W3 Wool Unleashed	11,049,000	11,049,000	1,662,893	3,161,894
Whai Hua (ended December 2016)	2,041,000	2,089,000	–	2,036,301
TOTALS	356,950,681	399,517,890	37,473,734	272,795,293

*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.

** 2017/18 PGP Investment Paid Out amount includes the last invoice paid on 10 September 2018.

