New Zealand sheep industry transformation PGP programme mid-term progress review

Ministry for Primary Industries

The New Zealand Merino Company Limited

March 2014

Summary report

pwc

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1 Executive summary

This summary report outlines the results of our mid-term progress review of the New Zealand Sheep Industry Transformation Project (NZSTX) completed in conjunction with Dr Ian Ferguson and Barry Brook. It is intended to provide an independent assessment of how the programme is tracking towards its goals, and to give an opinion on future performance and funding requirements.

In the opinion of the review team, the NZSTX is a worthwhile programme that has potential to substantially transform the sheep industry and improve economic outcomes in the sector. This transformation will be dependent on further advancements in the production science part of the programme, combined with a strong value proposition that is market-led and well-communicated in order to drive adoption.

Overall, while progress has been slower than anticipated, the programme has seen a number of good outcomes, such as the industry uptake of 'estimated breeding values' (EBVs), and supply chain improvements for fibre and meat.

1.1 Background

The NZSTX was launched in September 2010 as a Primary Growth Partnership (PGP) programme between the Ministry for Primary Industries (MPI) and The New Zealand Merino Company Limited (NZM).[1]

The PGP programmes are primarily business-led and market-driven innovation programmes that work across primary industry value chains. PGP programmes are long-term innovation programmes that seek to be interventionist and aspirational in order to achieve long-run improvements to economic growth and sustainability across the primary sector. A key requirement of PGP programmes is that they must deliver benefits to New Zealand through investments which are innovative and additional to existing initiatives and work programmes. Without PGP investment these initiatives would be either unlikely to proceed or proceed on a much reduced scale or pace.

The NZSTX aspiration, as per the original business plan, was to add $2 billion added value per annum through Fit For Market (FFM) [2] sheep production. Achievement of this aspiration is supported through three projects:

- Project 1: Fibre - transforming demand for FFM fibre
- Project 2: Meat and co-products - transforming demand for sheep meat and other FFM products
- Project 3: Production science - growing New Zealand's FFM sheep base.

This mid-term progress review provides an assessment of each of the three projects; the programme overall; and programme governance and management.

1.2 Project 1: Fibre

Overall, the Fibre project has made reasonable progress including the development of a toolkit for use by brand partners, establishment of the ZQ brand story, and enhancement of the supply contract model. Overall, the Fibre project met key targets for years one and two, and partially met targets for year three.

In terms of contribution to broader programme outcomes, wool contract volumes have increased from 29% in 2009-10 to 41% in 2012-13. Contract prices have been well above targets set at the outset of the programme (in part due to shifts in global commodity prices); however, brand partners do not consider them to be sustainable

[1] PGP investments must be consistent with New Zealand's international trade policy obligations. Areas of the NZSTX project concerning specific branding and marketing activities were ineligible for PGP funding, particularly in light of World Trade Organisation rules. These activities were instead fully funded by NZM.

[2] The term FFM sheep is used throughout this report to refer to the varieties of sheep which are likely to be developed through the NZSTX programme having a combination of fine wool, high productivity traits (lambing percentage and lamb growth rates), high quality meat and disease resistance especially to footrot and parasites.

in the long-run, without intervention. Production volumes have remained relatively static since the start of the NZSTX and are now not expected to show any signs of uplift until after 2017.

Over the next two years, the Fibre project will need to ensure that there is sufficient supply to meet demand, while also providing support to brand partners, and maintaining the benefits of the contract model.

A number of recommendations have been made for the Fibre project, including developing a plan to increase the supply of fibre, and working with brand partners to increase the range and volume of fibre used in their products.

1.3 Project 2: Meat and co-products

Initially, progress in the Meat and co-products project was reasonable. Most of the key targets for the first two years were met, including the establishment of a meat processor agreement and supply contracts. For year three, however, none of the key targets were met, and there was significant shortfall in volumes of contracts, supply and sales.

In terms of contribution to broader programme outcomes, meat contract volumes have been significantly below the original targets set for the programme. Targets have now been revised with no significant uplift expected until after 2017. Meat pricing has been above the original targets and spot market prices, similarly to the Fibre project this has been impacted by global commodity prices.

Over the next two years the programme will face challenges in increasing supply, driving demand, and developing a stable supply chain for meat and co-products. Ensuring the implementation of long-term contracts by brand partners with growers will be important to deliver the benefits of the contract model.

Key recommendations relating to meat are to expand the use of the contract model by getting more growers into contracts and to develop plans to increase the percentage of the carcass going into branded, value-add products. In relation to leather product development, a key recommendation is to develop capacity to be able to meet potential commercial demand.

1.4 Project 3: Production science

The Production science project acts as an enabler, supporting achievement of greater productivity and product value for fibre, meat and co-products. This project has seen good progress in the last 18 months, a clear improvement from the first two years when the majority of targets were not met.

A previous review of the Production science project was undertaken in December 2012, and made a number of recommendations to improve progress in the project. As noted above, recent progress in the Production science project has seen a notable improvement. The key target for 2012-13, relating to increased stock units, was significantly exceeded. While a number of supporting targets were not met or delayed, there is clearly increasing momentum and confidence in this area.

Good progress has been made in a number of the supporting work streams. For example, the forage work stream is demonstrating real possibilities for extending merino environments and improving farming profitability. The introduction and continuing uptake of EBVs has been a success, with an increase from three to 23 stud breeders transitioning to EBV, representing 80% of commercial rams in New Zealand. A nucleus flock has also been established to provide sheep to meet demand from high-growth wool contract markets, while also possessing other FFM traits.

Over the next two years the production science work streams face a number of challenges to support delivery of the underlying transformation required for the NZSTX.

A footrot solution has been cited as critical to the entire programme and one of the biggest risks. Genomic work regarding footrot is progressing, with the intent to produce a selection test for the industry. Footrot challenged rams show that there is a strong genetic base that would allow a quantitative genetics approach to be made if the genomic work was not sufficiently fruitful.

Within two years, we would expect results from the breeding value and central progeny testing work, which would provide confidence that a long-term, sustainable scenario for dual purpose animals is achievable.

Adoption is emerging as the key to future progress, provided FFM sheep can be produced in reasonable time. Incremental improvements are available through a range of initiatives, but transforming industry is dependent on developing FFM sheep. This requires achievement of genetic improvements that deliver one or more types of sheep that produce high value fine wool and high quality meat, while also possessing advantageous traits in relation to reproduction and disease resistance.

Key recommendations in the Production science project relate to progressing the genetics programme, expanding forage work, separating the adoption work stream and undertaking adoption planning.

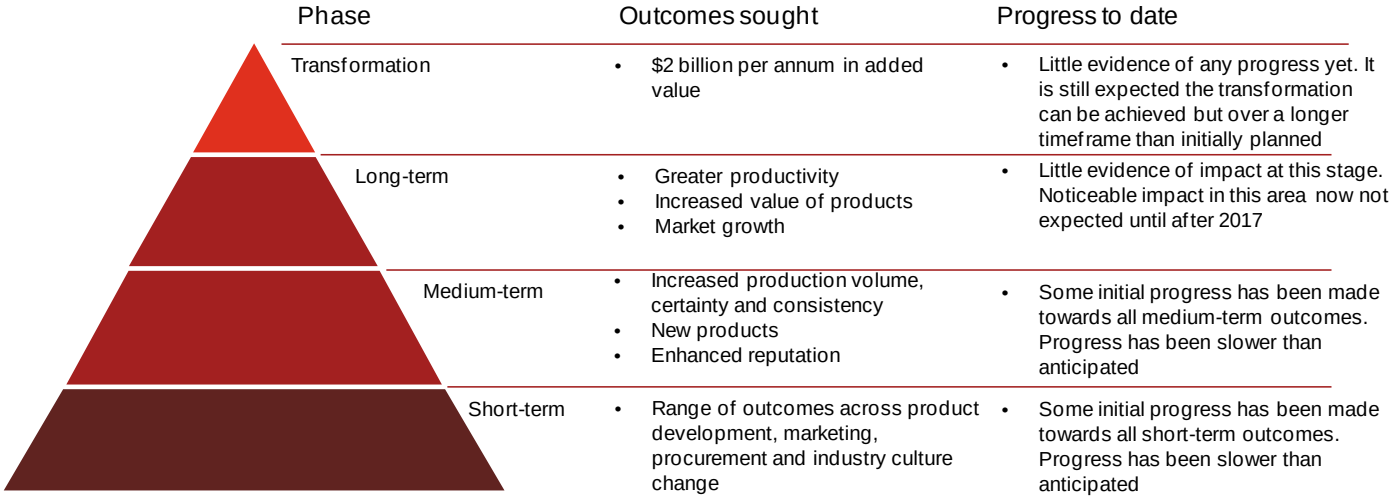
1.5 Programme progress

As noted above, the programme is still in relatively early stages and given the time lag between outputs (eg scientific breakthroughs) and outcomes (eg economic impact) significant progress towards long-term outcomes is not expected.

There has been some progress towards short and medium-term outcomes, but slower than originally anticipated. This is reflected in the timeframe for the $2 billion per annum value added target being pushed back to 2029. As per the revised targets set in the NZSTX 2013-14 Business Plan, no measurable impact is expected against this objective until after 2017.

Figure 1, below, shows a high level summary of progress towards the programme outcomes. The full list of outcomes is set out in the NZSTX outcome logic model in Figure 3.

Figure 1. Progress towards programme outcomes



A range of external factors have impacted the programme's progress to date. These have included difficulties in recruiting suitably qualified personnel for the programme, and competition with other land use options such as dairy grazing. Domestic and international market conditions have also impacted the NZSTX, particularly in the Fibre and Meat and co-products projects.

1.6 Governance and management

Overall, the programme exhibits indicators of good governance and management, demonstrating clear vision and direction, effective decision making and operations, continuous learning and improvement, and sound financial management.

However, there are a number of improvements that could be made in this area. Key recommendations relating to programme governance and management include more streamlined reporting, greater collaboration with other PGP programmes and developing a post-PGP transition plan.

2 Introduction

2.1 The Primary Growth Partnership

MPI is committed to helping the primary industries to double the value of exports by 2025. This is the Ministry's contribution to the Government's Business Growth Agenda target. Achieving this will require significant changes in the way the primary industries operate – to increase both volume and value of exports.

To help achieve this aim, MPI is co-investing with primary sector industries in innovation through the Primary Growth Partnership (PGP). The PGP aims to drive substantial gains in economic growth and sustainability, through shared investment in complementary and mutually supporting projects that work across the primary industry value chains.

A key requirement of PGP programmes is that they must deliver benefits to New Zealand through investments which are innovative and additional to existing initiatives and work programmes. Without PGP investment, these initiatives would be either unlikely to proceed or proceed on a much reduced scale or pace.

2.2 The New Zealand Sheep Industry Transformation project

One of these programmes is the New Zealand Sheep Industry Transformation project (NZSTX) led by the New Zealand Merino Company Limited (NZM). The NZSTX aims to create new opportunities and value for New Zealand's sheep industry. The programme's objective is to increase production of market-driven FFM sheep, shifting the balance between New Zealand strong and fine wool production, and using product differentiation to generate better grower returns for fibre, meat and other products, such as leather.

The NZSTX is a five-year PGP programme with funding of just under $37 million, including a $15 million government contribution. The FFM framework aims at lifting the value of wool, meat and co-products per animal. The aspiration of the objective is that by 2029, half of all coarse wool growers have transitioned into the FFM framework. This will be achieved through three projects:

1. transforming demand for FFM fibre
2. transforming demand for FFM meat and co-productions
3. growing NZ's FFM sheep base through a Production Science and farmer uptake programme.

2.3 Rationale for PGP investment

NZSTX was approved for PGP investment on the recommendation of the PGP's Investment Advisory Panel who noted that:

- It met all of the eligibility criteria for PGP investment.
- The programme was ambitious and aspirational in its objectives, which if successful, would transform New Zealand's sheep industry and make a material contribution to the New Zealand economy – claimed to be approximately $2 billion by 2019. This time frame has been subsequently extended to 2029.
- The programme would also provide spill-over benefits to the wider New Zealand economy, including new business skills and international expertise, greater collaboration between companies and researchers in the sheep industry generally, tourism and environmental sustainability.
- The barriers to be addressed to achieve this transformation were clearly identified and could not be achieved through "business as usual" activities within the industry.

2.4 The review

PwC was engaged by MPI and NZM in October 2013 to provide an independent, mid-term progress review of the programme after its first three years of operation. This review is intended to provide the NZSTX partners with an independent assessment of how the programme is tracking towards the programme's intent and purpose as set out in the original business plan and approved variations, and where it can make improvements and adjustments. This report is provided in accordance with the terms of our contract dated 22 October 2013 and is subject to the restrictions set out in Appendix C of this report.

Objectives

The objectives of the review were to:

- review progress made in each of the three projects in the programme and make recommendations as to their future direction and funding
- review project outputs to date and expected programme outcomes within the timeframes established in the business plan
- review internal and external factors affecting the programme including management and governance.

Scope

The scope of the review included all projects within the NZSTX programme, management and governance, project resources, programme funding, programme outcome monitoring and evaluation framework and other internal and external factors affecting the programme.

The scope included a strong focus on project three (Production science), as the underpinning enabler for achieving the intended growth in volume and value in the sheep industry.

The scope excluded undertaking an in-depth economic assessment of the NZSTX, or consideration of the relevance or public policy basis under which it was entered in to.

Review team

The review team consisted of PwC, science specialist Dr Ian Ferguson and industry specialist Barry Brook. Dr Ferguson was previously Chief Scientist for Plant & Food Research, and is currently Departmental Science Advisor to the Ministry for Primary Industries. Mr Brook is a professional director with a diverse background in agribusiness including being CEO of PGG Wrightson. This report has been jointly prepared and presents the collective view of the review team.

Methodology

As a first step, the team reviewed the existing documents relating to the programme, including the NZSTX contract and annual variations, business plan and subsequent updates, quarterly progress reporting, and science research reports.

Interviews were conducted with a broad range of stakeholders in the fibre, meat and leather industries, as well as with members of the science community and grower representatives. Through these interviews, the review team sought to understand the issues impacting the programme to date, perceptions of project efficacy, factors impacting ongoing performance, and opportunities for improvement.

In addition to the information gathered through the document review and interview process, the review team sourced independent data on industry performance and metrics, relevant factors in the external environment, and international comparisons.

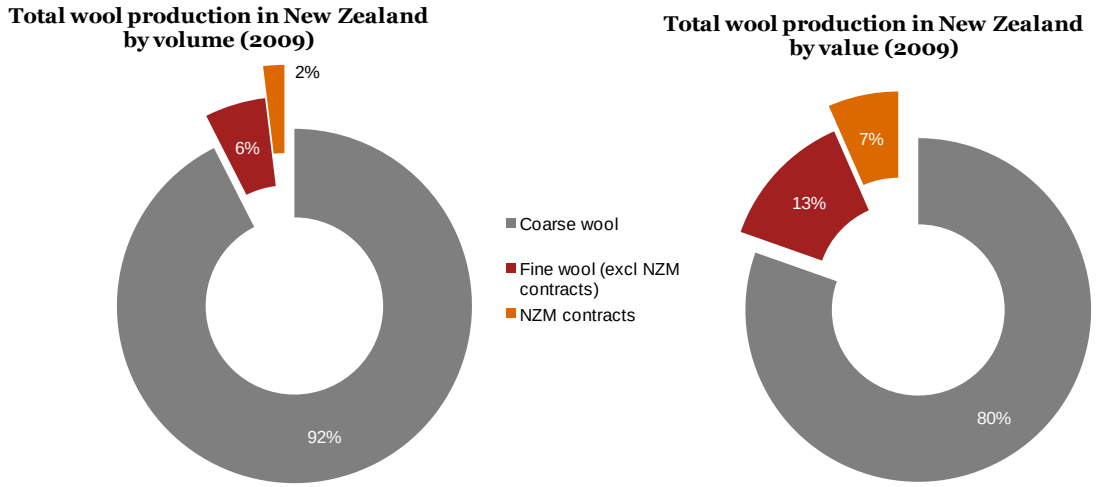
3 Overview of the NZSTX

3.1 Context

Over recent decades, the New Zealand sheep industry has been in notable decline, with total sheep numbers reducing by more than half over the last 30 years.[3] While New Zealand sheep farms have made huge gains in productivity over that period,[4] these gains have been unable to offset the challenges of rising input costs, commodity price fluctuations and land use competition.[5] [6] [7]

As shown in Figure 2 below, merino and mid-micron (fine) wool accounts for only eight per cent of New Zealand's total wool production, but contributes 20% of the total value of the New Zealand wool clip. NZM contracts account for around one third of this value, or seven per cent of the overall market value.

Figure 2: Volume and value of wool production in New Zealand (2009)



Source: NZSTX 2009-19 Business Plan

As highlighted by these figures, the merino and mid-micron wool market and supply contract model present a value proposition that is significantly better than for coarse wool.

However, while there is a clear value proposition presented by merino sheep in terms of wool value, selective breeding for optimal fine wool production has not improved the efficiency of meat production, nor other traits such as reproduction performance and disease resistance.

In particular, the current vulnerability of the existing genetic stock to footrot disease and parasite infection is a constraint on the expansion of merino into lowland environs. This results in a significant limitation to the potential size of the New Zealand merino flock.

3.2 The intervention

The NZSTX seeks to address these issues by developing FFM sheep. Such a sheep would produce high value fine wool, quality meat and other products such as leather and lanolin, while also possessing advantageous traits in relation to reproduction and disease resistance.

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[3] Statistics New Zealand, annual agricultural surveys.

[4] Dr Peter Fennessey, May 2012, 'The New Zealand Sheep Scene' presentation to the Western Australia Sheep Industry

[5] Federated Farmers, 2008, T150 campaign factsheet.

[6] Copland, R.J. and Stevens, D.R., 2012, The changing face of southern New Zealand farming: opportunities of land use change.

[7] Mike Barton, June 2012, 'Science needs of a Nitrogen capped farmer', presentation to the Beef & Lamb New Zealand Innovation at Invermay seminar.

In addition to developing FFM sheep and transitioning growers to FFM farming systems, the NZSTX aims to improve the supply chain through increased uptake of a contract supply pricing model for both wool and meat.

In tandem with transforming the supply side of the market, the NZSTX aims to grow demand by working with brand partners to create new products and markets, and creating and promoting premium brands for New Zealand merino products.

The NZSTX aspiration, as per the original business plan, was to add $2 billion[8] added value per annum through FFM sheep production by 2019. Achievement of this aspiration was supported through three projects:

- Project 1 Fibre - transforming demand for FFM fibre
- Project 2 Meat and co-products - transforming demand for sheep meat and other FFM products
- Project 3 Production science - growing New Zealand's FFM sheep base.

It was acknowledged at the outset of the programme that the initial focus for milestones and performance measurement would be on the first 12-24 months. Future year objectives, their underlying milestones and achievements, would need to be developed in response to progress achieved over that period.

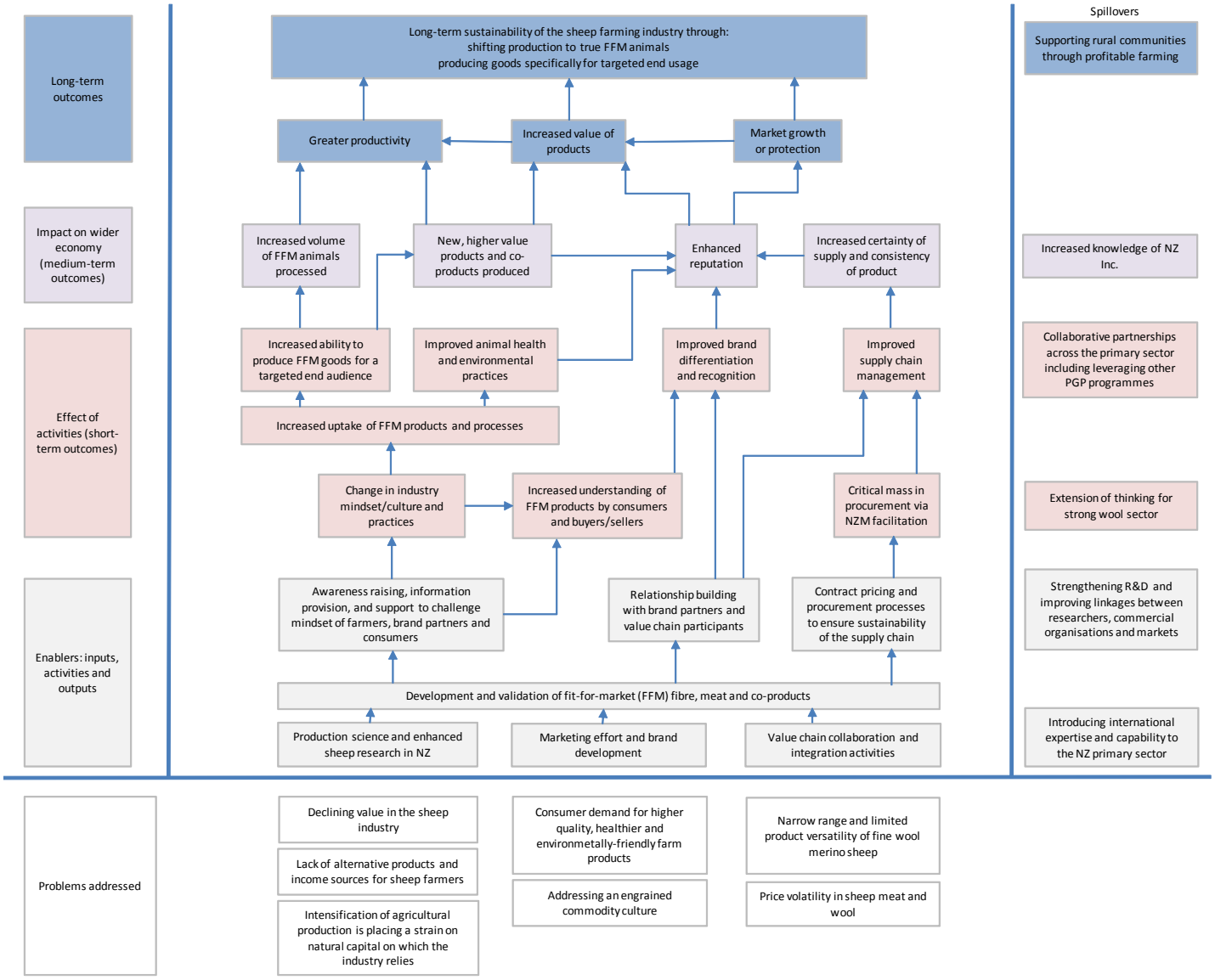
As such, the programme and project objectives have evolved from those set out in the original contract. Each year a revised business plan has been agreed between NZM and MPI setting out objectives and performance measures for the upcoming period.

The $2 billion per annum in added value remains the overarching aspiration but the target for achieving this has recently been pushed out from 2019 to 2029.

The NZSTX intervention logic model, as shown in Figure 3 on page 8, provides the underpinning rationale for investment in the PGP programme and sets out the expected short, medium and long-term outcomes.

[8] 2009 dollars.

Figure 3. The NZSTX intervention logic model



Source: NZSTX Business Plan

4 Project 1: Fibre

4.1 Overview

The overarching objective set for the Fibre project at its inception was:

> *Development of tools to assist brand partners in realising market opportunities through the conversion of non-users of FFM and the identification of new uses of FFM.*

The Fibre project is focused on two key output areas of the outcome logic model shown in Figure 3: marketing effort and brand development, and value chain collaboration and integration activities.

4.2 Project progress

Overall, the Fibre project has made reasonable progress including the development of a toolkit for use by brand partners, establishment of the ZQ brand story, and enhancement of the supply contract model.

An overview of progress against the key output areas for the Fibre project, and against the project's objectives, is provided below.

Marketing effort and brand development

NZM has built a positive reputation in the marketplace through the development of ZQ, NZM's merino wool brand. NZM also has an excellent reputation with its brand partners.

One of the key strengths of the ZQ brand story is that it resonates with the consumers of brand partners. These consumers love experiencing outdoor activities, often in alpine surroundings, and identify with issues such as sustainability and natural production in the wild.

Value chain collaboration and integration activities

The concept of supply contracts between brand retailers and farmer suppliers has been something talked about in New Zealand agriculture for a long time but without much success. NZM has broken through this impasse and established supply contracts between brand partners and wool growers as a core and dominant activity which is regarded very positively by both parties. The supply contract model developed by NZM and enhanced by the PGP programme is a major positive achievement for New Zealand agriculture.

"The supply contract model developed by NZM and enhanced by the PGP programme is a major positive achievement for New Zealand agriculture"

Progress towards project objectives

The overarching objective target for the Fibre project was met for year one and two, with a toolkit being developed and volume targets met or exceeded. For year three the target was met for two of the four target micron categories.

4.3 Contribution towards programme outcomes

"Contract volumes have seen clear improvements over the term of the programme"

The Fibre project, along with Production science as an underlying enabler, will be key to achieving the NZSTX's long-term outcomes relating to greater productivity, increased product value for fibre and market growth. In alignment with the logic model in Figure 3, we have used the following indicators to examine progress towards programme outcomes: contract volumes, contract prices and production volumes.

Contract volumes

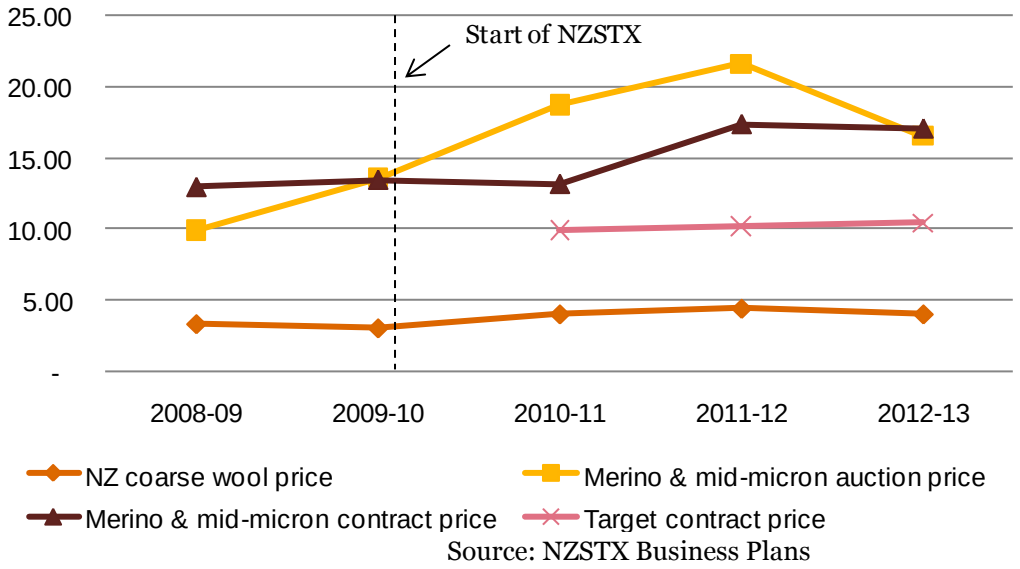
Contract volumes have seen clear improvements over the term of the programme. The total proportion of the NZSTX wool being sold through supply contract via NZM has increased from 29% in 2009-10 to 41% in 2012-13.

Contract prices

Despite the significant gains in contract volumes, the overall progress in prices has seen mixed results. As shown in Figure 4 below, the merino and mid-micron prices have been well above the targets set at the outset of the NZSTX. However, much of this pricing increase has been driven by the 2011 commodity boom, which has resulted in spot market prices well above the long term average.

Over the last four years, the contract pricing has been on average four per cent lower than the spot market prices. This is a result of the contract pricing mechanism working to even out the impact of boom and bust cycles. While this price-smoothing is beneficial in the long-run, it has reduced the relative value of the contracts compared to spot prices in the short-term. More recently, the spot market prices have fallen well below the contract prices putting increased pressure on brand partner margins.

Figure 4. Wool prices ($/kg clean) 2008-2013



Source: NZSTX Business Plans

"Merino and mid-micron prices have been well above the targets set at the outset of the NZSTX"

Production volumes

As the programme is still in the initial stages and the transformation in supply has not yet been achieved, there is little evidence of impact on long-term volumes. There has been a gradual decline in merino and mid-micron wool production over the period 2001-2009. This decline stopped before the start of the NZSTX and production volumes have remained stable since. It is not possible, however, to tell what impact the NZSTX has had on production volumes, and whether, for instance, the absence of NZSTX would have meant further decline.

Due to the nature of the programme, there will be a lag between the project outputs and achievement of programme outcomes. The expected delay before results are seen has been reflected in the revised wool volume targets.

4.4 Future outlook

In regards to the fibre aspects of the programme, over the next two years the programme will face challenges in ensuring there is sufficient supply to meet demand, supporting brand partners, and maintaining the benefits of the contract model. A number of recommendations have been made to help the programme overcome these challenges. These are summarised in Appendix A. While it is noted that some of the recommendations in this area relate to marketing activity that is outside the scope of PGP funding, these activities are considered to be important for NZM to undertake in order to complement the broader NZSTX programme.

5 Project 2: Meat and co-products

5.1 Introduction

The overarching objective set for the Meat and co-products project at its inception was:

Integrated supply chain and business model for meat and co-products.

Underneath this objective, there were a number of supporting milestones and achievement measures. Over the first two years of the project, the supporting milestones were mostly one-off targets relating to the establishment of the integrated supply chain model.

"The original targets... were largely achieved during the first two years of the project"

These original targets, which included setting up a meat processor agreement and supply contracts, were largely achieved during the first two years of the project.

From year three (2012-13) the overarching objective was changed to:

Transforming demand for FFM meat and co-products.

To achieve this, the Meat and co-products project is focused on two key output areas of the outcome logic model in Figure 3. These output areas are marketing effort and brand development and value chain collaboration and integration activities.

5.2 Project progress

An overview of progress against the key output areas for the Meat and co-products project, and against the project's objectives, is provided below.

Marketing effort and brand development

The Silere brand for merino lamb has been introduced to the marketplace both within New Zealand and in a limited number of international markets. While there is evidence from marketplace taste testing that the Silere product is positively differentiated by consumers, it is yet to be determined whether significant price premiums will be achievable for much larger volumes and across the international markets being targeted.

The Alpine Origin Merino Limited (AOML) joint vehicle with Silver Fern Farms (SFF) has proved to be a successful vehicle for the marketing of Silere product. SFF offers Silere as part of its range of premium red meat products alongside Reserve beef, venison and high quality lamb cuts.

Value chain collaboration and integration activities - meat

As mentioned under the Fibre project section, the supply contract model developed by NZM is a major positive achievement for New Zealand agriculture. NZM has now introduced the concept to the meat sector through AOML.

"While initial contract volumes are small, an important step has been made towards a more integrated supply chain"

Supply contracts for lambs qualifying for the value-add 'Silere' branding have been successfully introduced. While initial contract volumes are small, an important step has been made towards a more integrated supply chain. Initially the forward contracts were signed for three years. Recently however, the forward contracting period has been severely reduced to between three and six months as a result of the volatility of sheep meat prices.

Value chain collaboration and integration activities - leather

Positive progress has been made in developing merino leather for use in high fashion items such as bags and shoes. Following research into both the raw material and the process for producing the pelts, process modifications have enabled a unique and highly textured leather to be produced.

While early indications of interest from the marketplace are positive, sales volumes are low and there is uncertainty as to whether success can be achieved for large volumes of product.

Progress towards project objectives

The Meat and co-products project has not met any of the revised targets for volumes of contracts, supply or sales. Some of the shortfall on the supply side has been due to timing issues and climatic conditions over this period. On the demand side, however, the sales figures are significantly below target and only account for a very small proportion of supply.

5.3 Contribution towards programme outcomes

The Meat and co-products project, along with production science as an underlying enabler, will be key to achieving the NZSTX's long-term outcomes relating to greater productivity, increased value of products, and market growth.

In alignment with the logic model in Figure 3, we have used the following indicators to examine progress towards programme outcomes: contract volumes and contract prices. Total production volumes have not been separately considered as these are not specifically measured by NZM.

Contract volumes

As the programme is still in the initial stages and the transformation in supply has not yet been achieved, there is little evidence yet of impact on long-term volumes.

The NZSTX contract volumes have been significantly below the target volumes, and have not yet shown any upward trend towards meeting targets.

In light of the lack of progress made towards the contract volume targets, the programme targets were revised downwards. Meat volumes are expected to remain near current levels, with no significant uplift until after 2017.

Contract prices

Meat pricing has shown favourable progress, with the NZSTX pricing being above the original targets and also exceeding the spot market prices. As with wool pricing, it is noted that the commodity boom has impacted the contract price setting.

While the price premium achieved in the initial years is a good result, a move by SFF away from long-term contracts may jeopardise the programme's ability to achieve the key benefits of the supply contract model: price certainty and stability. Ensuring the implementation of long-term contracts by SFF with growers will be important to deliver the benefits of the contract model.

"Meat pricing has shown favourable progress, with the NZSTX pricing being above the original targets and also exceeding the spot market prices"

Due to the nature of the programme, there will be a lag between the project outputs and achievement of programme outcomes. In addition, the Meat and co-products project has faced challenges in developing and marketing value-added products to drive the desired increase in volumes and prices.

5.4 Future outlook

Over the next two years the programme will face challenges in increasing supply, driving demand, and developing a stable supply chain for meat and co-products. A number of recommendations have been made to help the project overcome these challenges. These are summarised in Appendix A.

6 Project 3: Production science

6.1 Introduction

At the inception of the NZSTX, the following overarching objective was set for the Production science project:

> *Best farming practices, breeding management plans, and pathways and strategies to transition farming systems to FFM sheep systems.*

Over the first two years, the majority of the original milestone targets for production science were either not met or only partially met, and the overarching objective achievement measure was not met. This was due to a combination of factors, including lack of appropriately qualified personnel, unfavourable weather conditions, and insufficient numbers of growers recruited to the programme.

As per the 2012-13 Business Plan, it was agreed that the objectives, milestones and achievement measures from year two onwards would be revised. Through this process there was a redirection of these projects to provide a set of more coherent, focused projects. These were grouped into five headings: forage science, livestock system trials, genetics/trait acceleration, animal health, and adoption. The projects within these workstreams were targeted at a completion date at the end of 2015.

The objective for year three (2012-13) onwards was amended to:

> *Increase in FFM merino flock in New Zealand.*

The achievement measure set for this objective was an increase in FFM livestock production due to the NZSTX initiatives of 3,000 stock units by 30 June 2013, and 60,000 stock units by 30 June 2014.

6.2 Project progress

The Production science project has delivered a number of outputs over the three years of the programme to date, particularly in the last 18 months. An overview of the progress in each of the five workstreams is provided in the sections below.

"In general, the proposed new forage systems have the potential to improve merino management systems and exploit additional environments"

Forage

In general, the proposed new forage systems have the potential to improve merino management systems and exploit additional environments. Lead farmers are trialling different forage systems that incorporate lucerne, specific clovers and lupins. These trials are either already showing benefits or showing the potential for profitability gain, although benefits are difficult to precisely quantify.

The varying successes on different farms, with their different conditions and management practices, demonstrates progress but also shows that successful adoption will still be very dependent on local conditions and practices. The forage work stream will therefore require continued monitoring and adjustment to be successful. Issues that still remain include aluminium with lucerne, the need to demonstrate lambing and feeding gains across the different environments, farmer seeding management and practices, and the tailoring of forage use into whole-of-farm management.

Livestock trials

The livestock trials were designed to contribute to the establishment of a platform (demonstration farms, livestock trials, active use of the Merino Manager), that would provide a proof of concept for livestock improvement and management. This on-farm testing is important in developing a convincing value proposition that would encourage transformation to fine fibre wool, and also as the basis for continuing adoption projects.

This work stream was scheduled to be completed in 2013 and no further work was scheduled beyond this date. Milestones were largely achieved. Continuing on-farm trials is a vital part of the adoption programme to show financial benefits over competing management systems, and encourage uptake of the fine wool programme.

Trait acceleration

Progress is being made towards developing FFM sheep (better sheep, not a 'perfect sheep'), particularly with adoption of more robust genetics. There has been a substantial increase in progress, and growing confidence, with the appointment of Dr Mark Ferguson. There might need to be some caution with the concept of the 'perfect sheep'. Step changes cannot be made overnight. Ongoing adoption of incrementally better genetics is more likely. This strategy will be better recognised by farmers, ensuring more successful uptake. Rather than one perfect sheep breed, a more likely outcome will be a variety of breeds incorporating the FFM objectives for fine wool, meat and co-products.

Major progress has included the introduction and continuing uptake of 'estimated breeding values' (EBV) with an increase from three to 23 stud breeders transitioning to EBV, representing 80% of commercial rams in New Zealand. A nucleus flock has also been established. The involvement of the seven commercial breeders in this flock should enable a broader impact once the adoption pathway is formulated and implemented.

Animal health

There have been delays in the footrot genomics work (making associations between the incidence of footrot and genetic markers on single nucleotide polymorphisms (SNP) chips). There is no expectation of a single marker, and it is likely that markers will be in the nature of shared DNA rather than major functional genes. The advantage of this genomic approach is that selection is not dependent on variable footrot occurrence.

Footrot challenged rams show that there is a strong genetic base, such a base would allow a quantitative genetics approach to be made if the genomic work was not sufficiently fruitful.

Adoption

Adoption is emerging as the key to future progress, provided FFM sheep can be produced in reasonable time. Incremental improvements are available through a range of initiatives, but transforming industry is dependent on developing FFM sheep. Current wide use of field days, transition farms, and small group models for transferring knowledge may not be of sufficient scale to get adoption at the required rate in the next years. Awareness of the programme and objectives throughout the industry at large could be better and would help to increase momentum.

6.3 Contribution towards programme outcomes

The Production science project acts as an enabler, supporting achievement of greater productivity and product value for fibre, meat and co-products. The work that has been achieved in the last one to two years however, has been a significant step forward. Although it is not possible to provide an objective assessment of the impacts of this project, it is considered that clear benefits have been achieved that would not have happened in the absence of the NZSTX intervention.

"Clear benefits have been achieved that would not have happened in the absence of the NZSTX" intervention"

6.4 Future outlook

Over the next two years the production science work streams will face a number of challenges to support delivery of the underlying transformation required for the NZSTX. A number of recommendations have been made to help the project overcome these challenges, these are summarised in Appendix A.

7 Programme progress

7.1 Outcomes

This section provides an assessment of the high-level progress towards the logic model outcomes as set out in Figure 3. Project outputs and progress towards project objectives were covered in the sections above.

The programme is still in relatively early stages so significant progress towards logic model outcomes would not be expected. It is also important to note that the time basis of progress will not be linear. For many of the outcomes a step change is needed which will then see rapid progress made towards achieving the outcome.

Overall, it is considered positive to see some progress towards all short-term outcomes, although this is slower than originally anticipated. Progress has also been made towards each of the medium-term outcomes, and towards the long-term outcome of 'increased value of products'.

Figure 5 below, sets out the short, medium and long-term outcomes for the programme and progress to date.

Figure 5. Progress against logic model outcomes

Outcome	Comment
Short-term *2012-2019*	
Change in industry mindset/culture and practices	• Initial progress evident in increased uptake of contract model • Further work needed to change grower mindsets regarding merino
Increased understanding of FFM products by consumers and buyers/sellers	• Increased understanding exhibited by buyers and sellers • Little cut-through yet with consumers
Critical mass in procurement via NZM facilitation	• Progress evident in increased contract volumes, however, critical mass not reached yet
Increased uptake of FFM products and processes	• Work underway to increase use of contract model • Work underway to improve seasonal supply of meat • Increased number stock units (additional14,800 as at June 2013)
Increased ability to produce FFM goods for a targeted end audience	• Work ongoing with science team and growers to develop and supply goods to meet market specifications
Improved animal health and environmental practices	• There have been good outputs in this area, and initial progress is being made toward a solution for footrot
Improved brand recognition and differentiation	• Good work in brand development, however further work needed around recognition and differentiation
Improved supply chain management	• Clear improvements in supply chain management, particularly the meat sector
Medium-term *2015-2022*	
Increased volume of FFM animals processed	• No increase yet in wool volumes • Meat volumes well below target, but still an increase on baseline
New, higher value products and co-products produced	• Initial testing of new products, but not yet being produced
Enhanced reputation	• Evidence of NZM and NZSTX building good reputation with growers and stakeholders • Broader reputational benefits for NZ Inc.
Increased certainty of supply and consistency of product	• Some improvements provided by contract model, but currently a lack of certainty regarding ability to supply future volume needs
Long-term *2020 +*	
Greater productivity	• Too early to tell the impact of interventions in this area
Increased value of products	• Progress made in wool contracts and SILERE premiums for restaurants
Market growth or protection	• Too early to tell the impact of interventions in this area

In addition to these outcomes, the NZSTX is likely to have had broader benefits. While evaluation of these was outside the scope of this review, NZM's own assessment of the programme's broader benefits to date is provided in Appendix B.

8 Governance and management

The NZSTX is managed and delivered by NZM, as an extension of their existing operations. The programme is governed by a Steering Group which includes representatives of the two funding partners, MPI and NZM. Overall, the programme exhibits indicators of good governance and management.

The programme has a clear vision for the long-term outcomes and has established a logical pathway to get there, as set out in the outcome logic model in Figure 3.

"Ensuring the programme is moving towards its long-term aspirations is of more importance than the path taken to get there"

There are clear lines of accountability and responsibility evident in the NZSTX programme and constituent projects. The current processes provide for openness and transparency from the project level through to management and governance, giving confidence in the decision-making and management processes of the scheme.

NZM has also demonstrated effective use of partnerships and collaboration. A joint-venture with SFF has enabled the NZSTX to leverage their scale for contracting and processing, and undertake joint marketing initiatives such as the promotion of premium New Zealand meats in the United States.

Interactions with other PGP programmes have been promising, such as the primary sector boot camps, a collaborative forum that NZM was a key driver of. However, there are opportunities for greater collaboration and knowledge sharing between the NZSTX and other PGP programmes, particularly with Farm IQ and the new Red Meat Profit Partnership.

The NZSTX undertakes regular planning through the annual business planning process and associated contract variations. However, these planning and reporting mechanisms are overly detailed, resource intensive to produce and consume, and often lacking in cohesion. The length and structure of the reports limits their usefulness from a governance and accountability perspective. It is recommended that business planning and reporting mechanisms be more streamlined to be more efficient at communicating relevant programme information.

An important consideration for the NZSTX, as well as other PGP programmes, is how to accurately measure and report the economic benefits of the programme. Latest estimates from NZM are that the programme to date has generated $410 million in added value.[9] However, the framework for measurement could be more robust, and would benefit from being undertaken in conjunction with the broader PGP benefits analysis that is underway.

As noted earlier in this report, staff shortages have resulted in significant delays in some aspects of the programme. It is important for NZM to ensure that they have plans in place to manage any staffing changes with minimal disruption to the programme.

The investment made in the programme to date has helped to develop a number of tangible and intangible assets that need to be maintained after the conclusion of the PGP funding. A transition plan should be developed to establish how the project outcomes will continue to provide benefits after the conclusion of the NZSTX programme.

"The investment made in the programme to date has helped to develop a number of tangible and intangible assets that need to be maintained after the conclusion of the PGP funding"

[9] Based on NZM's value add calculations, with adjustment to the 2012/13 NZSTX wool price, as per discussions with NZM.

9 Concluding remarks

The revised targets and timeframes for the NZSTX provide a more realistic goal than the original aspiration; however, it is still too early to tell if the programme can deliver $2 billion in added value per annum by 2029.

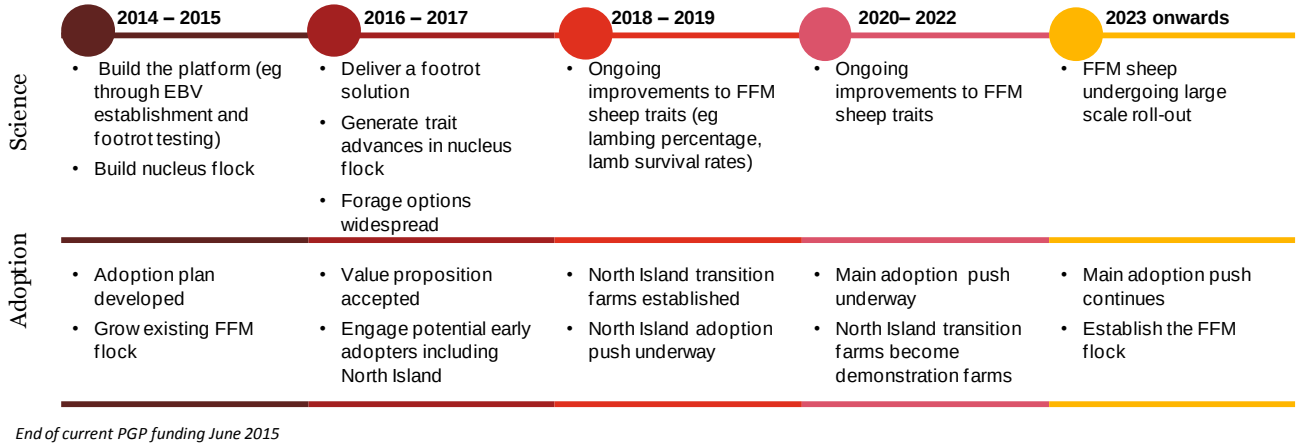
The development of FFM sheep is a critical success factor underlying the industry transformation sought by the NZSTX. Due to the nature of the genetics work required, however, it will be some time before FFM sheep are available for large-scale adoption. Current best estimates are around 10 years.

In order to deliver the required improvements in the genetic stock and forage options needed for FFM sheep, there needs to be concentrated, ongoing effort in the Production science project.

The programme has seen some good progress so far in the production science area such as industry uptake of EBV. The NZSTX can leverage off these initial gains to promote adoption uptake in the short to medium-term, prior to the development of FFM sheep. Ensuring that there is ongoing adoption will be important to provide the momentum needed for the transformation, and meet the demand for fibre from brand partners.

An overview of the potential future timeline in production science and adoption is provided in Figure 6, below.

Figure 6. Estimated timeline towards achieving transformation[10]



Driving adoption requires:

- promoting footrot management solutions and challenging existing mindsets around merino sheep
- developing an adoption plan for transitioning new growers into FFM production systems
- ensuring a compelling value proposition is available for growers to transition to FFM production systems.

There also needs to be more visible appreciation of the wide variation in farm management systems in practice, including different revenue models. Farmers have a more holistic approach than that assumed in compartmented forage, genetics or animal health projects. Successful transformation will only occur when this holistic view of farm management is considered.

Overall, the NZSTX has the potential to substantially transform the sheep industry and improve economic outcomes in the sector. Individual farmers who have bought into the aims of the programme with enthusiasm provide evidence that this transformation can be achieved. The key will be to build on the science achievements with communication of powerful value propositions and a compelling adoption programme.

[10] This timeline represents best estimates based on information received, and assumes adoption of the recommendations in this report. It is not possible, however, to predict the future programme outcomes with any degree of certainty.

Appendix A Summary of recommendations

	Recommendation	Priority
	Fibre	
1	Develop a plan for growing fibre supply, with an initial targeted increase of 1,000 to 2,000 tonnes of fine wool per year.	High
2	Review the relevance and effectiveness of the ZQ brand marketing effort and refine this in consultation with brand partners.	Medium
3	Research how to effectively use online channels and support brand partners in this area.	Medium
4	Work collaboratively with brand partners to help develop cost effective blends and to broaden micron ranges used.	High
5	Support second-tier brand partners to expand their use of fine wool, in order to diminish the risk of reliance on a limited number of brand partners.	Medium
6	Work proactively with brand partners to refine supply contract terms around pricing and encourage longer contract terms.	Medium
	Meat and co-products	
7	Develop an action plan via AOML to ensure that the number of merino lambs contracted consistently exceeds 200,000 in the next two years.	High
8	Develop an action plan to lift the percentage of the merino lamb carcase going into Silere branded product sales from the current six per cent to over 30%.	High
9	Develop a pre-investment business case for marketing Silere in a key offshore market.	Medium
10	Work proactively with brand partners to refine supply contract terms around pricing and encourage longer contract terms.	Medium
11	Explore opportunities to find brand partners at the retail end of the value chain.	Medium
12	Develop a plan in the next six months on how to achieve fulfilment of an order for a significant volume such as 400,000 “squares” of merino leather.	High
13	Work with brand partners to ensure delivery of high quality leather and other co-products.	Medium
	Production science	
14	Reform the advisory groups into a single smaller, more incisive panel that can take a view of the whole programme and provide regular reviews to the Steering Group.	High
15	Quantify the benefits of forage adoption in order to provide a clear value proposition	Medium
16	Develop a more intensive plan for expanding lupin trials across different environments and soil types to show wider potential for uptake.	High
17	Reassess research on clover to determine whether more background work is necessary, or whether an increased on-farm effort will bring this project to a more useful stage of development.	High

	Recommendation	Priority
18	Retain funding of the forage programme at least at existing levels over the next two years to ensure that on-farm research has developed to the point that will allow much wider adoption.	High
19	Specifically identify major barriers to farmer uptake of new forage options and develop a plan to mitigate these.	Medium
20	Develop a plan for the ongoing maintenance of the nucleus flock and central progeny testing, particularly in relation to the conclusion of the PGP milestone achievement.	Medium
21	Institute regular reviewing of the genetics programmes, involving a revamped science advisory panel, to closely monitor progress.	Medium
22	Reassess the level of industry transformation that will be possible if footrot resistance, particularly through a quicker genomics approach, is not achieved.	High
23	Provide a report to the Steering Group and a revamped science advisory panel, on the results of genome wide association regarding the likelihood of success of markers and genome wide selection for footrot resistance, with a decision on next steps, by June 30, 2014.	High
24	Adopt a metric for measuring progress in genetic improvement.	Medium
25	Separate the adoption work stream from production science to give it a clear focus and a new set of timelines, milestones and resourcing for the next two years.	High
26	Develop a new adoption plan with associated performance measures and timeframes.	Medium
27	Introduce new expertise relating to technology transfer and grower adoption, such as engaging external advisors or undertaking reviews of alternative farming models.	High
28	Invest in the Discovery computer model to allow user-friendly interrogation by farmers and validate the comparative stocking options.	Medium
	Governance and Management	
29	That the NZSTX programme steering group work more closely with the Board of NZM during the NZSTX annual business planning and funding agreement process.	Low
30	Increase engagement with other PGP programmes, particularly those working in the same industry, to share learnings and collaborate on projects.	High
31	Amend business planning and reporting mechanisms to be more streamlined and efficient at communicating relevant programme information.	High
32	Establish a robust framework for measuring the economic impacts of the NZSTX, in conjunction with the broader PGP portfolio analysis.	Medium
33	Prepare succession plans for key programme personnel.	Medium

Appendix B Additional benefits

The following list of additional benefits were noted by NZM in the quarterly report to September 2013

(a) Better alignment of private-public partnerships and increased profile for PGP with positive media exposure.

(b) Enhanced marketing capability in the New Zealand primary industry, especially around social media and technology.

(c) Up-skilling resources within the industry, with extension of research, development and innovation capability (particularly through the wide range of production science projects).

(d) Confidence in the economic sustainability and resilience of the New Zealand Merino sector.

(e) Increased collaboration within the Merino sector, with Merino Inc agreeing to contribute significant funding to the NZSTX FeetFirst (footrot) project.

(f) Building resilience in the New Zealand sheep industry to changing climate and weather conditions (such as drought) through enhanced forage systems.

(g) A continuing search for how the approach taken to fine wool opportunities could be applied to strong wool opportunities.

(h) Development of 'brand New Zealand' as we evolve differentiation strategies for meat and other products.

(i) Prototyping a branded, contract-based model for the meat and wider sheep industry, which more effectively links product supply with consumer demand and recognises the need for branding and differentiation of New Zealand primary products.

(j) Further development of collaborative in-market partnerships.

(k) Leadership of the 'Primary Sector Boot Camp' concept, facilitating the inaugural event at Stanford University in Palo Alto, and successful follow-up events in Hawkes Bay in February 2013 and at Premier House in August 2013. Prime Minister John Key, Minister Joyce and Minister Guy all attended components of the Premier House event, and it was the first time that leaders from five key Government agencies (NZTE, MPI, MSI, MFAT and Callaghan Innovation) were in the same room, at the same time, as CEOs from across New Zealand's primary industry. The event included an update on collaborative actions regarding talent and in-market activities, as well as a deep-dive into sustainability.

(l) Building on the success of the first 'Primary Sector Boot Camp' in Palo Alto, Professor Baba Shiv of Stanford University was brought to Auckland to present to senior managers from the New Zealand primary sector in February 2013.

(m) As a result of the 'Primary Sector Boot Camp' follow-up event in Hawkes Bay in February 2013, closer relationships have been forged with other New Zealand primary sector organisations enabling the industry to capture the value of our sustainability efforts more effectively through collaboration and benchmarking.

(n) Using the 'Primary Sector Boot Camp' as the model, NZM provided assistance with the leadership and organisation of a highly successful Maori Leaders' Boot Camp at Stanford University in August 2013.

Appendix C Restrictions

This report has been prepared for the Ministry for Primary Industries and The New Zealand Merino Company Limited to evaluate the progress of the New Zealand Sheep Industry Transformation Project. This report has been prepared solely for this purpose and should not be relied upon for any other purpose. We accept no liability to any party should it used for any purpose other than that for which it was prepared.

This report has been prepared solely for use by for the Ministry for Primary Industries and The New Zealand Merino Company Limited.

To the fullest extent permitted by law, PwC accepts no duty of care to any third party in connection with the provision of this report and/or any related information or explanation (together, the "Information"). Accordingly, regardless of the form of action, whether in contract, tort (including without limitation, negligence) or otherwise, and to the extent permitted by applicable law, PwC accepts no liability of any kind to any third party and disclaims all responsibility for the consequences of any third party acting or refraining to act in reliance on the Information.

We have not independently verified the accuracy of information provided to us, and have not conducted any form of audit in respect of The New Zealand Merino Company Limited. Accordingly, we express no opinion on the reliability, accuracy, or completeness of the information provided to us and upon which we have relied.

The statements and opinions expressed herein have been made in good faith, and on the basis that all information relied upon is true and accurate in all material respects, and not misleading by reason of omission or otherwise.

The statements and opinions expressed in this report are based on information available as at the date of the report.

We reserve the right, but will be under no obligation, to review or amend our report, if any additional information, which was in existence on the date of this report, was not brought to our attention, or subsequently comes to light.

We have relied on forecasts and assumptions prepared by The New Zealand Merino Company Limited about future events which, by their nature, are not able to be independently verified. Inevitably, some assumptions may not materialise and unanticipated events and circumstances are likely to occur. Therefore, actual results in the future will vary from the forecasts upon which we have relied. These variations may be material.

This report is issued pursuant to the terms and conditions set out in our contract dated 22 October 2013.