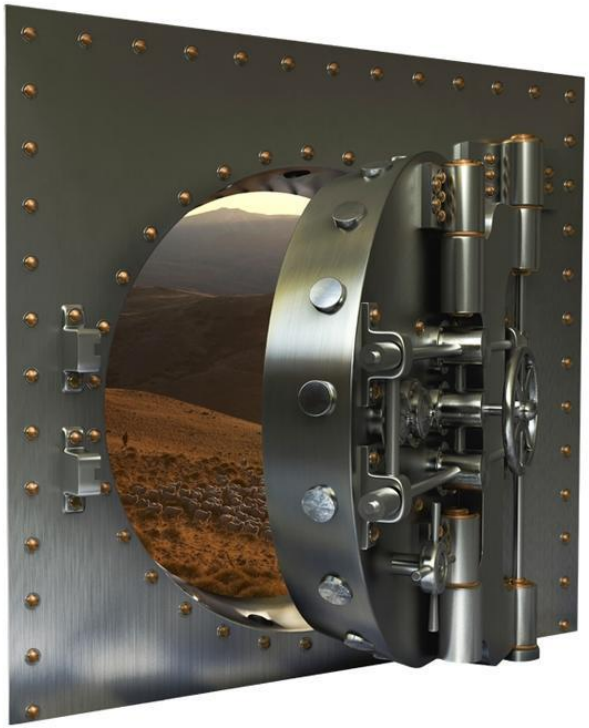


THE NEW ZEALAND SHEEP INDUSTRY TRANSFORMATION PROJECT (NZSTX)

PUBLIC SUMMARY REPORT

MARCH 2018

INDEX

1.0 EXECUTIVE SUMMARY

1.0.1 **Public Summary Report:** This is the Public Summary Report for The New Zealand Merino Company's (NZM's) Primary Growth Partnership (PGP) with the Ministry for Primary Industries (MPI): The New Zealand Sheep Industry Transformation Project (NZSTX). While we have tried to be as open as possible in the content of this report; some commercially sensitive data such as pricing, volumes and customer data has been excluded.

1.0.2 **Programme highlights:** NZM is proud of the achievements and outcomes from the seven-year NZSTX programme and these are discussed in more detail in section 4. A summary of these highlights follows below:

Benefits for the Economy and Sheep Sector:

- Over the life of NZSTX, the programme has delivered direct economic benefits to the New Zealand economy of $95 million, with $84 million of this coming from fibre and $11 million coming from meat. These economic benefits have resulted directly from the programme's successes in creating new and expanding markets for fibre and meat and achieving price premiums for these products.
- In addition, the NZSTX programme has supported the growth and sustainability of the fine-wool industry in New Zealand at a time when the sheep industry (as a whole) has been declining. NZM estimates that the programme has delivered a cumulative, additional value-add of $341 million for the sheep industry, against the counterfactual in the absence of NZSTX. We note that the benefits to the sector, in terms of the contribution to national economic benefits, will be offset in part by alternative uses of land that was previously used for farming sheep (e.g. where sheep farming has been replaced by dairy).
- Importantly, NZSTX has provided a platform for significant future economic benefits driven by exceptional levels of market demand that are now emerging, particularly for ZQ-certified wool, and the Production Science work that is now driving practice change and adoption of NZSTX outcomes on-farm. One of the objectives of NZSTX was to build market demand so that it exceeded supply and to use that as a driver for increases in production and supply from New Zealand growers – this is now occurring. By 2029, NZM estimates that the direct economic benefits to New Zealand from the programme will increase to $88 million per year.

Growing the Supply of Fit-For-Market Sheep to meet Market Demand:

- NZSTX has invested in removing the barriers to the production of fit-for-market, fine-wool and mid-micron sheep. This has been achieved through a Production Science programme targeting improvement across genetics, animal health, forage and nutrition, and farm systems and technologies.
- The Production Science programme has supported farmers in the adoption of improved farm practices through a network of producer groups, one on one advice and other extension activities.
- The major achievement in the Production Science programme has been the development of a breeding value for footrot resistance in fine-wool sheep. While the breeding value is still in the development phase, it is already enabling early adopters amongst fine-wool ram breeders to incorporate more footrot-resistant genetics into their flocks. The prevalence of footrot-prone genetics in the fine-wool sheep population has been a significant barrier to the expansion of the fine-wool flock in New Zealand in the past.
- NZSTX was the catalyst for the formation of a nucleus flock for breeding a new fine-wool sheep type. This new sheep type is targeted towards supplying NZM's fine-wool fibre and meat contracts, while being an easier-care alternative to traditional fine-wool sheep types. The nucleus flock was commercialised by a group of ram breeders (Southern Cross Sheep Limited) in 2015 and the first rams were sold commercially in the 2015/16 season. These rams have been trialled successfully in the North Island, with their progeny comparing favourably with the progeny from the property's existing strong-wool sires, outperforming the strong-wool lambs by more than $10 per lamb.

Growing Demand for Fine and Mid-Micron Wool:

- Total NZM fine-wool fibre contracts have increased by 39% over the life of the programme, with ZQ-branded[1] contracts increasing by 71%. These contracts have over the life of the programme delivered significant price premiums over commodity prices. NZM expects contract volumes to grow significantly in the coming years, based upon the level of enquiry NZM is getting at present, built off the platform established by NZSTX.
- Notable fine-wool fibre contracts have included a $45million 5-year contract with the Italian manufacturer, Reda, for 17.5-micron wool, and an unprecedented $100 million 10-year contract for 18.9-micron wool with Icebreaker.
- The success of relationships that NZM has built with innovative brands such as Allbirds (shoes made of New Zealand Merino) and Glerups (indoor shoes that contain mid-micron New Zealand wool) are also highlights. All wool for Allbirds comes from NZM and is supplied through NZM's 5-year contract with Reda and uses new fabric technology developed by Reda; similarly, Glerups sources all its sub-28-micron fibre through NZM contracts (in addition to stronger wool they also contract via NZM).
- NZSTX has been pivotal in providing category leadership – particularly in the active outdoors category, and in the new emerging footwear category. These are the market categories from which continued growth is expected to come.

Growing Demand for Merino Meat and Other Products:

- Alpine Origin Merino (AOM) – a joint venture initiated by NZM, initially with Silver Fern Farms, before partnering with Alliance Group – has established an excellent foundation for differentiating Merino meat in the market.
- The objective of the AOM programme is to improve financial returns to fine-wool sheep growers by creating long-term relationships via the meat supply chain through to the end customer, with a focus on branding and product differentiation.
- NZM's joint venture partner, Alliance Group, has committed to extending Alpine Origin Merino post-NZSTX and is developing a portfolio of differentiated offerings (such as Te Mana Lamb) across their business that will support the growth of Alpine Origin Merino in global markets.
- We learnt valuable lessons from our work prototyping Merino leather in the high-end fashion market and exploring the opportunities to differentiate lanolin from fine-wool sheep. While these concepts did not prove to be commercially scalable during the life of the programme, we remain open to revisiting these initiatives should market conditions change and opportunities present themselves.

1.0.3 **Adoption of FFM Practices:** Good progress has been made in terms of volume and price increases over the life of the project and we believe that the 'tipping point' at which we will see an acceleration in the transition to FFM practices is likely to occur from 2020. This will be largely based upon the success of the adoption of the Production Science outcomes by growers, particularly the footrot breeding value and new sheep type being bred by Southern Cross Sheep Limited (which are currently in the early phases of adoption). This work continues to be supported by the NZM Production Science programme. These on-farm developments will be reinforced by NZM's market-facing work for both fibre and meat to strengthen the economic proposition of FFM production for New Zealand sheep farmers.

1.0.4 **Market development:** NZSTX investment in NZM's fine-wool marketing capability has contributed to the development of new, and the expansion of existing, business opportunities for NZM (see figures 1 and 2). This significant increase in the number of market and supply chain partners for fibre since the commencement of NZSTX provides a strong platform for future growth of volumes and value for New Zealand fine-wool. We note, in particular, the significant changes in the fine end of the clip (<19 micron), and the stronger end of the fine-wool clip (24-28 micron), which were two specific target areas for NZSTX investment.

[1] ZQ is NZM's assurance standard for ethically-sourced wool. ZQ is underpinned by grower accreditation to the standard set out in NZM's ZQ accreditation manual. The standard and manual have been reviewed and enhanced as part of NZSTX, with the current standard being ZQ v4.0.

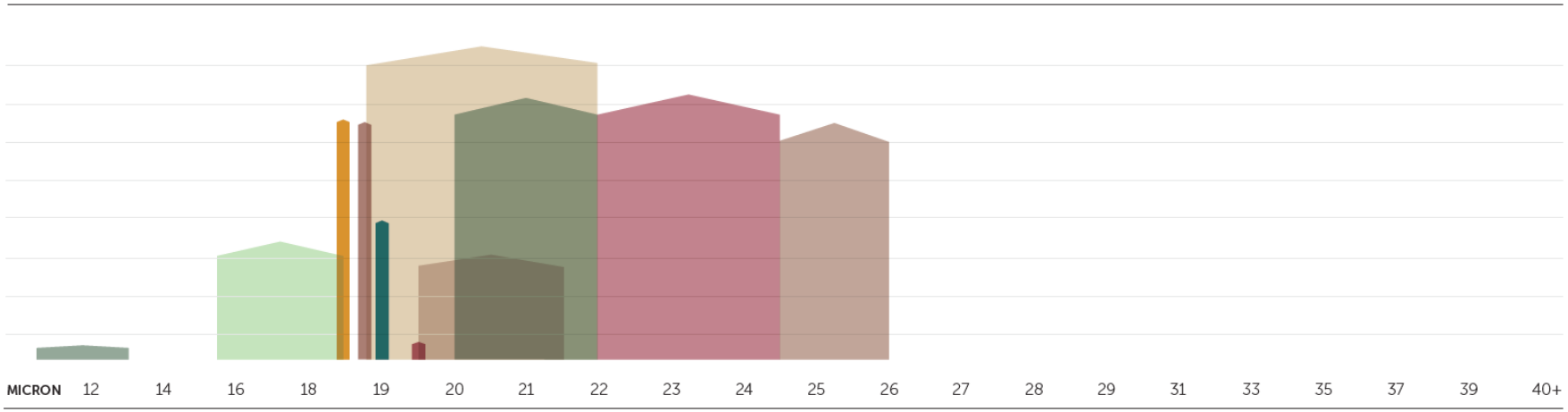


Figure 1. NZM market and supply chain partners at the start of NZSTX (showing their relative volumes and micron specifications).

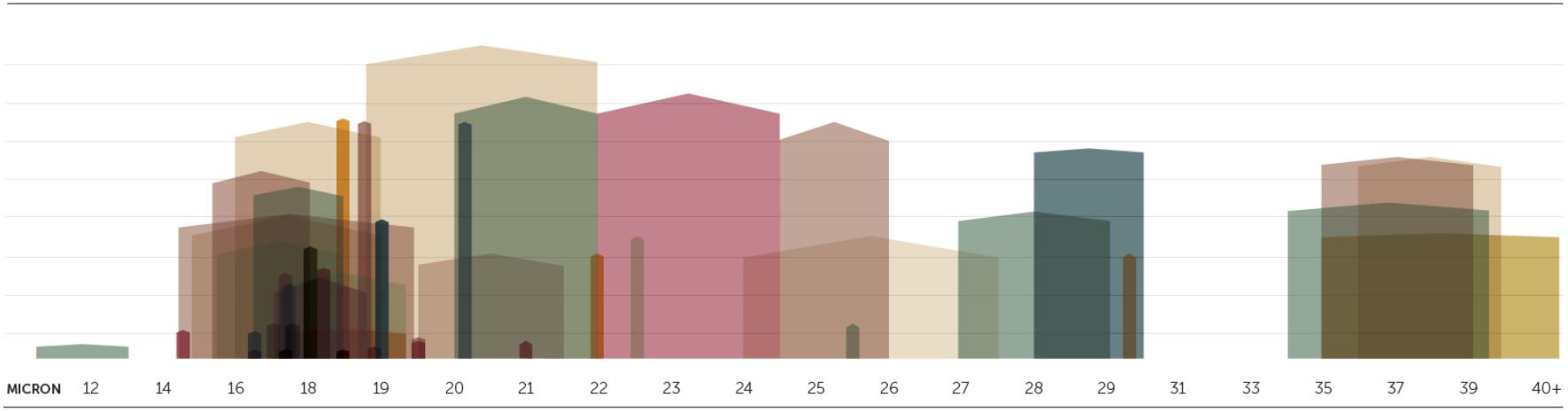


Figure 2. NZM market and supply chain partners at the end of NZSTX (showing their relative volumes and micron specifications).

1.0.5 **Outlook for the future:** NZSTX has already delivered volume and price increases over the life of the programme. With the foundation laid by the Production Science work, we believe a 'tipping point' (at which point we will see an acceleration in the transition to FFM practices) is likely to occur sometime after 2020. This will be largely based upon the success of the adoption of the footrot breeding value and the new fine-wool sheep type being bred as a result of NZSTX investment. These on-farm developments will continue to be supported by market-facing work for both fibre and meat to reinforce the economic proposition of FFM production for New Zealand sheep farmers.

1.0.6 **Post-programme activities:** The Production Science component of NZSTX was completed on 30 June 2017. The Fibre and Meat & Other components of the NZSTX programme formally finished on 30 June 2015.

1.0.7 Production Science is the most critical area in terms of enabling the production increases that must happen over time, if our long-term NZSTX objectives are to be achieved. Significant work has been done to ensure that the market signals to support NZSTX, and the right economic drivers for growers are in place to incentivise FFM production. Increases in supply must now follow. NZM and our grower suppliers are committed to ensuring that the momentum generated by NZSTX activities continues in the post-PGP-funded environment andhave committed to ongoing grower-funding of the Production Science work programme.

1.0.8 The Fibre component is at the heart of the NZM business and so all NZSTX initiatives have continued, fully funded by NZM and our growers. As noted in this report, there have been significant successes recorded in the past three years (e.g. the $45 million Reda contract, the launch of Allbirds shoes using NZM-sourced fine-wool fibre, and the new $100 million, 10-year contract with Icebreaker) and we expect this to continue, leveraging off the platform that NZSTX has created and the continued investment being made in the market by NZM to grow demand for FFM fibre.

1.0.9 The post-NZSTX transition plan for Meat & Other has been focussed on the development of a new partnership with Alliance to drive AOM (and the SILERE brand) forward. NZSTX meat activities therefore continue, fully funded by NZM growers, NZM and Alliance. 'Other' activities, primarily leather and lanolin, were found to be uneconomic and were stopped some years ago. We have no current plans to resurrect activity in these areas; however, we remain open to revisiting these initiatives should market conditions change and new opportunities present themselves.

1.0.10 **Investment:** Table 1 summarises the investment made in NZSTX over the seven-year programme:

Table 1. Summary of the investment made in NZSTX.

	Year One 2010/11 $000	**Year Two 2011/12 $000**	**Year Three 2012/13 $000**	**Year Four 2013/14 $000**	**Year Five 2014/15 $000**	**Year Six 2015/16 $000**	**Year Seven 2016/17 $000**	**Total Spent $000**
Project 1 – Fibre	1,941	3,331	3,438	1,341	1,279	-		11,330
Project 2 – Meat & Other	651	1,239	1,132	1,132	728	-		4,882
Project 3 – Production Science	782	1,660	4,074	3,162	2,503	2,576	1,963	16,720
Total Expenditure	**3,374**	**6,230**	**8,644**	**5,635**	**4,510**	**2,576**	**1,963**	**32,932**
Total PGP Funding	**1,687**	**3,115**	**4,322**	**2,817**	**2,255**	**1,288**	**982**	**16,466**

1.0.11 The original figure approved for PGP investment in NZSTX was $15.15 million; of this, $14.16 million had been used by the end of year five (the original end date of the programme). The approved PGP funding for the year six and seven extension of the programme was $2.52 million; of this, $2.31 million was ultimately used.

1.0.12 **External reviews of the programme:** Two external reviews of the NZSTX programme have been undertaken.

1.0.13 **PricewaterhouseCoopers review:** The first review was completed by PricewaterhouseCoopers in March 2014 (mid-term), and concluded that NZSTX 'is a worthwhile programme that has the potential to substantially transform the sheep industry and improve economic outcomes in the sector'. The review also noted that there was merit in a two-year extension of the production science component of NZSTX, which was agreed to by the programme partners for years six and seven.

1.0.14 **Nimmo-Bell review:** The second review was an interim evaluation completed by Nimmo-Bell in February 2016. This review noted that "Progress to date has been very encouraging built on key supply chain relationships between NZM, growers and brand partners" (Nimmo-Bell, 2016).[2]

1.0.15 **End of programme evaluation:** An independent evaluation of the completed programme will be undertaken by MPI and the results of this will be made publicly available.

1.0.16 **Spillover benefits:** Spillover benefits from the NZSTX programme have centred around the development of Te Hono[3], a collaborative movement that now includes over 220 leaders from the primary sector representing around 80% of our primary sector exports. Team USA and Waka Aotearoa, collaborative activities in-market and on-farm, have also developed from relationships built as a result of the NZSTX programme. An emerging spill over benefit is that other New Zealand wool suppliers are now adopting the FFM contract model championed by NZSTX. NZSTX has also been the catalyst for the W[3] – Wool Unleashed PGP programme, which aims to deliver FFM thinking to the coarse wool sector.

[2] *Primary Growth Partnership: Interim evaluation of the New Zealand Sheep Industry Transformation Programme (NZSTX) Projects 1 and 2 – Summary report to the Ministry for Primary Industries*. Nimmo-Bell & Company Limited. February 2016.

[3] Te Hono started in 2012 as the New Zealand Primary Sector Bootcamp, with 23 Chief Executives from New Zealand's primary sector companies, together with the then Minister for Primary Industries, Hon. David Carter, and Chief Executive of New Zealand Trade & Enterprise, Peter Chrisp, meeting at Stanford University. Since then, the group has grown to include over 220 influential leaders representing 80% of New Zealand's primary sector. In addition, Te Hono counts leaders from across government amongst its alumni, which is crucial to its success. The sixth Stanford Bootcamp was held in Palo Alto in July 2017. Te Hono's key mission is moving the New Zealand primary sector from being 'price takers to market shapers', exactly what NZSTX is focused on achieving, with an emphasis on collaboration across the primary sector.

The most recent Stanford Bootcamp in July 2017 focussed on developing a number of specific pan-primary-sector projects designed to improve outcomes for the New Zealand primary sector – economically, socially and environmentally. These projects include three major primary sector initiatives: (1) The Bach USA – development of a collaborative in-market footprint in the USA, driven by consumer empathy insights and translation of these, and go-to-market planning; (2) Te Hono Water – a collaborative project focussed on New Zealand becoming a global exemplar for water quality and using this as a key differentiator; and (3) Project Positioning – a collaborative project focussing on how New Zealand products are positioned globally and what New Zealand should be known for. In addition to these projects, other groups worked on include projects focussed on primary sector technological opportunities, plant-based protein, and opportunities to differentiate meat offerings.

We note that Te Hono has not received any funding through the NZSTX programme.

2.0 DEFINITIONS

2.0.1 We have used the following definitions in the report:

- Fine and mid-micron = sub-28-micron wool.
- FFM = fit-for-market (i.e. suitable for NZM's fine-wool fibre contracts and / or AOM's meat contracts).
- ZQ = NZM's assurance standard for ethically-sourced wool, underpinned by grower accreditation to the standard set out in NZM's ZQ accreditation manual.
- ZQ-branded contracts = contracts for fibre sourced by NZM for brand partners who stipulate wool must meet the ZQ accreditation standard.
- Non-branded contracts = contracts for fibre sourced by NZM for partners who do not require wool to meet the ZQ accreditation standard.

3.0 ASPIRATION AND ORIGINAL BUSINESS PLAN

3.0.1 **FFM:** NZSTX has sought to drive a paradigm shift from one where goods are produced and then a market sought, to one that is market-led, where end-markets are identified and FFM goods are produced specifically for a targeted end-use and customer. This paradigm shift requires New Zealand sheep production to shift to an FFM model, where the consumer informs an aligned supply chain right back to the grower.

3.0.2 **Value proposition:** The programme committed to strengthening the economic value proposition for fine-wool sheep farming in New Zealand, by investing in markets for New Zealand fine-wool sheep products and expanding NZM's forward contract model – for both fibre and meat – achieving price premiums above the commodity market.

3.0.3 **Removing barriers:** On the supply side, the programme addressed longstanding barriers to fine-wool sheep production (such as slow rates of genetic gain, animal health issues (including footrot and Johne's disease), lack of uptake of forage and nutrition tools in traditional fine-wool production systems, and issues with lamb survival).

3.0.4 **Original business plan:** Table 2, which is taken from the original business plan, outlines the broad strategy for the three NZSTX work programmes over the duration of the programme.

Table 2. Strategy for the three NZSTX work programmes, as proposed in the original NZSTX business plan.

NZSTX STRATEGY			
YEAR	**WOOL**	**MEAT / OTHER**	**PRODUCTION SCIENCE**
1	**ESTABLISH FOUNDATION FOR GROWTH**	**SITUATION ANALYSIS, IDEATION, AND EVALUATION**	**PRODUCTION MODELLING TOOLKIT**
	APPLY TO NEW MICRO-MARKETS	**PROTOTYPING VALUE PROPOSITION**	**PROTOTYPE STRATEGIES FOR CHANGE**
	AMPLIFY MICRO-MARKETS AND COMMERCIALISE BLUE OCEAN	**AMPLIFY AND COMMERCIALISE**	**AMPLIFY THROUGH COMMUNICATION**
	MAINTAIN AND BUILD	**MAINTAIN AND BUILD**	**MAINTAIN AND BUILD**
5	**TRANSITION TO SELF FUNDING**	**TRANSITION TO SELF FUNDING**	**NZM GUIDED SELF-PROPOGATION**

4.0 NZSTX PROGRAMME ACHIEVEMENTS

Benefits for the Sheep Sector

4.0.1 **Diversification and resilience:** The NZSTX programme committed to providing incentives for farmers to consider diversification of New Zealand's agricultural base, ensuring a strong sheep sector at a time of dairy dominance. By improving the value proposition and reducing the barriers to more productive fine-wool sheep farming, NZSTX investment has contributed to a more resilient fine-wool sheep industry in New Zealand, particularly when compared to its strong-wool counterpart.

4.0.2 **New Zealand sheep numbers:** Since the start of the NZSTX programme, we have seen fine-wool sheep numbers plateau initially and then start to increase, while overall sheep numbers in New Zealand have continued to fall significantly during this time. Figure 6 (refer to section 7 of the report) highlights the continuation of the declining trend in strong-wool sheep numbers (greater than 28-micron), while showing that the decline in finer-wool sheep (28-micron and below) has been arrested and is starting to be reversed. This has largely been due to the underpinning economic proposition that NZSTX and FFM production provides.

4.0.3 **Higher and more stable prices:** For the growers that have embraced the FFM way of thinking, the value back to them and the wider New Zealand sheep industry has been higher and more stable prices for their fibre, from a much broader range of brand and supply chain partners (see figures 1 and 2 above), as well as a new, differentiated brand for marketing their meat (SILERE), supported by higher prices and a commitment from AOM's joint venture partner, Alliance Group, to develop longer-term forward contracts.

4.0.4 **Tools and talent:** Supporting these initiatives, NZSTX investment has delivered important tools and information for farmers to use in their decision-making. The programme has also enabled the development of an outstanding team of talent and capability within New Zealand's sheep industry to support growers as they incorporate these tools and this knowledge into their day-to-day management of their farming enterprises.

Growing the Supply of Fit-For-Market Sheep to meet Market Demand

4.0.5 **Breeding value for footrot resistance:** The major focus within the Production Science component of the programme has been developing a breeding value for footrot resistance in fine-wool sheep. The breeding value will enable fine-wool sheep breeders to take steps towards incorporating more footrot resistant genetics into their flocks – an area which has been a significant barrier to the expansion of the fine-wool flock in New Zealand. This work has been a world-first, with previous genetic tests for the disease focusing on a small number of gene-markers, rather than the whole sheep genome. The spill-on effects of this work will include the reduced cost – both financial and social – of managing the disease for farm owners and their staff, improved productivity from the existing fine-wool flock, and improved health and welfare of fine-wool sheep. This combination of benefits also makes farming fine-wool sheep a more attractive option than it has been in the past. This will improve the value proposition for farmers with strong-wool, meat-focused enterprises who are considering switching to fine-wool sheep.

4.0.6 **New sheep type:** Investment in the formation of a nucleus flock to develop a new sheep type, targeted towards FFM production, was an important part of the Production Science component of NZSTX during years four and five of the programme. The objective of the nucleus flock is to breed a new fine-wool sheep type that is specifically targeted towards supplying NZM's fibre and meat contracts, while being an easier-care alternative to traditional fine-wool sheep types. The nucleus flock was commercialised by a group of ram breeders (Southern Cross Sheep Limited) in 2015 and the first rams were sold commercially in the 2015/16 season.

4.0.7 Demand from breeders across the South Island for this new sheep type is increasing, along with interest from some large-scale strong-wool sheep breeders in the North Island. The increasing demand for these type of rams is a result of growers (in both the North and South Islands) seeing value in NZM contracts, particularly in the 18-23 micron range for fibre and the re-boot of the AOM programme. The development of this new sheep type is enabling these growers to meet the specifications of these contracts with an easier-care, more productive sheep.

4.0.8 **Proof of concept:** A successful trial of this sheep type has been undertaken in the North Island, with the results showing a $10 per lamb premium over the farm's existing strong wool system. In addition, we have undertaken modelling for another North Island property, comparing the existing Romney system with the potential of a high-performance, fine-wool system. The sensitivity analysis showed that a future fine-wool system was economically compelling for this property, given the strength of finer-wool prices (both historically and with projected NZM contract prices).

4.0.9 **Other Production Science achievements:** Through a range of extension channels, we have assisted New Zealand fine-wool growers with implementing significant on-farm practice change across a range of indicators – including:

- Adoption of estimated breeding values (EBVs) by both ram breeders and commercial breeders. Investment in EBV adoption has increased the number of fine-wool ram breeders who use EBVs from three to 20 by the end of the programme, which has lifted the percentage of rams sold by breeders that use EBVs from 20% to 90%. This, in turn, is enabling breeders to make genetic gain in important productivity traits, as well as ease-of-care and animal health traits.
- Forage development (close to 10,000 hectares of forage crops and improved pastures) and sheep nutrition advice (supported by one-on-one advice, producer groups and field days).
- Animal health, including footrot and Johne's disease management (supported by publication of guidelines and animal health workshops).
- Whole system changes to improve ewe performance and increase lamb survival (supported by one-on-one advice, producer groups, workshops and field days).

These changes to on-farm practice and decision-making are already having significant positive effect on individual growers' profitability.

4.0.10 **Development of Production Science capability:** The team assembled for the Production Science component of the NZSTX programme has built a strong platform for future success in the fine-wool industry. It is worth noting that this team has been a talent incubator for both NZM and the wider New Zealand sheep sector. Lead by Dr Mark Ferguson, the evolution of the team has seen several new and recent graduates choosing to start and develop their careers here. We are proud to see such passionate advocates for New Zealand's sheep industry (and wider primary sector) being given the opportunity to grow their talents and skills as a direct outcome of this programme.

Growing Demand for Fine and Mid-Micron Wool

4.0.11 **NZSTX fibre contracts:** Total NZM contract volumes have increased by 39% over the life of the programme, with ZQ-branded contracts increasing by 71%. In terms of pricing over the life of the programme, NZM contracts have delivered significant premiums over commodity prices We expect contract volumes to grow significantly in coming years based upon the level of enquiry we are getting at present built off the NZSTX platform that has been established.

4.0.12 **Market development:** NZSTX has contributed to the development of new (and the expansion of existing) markets for fine-wool growers (see figures 1 and 2, section 1.0). This significant increase in the number of market and supply chain partners for fibre since the commencement of NZSTX provides a strong platform for future fine-wool volume and value growth in New Zealand. We note, in particular, the significant changes in the fine end of the clip (<19 micron), and the stronger end of the fine-wool clip (24-28 micron), which were two specific target areas for NZSTX investment.

4.0.13 **Conversion tool kit:** NZSTX invested in collateral, attribute and benefit work, and communication tools to help supply chain and brand partners stand apart from their competitors and to enable them to 'sell-through' the New Zealand Merino story to consumers.

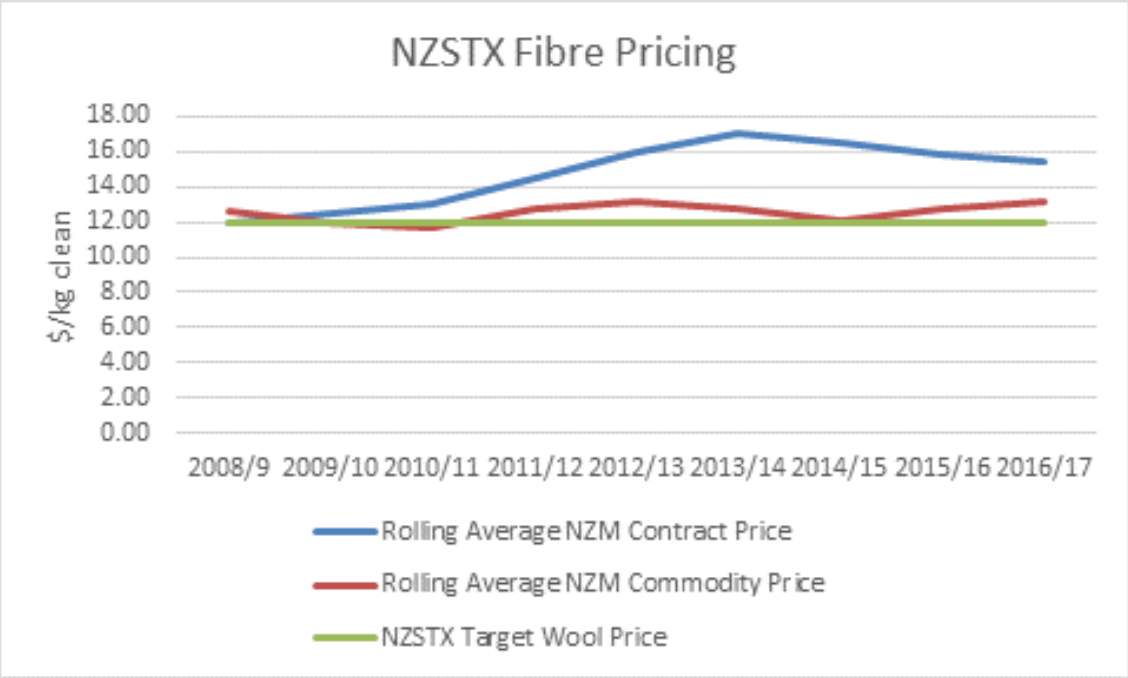
4.0.14 **New sales category for fine-wool:** Woollen footwear, such as Allbirds and Glerups, is a new category for fine-wool, which has been supported through NZSTX. Like the creation of the Merino active outdoors category before it, which was pioneered by Icebreaker in collaboration with NZM, this is an exciting new development for New Zealand's fine-wool industry.

4.0.15 **ZQ accreditation programme:** As NZSTX activities have started to come to fruition, the value of investment in the ZQ accreditation programme has become clear. NZSTX investment in ZQ has included reviews of the ZQ standard and the accreditation manual that underpins the standard, to ensure that it remains the industry-leader for ethical wool. Enquiry and demand for ZQ-certified wool from new brand partners has reached unprecedented levels over the past three years, with much of the growth in branded contract activity in 2015/16, 2016/17 and 2017/18 being as a result of this.

4.0.16 **Brand and supply chain partner highlights:** In terms of the contribution of specific brand and supply chain partners to the lift in value and volume of fibre contracts, Icebreaker, Reda, Allbirds and Glerups deserve special mention:

- Icebreaker has long been a proponent of the FFM model, with a close to 20-year history of contracting with growers, through NZM, for their fibre requirements. Building on that track record, Icebreaker has committed to a new 10-year contract for 18.9-micron wool. This unprecedented contract will be worth $100 million.
- NZSTX has been pivotal in growing the relationship with Italian fine-wool clothing manufacturer, Reda. Reda is now committed to the FFM concept, with long-term contracts in place with NZM and our growers. Significantly, Reda released a $45 million 5-year contract in 2016 for 17.5-micron fibre.
- The wool from the Reda 17.5-micron contract is used for a variety of products; these include Reda's own activewear range, Rewoolution, as well as the highly successful footwear start-up, Allbirds. Allbirds shoes also use a new fabric technology developed by Reda using some of the wool sourced through the Reda 5-year supply contract.
- Glerups is another more recent relationship for NZM, which is going from strength to strength. Glerups is an innovative Danish family business producing indoor felted shoes. In 2014, a partnership between NZM and Glerups was created, allowing improved wool quality, a bespoke wool story, a deeper connection between NZM growers and Glerups, and a more secure supply chain with sustainable pricing. Glerups sources all its sub-28-micron fibre through NZM contracts (in addition to stronger wool they also contract via NZM).

4.0.17 **NZSTX fibre pricing:** One of the original aims of the NZSTX programme was to achieve an average wool price of $12.00/kg clean for sub-28 micron wool. Figure 3 depicts the weighted 36-month rolling average price since the start of the NZSTX programme for all NZM contracts and all sub-28 micron wool.



Source: NZM

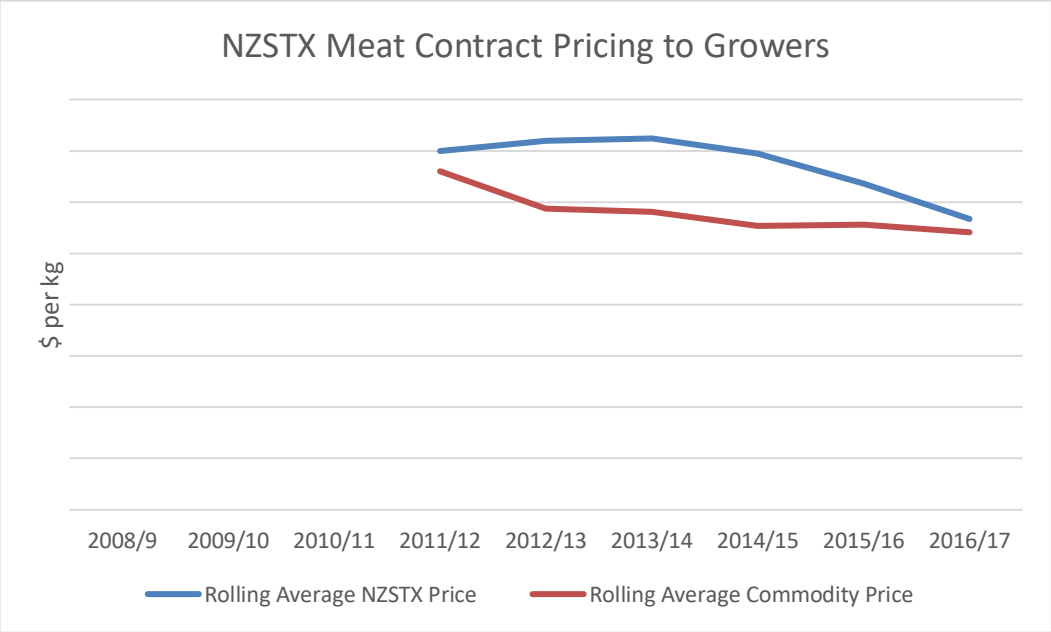
Figure 3. NZM overall NZSTX pricing for sub-28-micron wool (July 2009 to June 2017, three-year rolling average).

Growing Demand for Merino Meat and Other Products

4.0.18 **Differentiated meat brand:** NZSTX has established an excellent foundation for differentiated meat with the Alpine Origin Merino (AOM) joint venture and SILERE brand. The target market for SILERE is the high-end of the food-service industry (rather than retail consumers). With Silver Fern Farms, the brand gained traction in both the domestic market and select international markets; and from the start of Alpine Origin Merino programme, we have been able to achieve price premiums for grower suppliers over the commodity market (see figure 4). While sales growth in the past year has been impacted by the change of partner and the need to 'reboot' the AOM / SILERE programme (see figure 14), our confidence in the programme remains high. In Alliance, we have a committed partner who not only wants to extend AOM, but also to develop a portfolio of differentiated meat brands across their business that will further support the growth of AOM and SILERE in global markets.

4.0.19 Figure 4 shows the premiums that have been achieved for growers supplying the Alpine Origin Merino programme as it ran in partnership with Silver Fern Frams. As with the wool graphs, a rolling three-year average has been applied to this graph. In this graph, the commodity pricing is taken from the prevailing schedule

price for like-for-like meat. On average, the programme has achieved a premium of 18% over the average commodity price. The graph shows that the price premiums delivered to growers have been impacted by market conditions. In particular, we note that in the first three full years of the programme growers were able to take advantage fixed prices, despite significant falls in the commodity pricing during that time.



Source: NZM

Figure 4. The Alpine Origin Merino (AOM) contract price versus the prevailing spot market pricing for NZSTX meat 2008/9-2016/17.

4.0.20 **Lessons learnt from leather and lanolin initiatives:** Our work prototyping Merino leather in the high-end fashion market showed promise as a concept, but did not prove to be a commercially scalable prospect at this point in time. Likewise, our exploration of opportunities to differentiate lanolin from fine-wool sheep did not result in a viable business opportunity for the foreseeable future. We were disappointed that we were not able to commercialise these opportunities, but remain convinced that they were worthy of inclusion in the NZSTX programme. We remain open to revisiting these initiatives should market conditions change and opportunities present themselves.

5.0 ECONOMIC BENEFITS

5.0.1 We have considered the NZSTX programme value-add in two ways:

- Direct value-add based upon contract price premiums and volume increases over the life of the programme.
- Industry value-add based on the number of sheep producing finer wool/meat versus the counterfactual in the absence of NZSTX.

Direct value-add

5.0.2 Over the life of NZSTX, the programme has delivered direct economic benefits to the New Zealand economy of $95 million, with $84 million of this coming from fibre and $11 million coming from meat. These economic benefits have resulted directly from the programme's successes in creating new, as well as expanding, markets for fibre and meat and achieving price premiums for these products.

5.0.3 By 2029, NZM estimates that the direct economic benefits to New Zealand from the programme will increase to $88 million per year – $58 million for the wool component of NZSTX, and $30 million for the meat component of the programme.

Industry value-add

5.0.4 In addition, the NZSTX programme has supported the growth and sustainability of the fine-wool industry in New Zealand at a time when the sheep industry has been in decline. NZSTX has provided a platform for significant future economic benefits driven by exceptional levels of market demand that are now emerging, particularly for ZQ-certified wool, and the Production Science work that is driving practice change and adoption of NZSTX outcomes on-farm.

5.0.5 We estimate that the programme has delivered a cumulative, additional value-add of $341 million for the sheep industry, against the counterfactual in the absence of NZSTX; $170 million of this come from fibre and $171 million from meat. We note that the benefits to the sector, in terms of the contribution to national economic benefits, will be offset in part by alternative uses of land that was previously used for farming sheep (e.g. where sheep farming has been replaced by dairy).

5.0.6 By 2029, we estimate an annual value-add for the industry of around $269 million with $226 million of this coming from fibre and $43 million from meat. Notwithstanding the above, our aspirations for the fine-wool sheep sector remain ambitious and we will be doing all we can to outperform the numbers above.

6.0 PROGRESS TOWARDS OUTCOMES

6.0.1 **Updated outcome logic model:** The NZSTX Programme Steering Group (PSG) revised and updated the original NZSTX outcome logic model (OLM) during year 7 of the programme. The revised version of the model (as accepted by the PSG) is included below as figure 5.

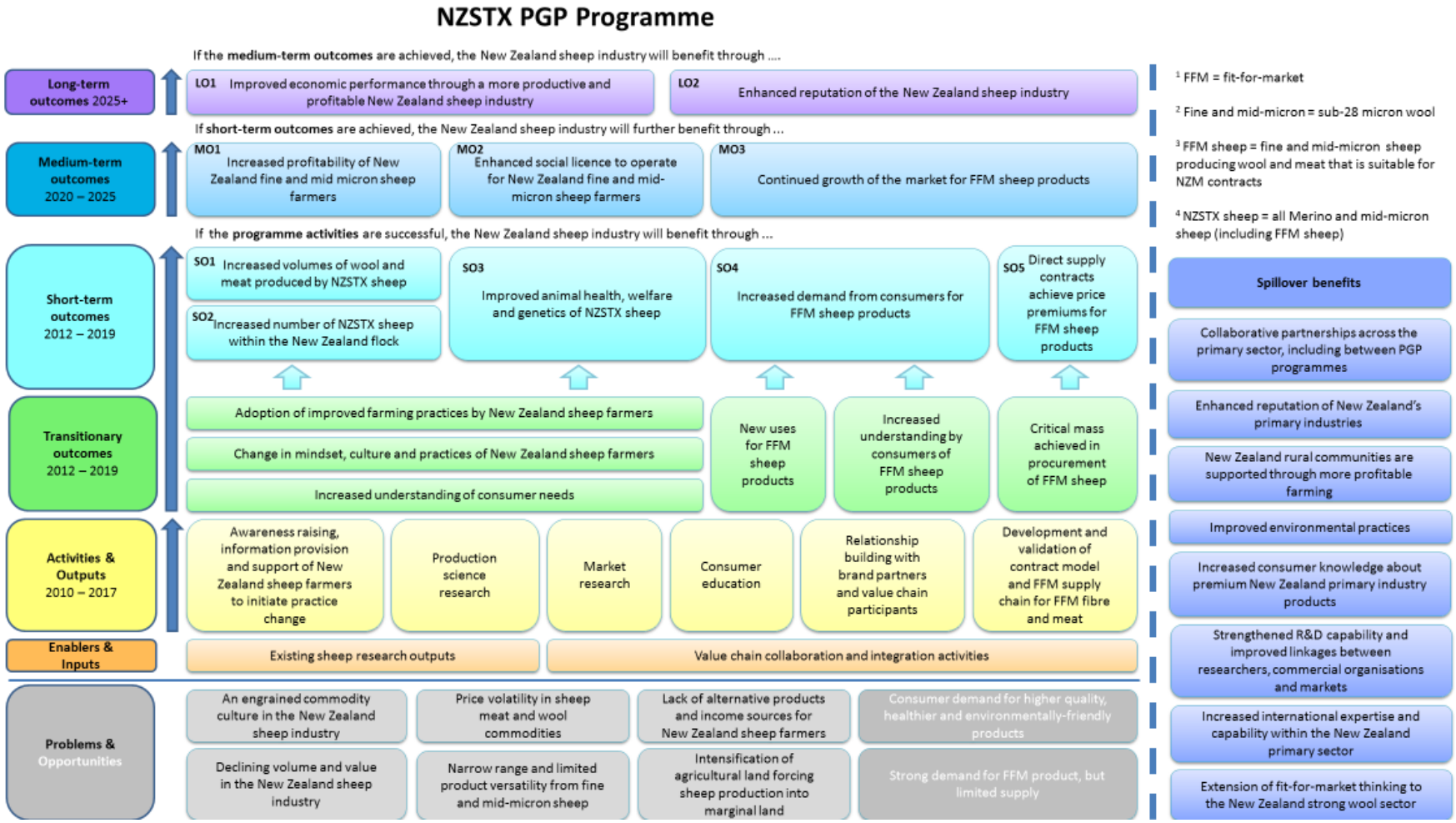


Figure 5. Revised NZSTX outcome logic model, accepted by the Programme Steering Group on 2 December 2016.

6.0.2 **Progress towards outcomes:** The remainder of this section provides graphs and commentary on the performance of NZSTX against key outcome measures over the life of the programme.

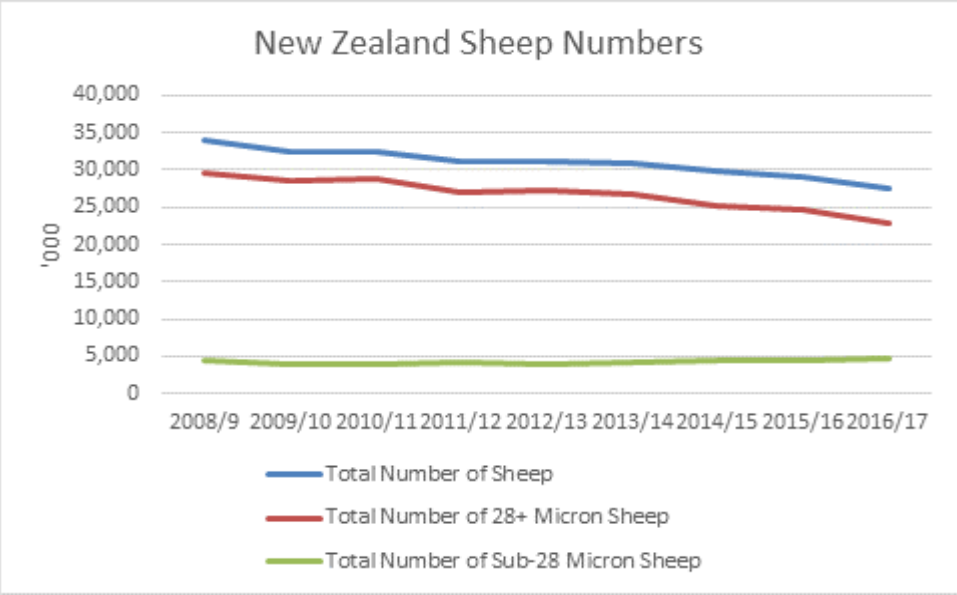
6.0.3 **Definitions:** Please refer to section 3.0 for the definitions of key terms used in this report.

Sheep numbers and wool volumes

6.0.4 Since 1990, there has been a significant decline in sheep numbers in New Zealand, with total sheep numbers falling from around 58 million in 1990 to around 27 million now. This decline has been caused by prolonged periods of poor returns for sheep farmers, resulting in farmers switching land uses to higher intensity farming systems such as dairy and, where this is not feasible, focusing breeding and genetics towards meat production. The decline has also been seen in the fine-wool sector where land tenure review and retirement of high country land have added to the economics of alternative land use as reasons for a reduction in sheep numbers.

6.0.5 Figure 6 highlights that, since the start of NZSTX, this declining trend has continued in strong-wool sheep (greater than 28-micron); however, the decline in finer-wool sheep (28-micron and below) has been arrested with finer-wool sheep numbers plateauing despite the further significant declines elsewhere in the industry. This has largely been due to the underpinning economic proposition that NZSTX and FFM production provides.

*Reference OLM SO2: "*Increased number of NZSTX sheep within the New Zealand flock."

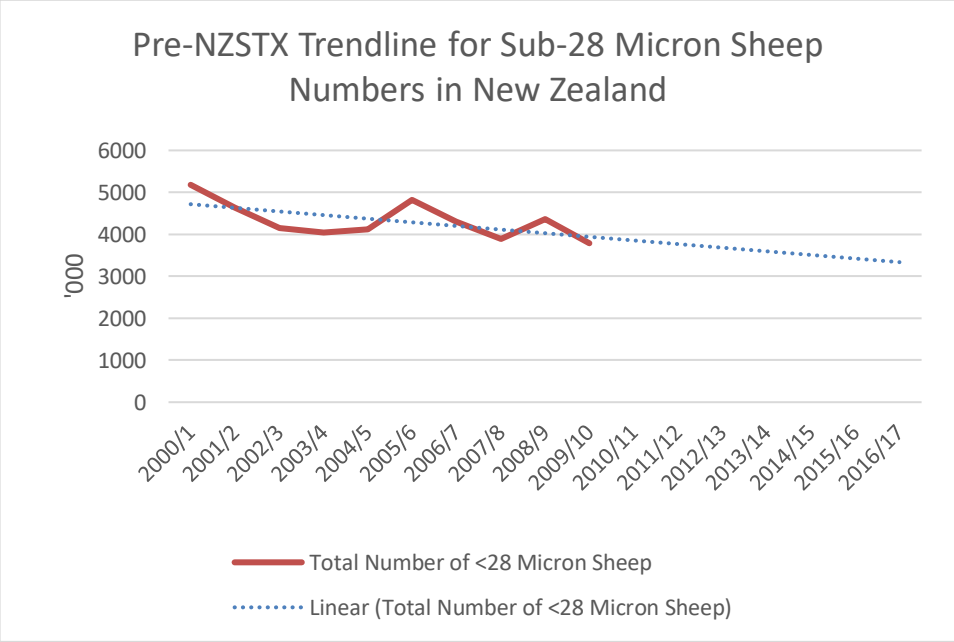


Source: Statistics New Zealand, New Zealand Wool Testing Authority, NZM

Figure 6. The number of sheep in New Zealand (2008/9-2016/17). The number of strong-wool sheep (28+ micron) has continued to decline, while the number of sub-28 micron sheep has remained relatively constant over the same period.

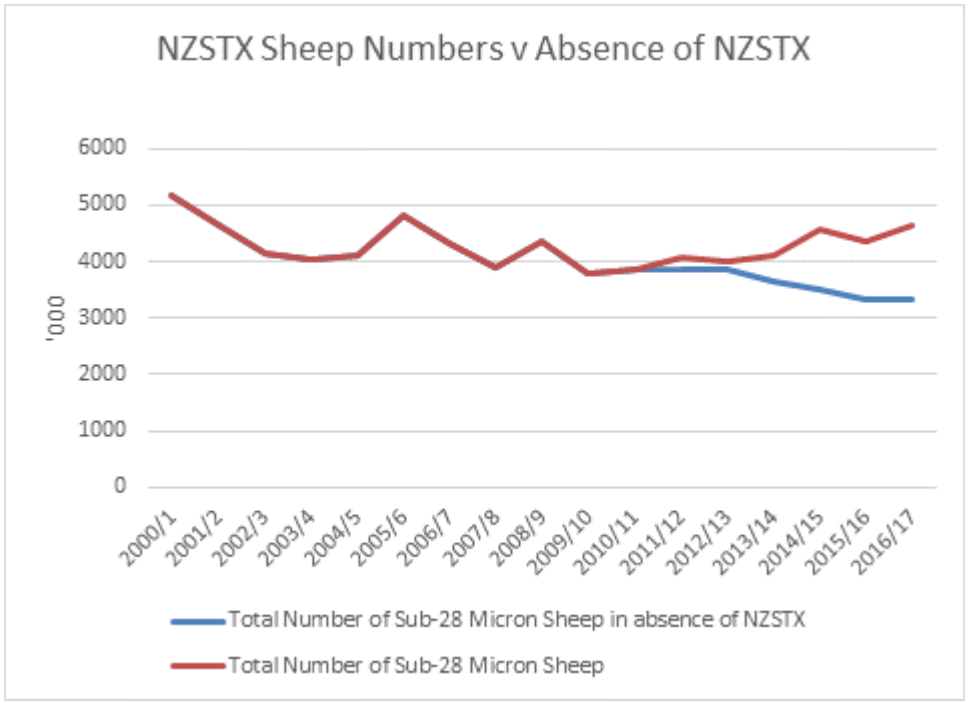
6.0.6 The performance of the fine-wool sheep industry is further demonstrated in figures 7 and 8. Figure 7 shows the pre-NZSTX trend line for the number of sub-28-micron sheep (based on the previous 10 years' data) and, in line with overall sheep number falls, the predicted further decline over the ensuing years. Figure 7 shows actual finer-wool sheep numbers since 2000 in red, with the blue line depicting the scenario we predicted at the start of the programme would occur in the absence of NZSTX (based on the trendline data). The gap between the two lines is a key component of the programme value-add for the industry to date. It is a result of the progress made through NZSTX in providing value and stability to the fine wool industry, giving growers the confidence and economic incentives to not only continue with fine-wool production and meat production from fine-woolled animals, but look at increasing flock sizes.

Reference OLM SO2: "Increased number of NZSTX sheep within the New Zealand flock."



Source: Statistics New Zealand, New Zealand Wool Testing Authority, NZM

Figure 7. The pre-NZSTX trendline for the number of sub-28 micron sheep in New Zealand.



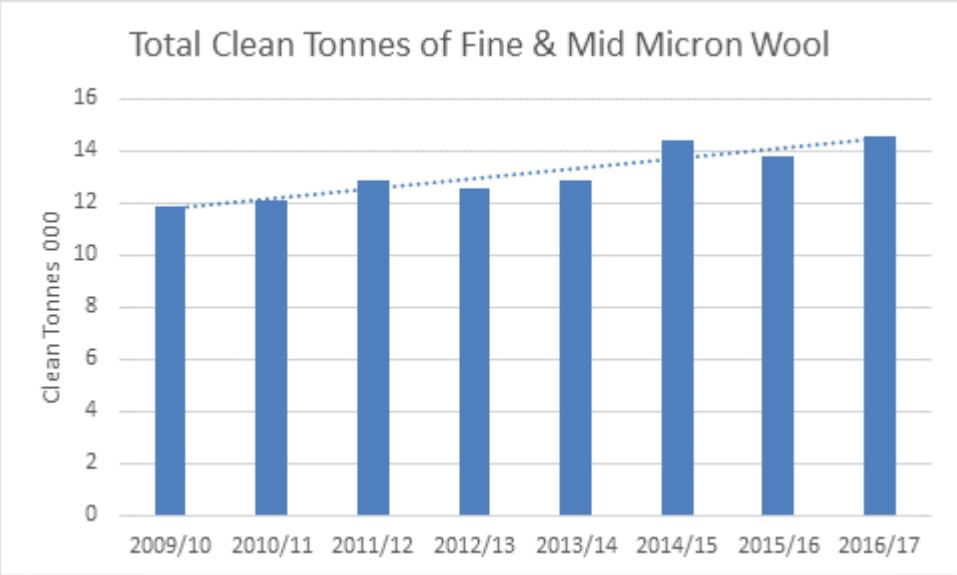
Source: Statistics New Zealand, New Zealand Wool Testing Authority, NZM

Figure 8. The number of sub-28 micron sheep in New Zealand – actual sheep numbers versus predicted sheep numbers (in the absence of NZSTX

6.0.7 Our view at the commencement of NZSTX was that the decline in sub-28 micron sheep would not continue on a linear basis indefinitely and, at some point, would plateau, particularly as land suitable for conversion from fine-wool sheep production to dairy became scarcer. Our estimation was that this would have been at around 3.3 million sheep.

6.0.8 Figure 9 highlights how the number of finer-wool sheep translates into wool volumes over the life of the programme. The total volume of fine and mid micron wool produced in New Zealand since the NZSTX programme commenced has increased by 23%.

*Reference OLM SO1: "*Increased volumes of wool and meat produced by NZSTX sheep."



Source: Statistics New Zealand, New Zealand Wool Testing Authority, NZM

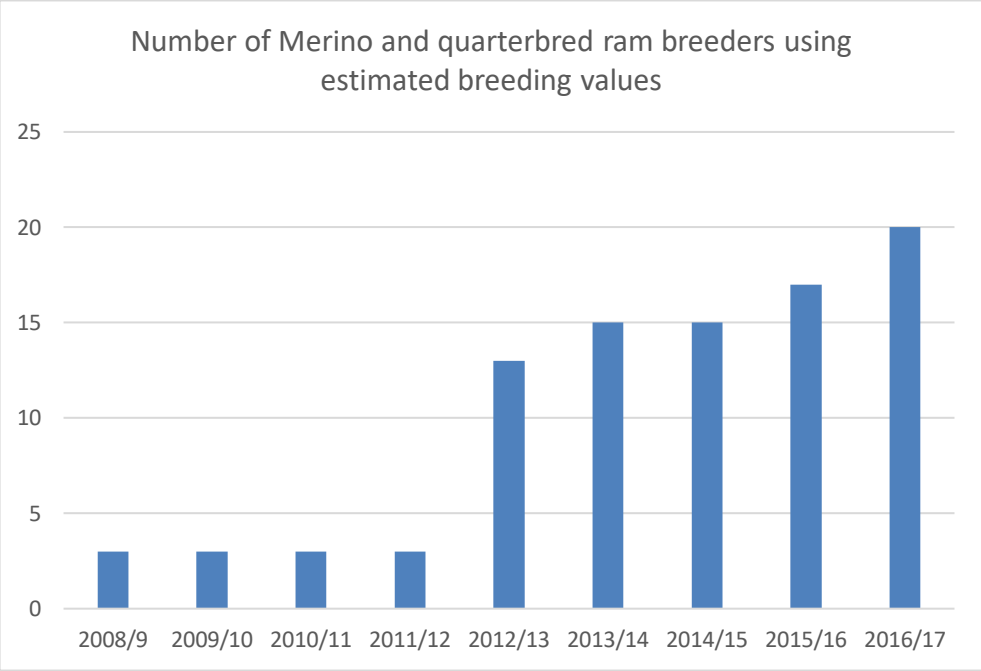
Figure 9. Total clean tonnes of fine and mid-micron wool (i.e. ≤28 micron) produced in New Zealand, from 2009/10 to 2016/17.

Production Science

6.0.9 The key measure for the Production Science components of NZSTX are the wool and meat volume graphs below. The programme recognises that much of the increase in volume that is being sought will not occur until the fundamental science is complete and the footrot breeding value has been fully commercialised and is being used by the industry. That notwithstanding, we have agreed additional measures relating specifically to Production Science outcomes (see below).

6.0.10 Since the start of the Production Science component of NZSTX, the number of ram breeders using estimated breeding values (EBVs) has increased substantially. Figure 10 shows the increase in the number of fine-wool ram breeders using EBVs; while Figure 11 shows the increase in the percentage of fine-wool (i.e. Merino and quaterbred) rams sold by breeders that use EBVs.

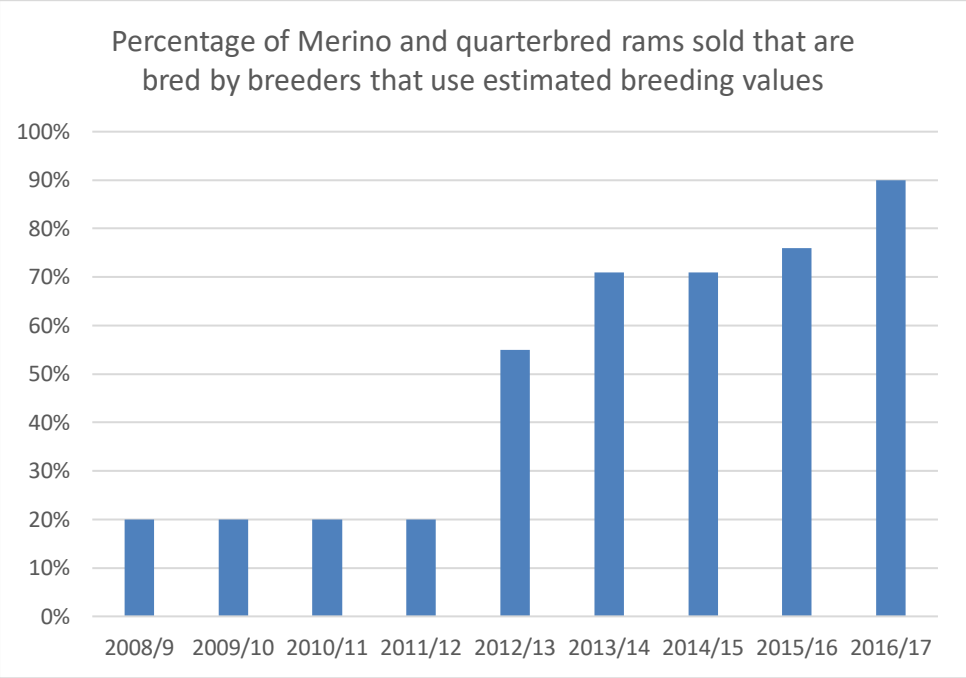
*Reference OLM SO3: "*Increased animal health, welfare and genetics of NZSTX sheep."



Source: NZM

Figure 10. The number of Merino and quarterbred ram breeders using estimated breeding values (2008/9-2016/17).

*Reference OLM SO3: "*Increased animal health, welfare and genetics of NZSTX sheep."



Source: NZM

Figure 11. The percentage of Merino and quarterbred rams sold by ram breeders that use estimated breeding values (2008/9-2016/17).

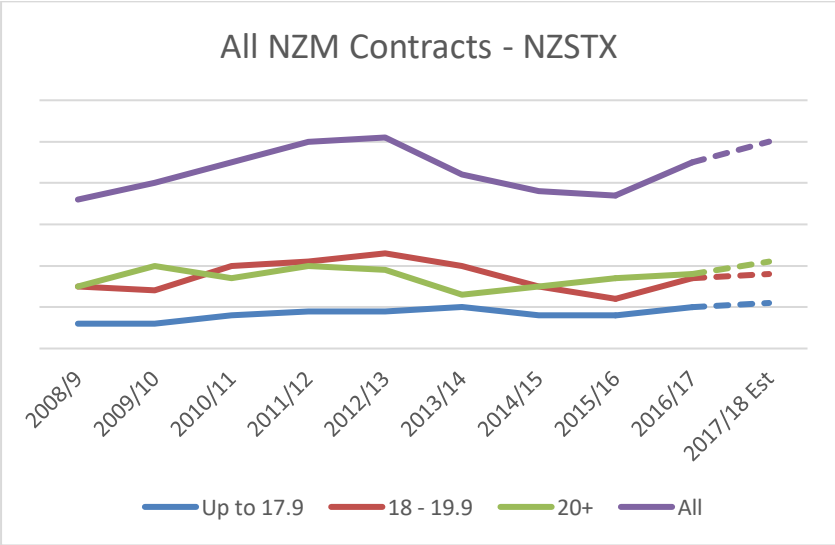
Wool Marketing Performance

6.0.11 One of the key outcomes sought from NZSTX has been a move away from reliance on auction markets for selling wool, to sale by direct supply contracts; hence, these measures focus on contract activity. The graphs below demonstrate the value of the NZSTX investment in the ZQ accreditation programme, with enquiry and demand for ZQ-certified wool from new brand partners reaching unprecedented levels over the past two years, with much of the growth in branded contract activity since 2015/16 being a result of this. We are now working on trials with many of these new brands and expect these to contribute to further volume growth in the future.

6.0.12 The graphs also show that global market forces have had a significant impact on volumes over the period, particularly after the post-global financial crisis (GFC). During the GFC, supply chain stocks were run down to minimum levels; as markets started to improve, brand partners significantly increased their purchasing requirements to rebuild stock levels and, consequently, there were some sharp lifts in volumes until around 2012/13. With hindsight, market conditions had not improved to the extent that brand partners had hoped and some brand partners found themselves in an overstocked position; it took them two to three years to work through these excess stocks. Since 2016/17, volume demands have shown good growth, which is projected to continue through the 2017/18 season.

6.0.13 Figure 12 shows all NZM contract activity for fine and mid-micron wool since the programme began. The impact of global market conditions described above can be seen in this graph.

Reference OLM SO4: Increased demand from consumers for FFM sheep products

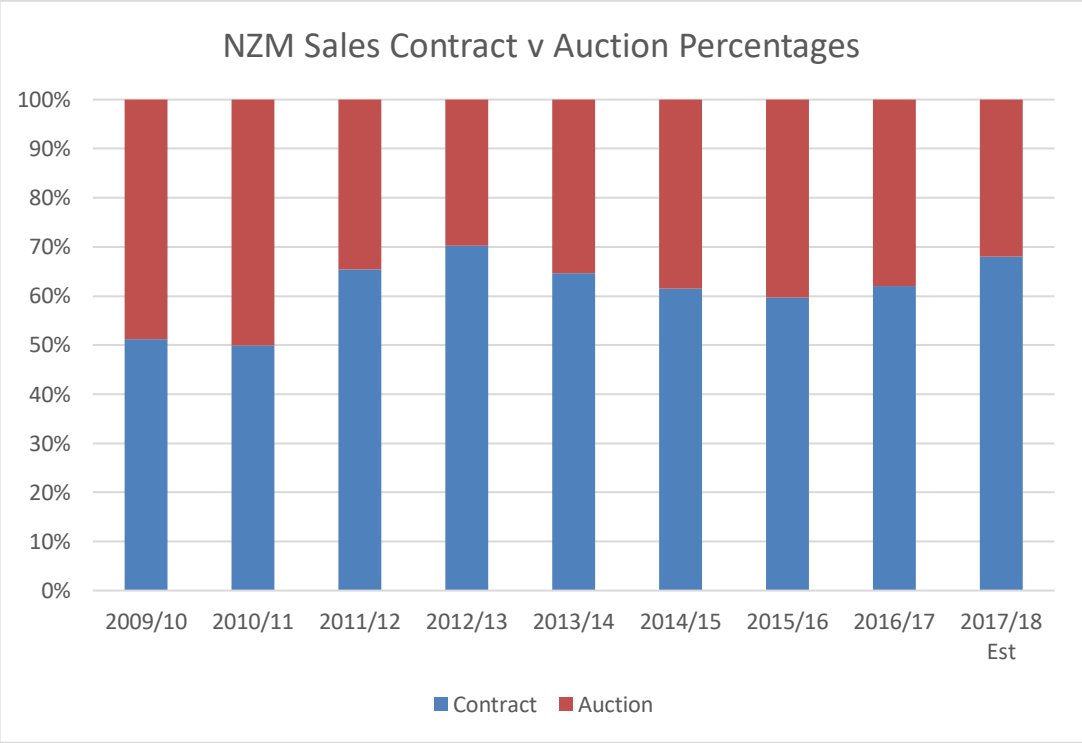


Source NZM

Figure 12. Volume of NZSTX wool (i.e. ≤28 micron) sold by NZM via contracts (2008/9-2017/18).

6.0.14 Figure 13 shows the changing balance between contract and auction activities in sub-28 micron wool since the NZSTX programme began, driven by increased demand for ZQ contracts. At the commencement of NZSTX, around 51% of NZM sales were through contracts. The percentage sold by contact is now sitting at around 68%. The impact of the market conditions in 2011/12 and 2012/13 described above can also be seen in this graph.

Reference OLM SO4: Increased demand from consumers for FFM sheep products



Source: NZM

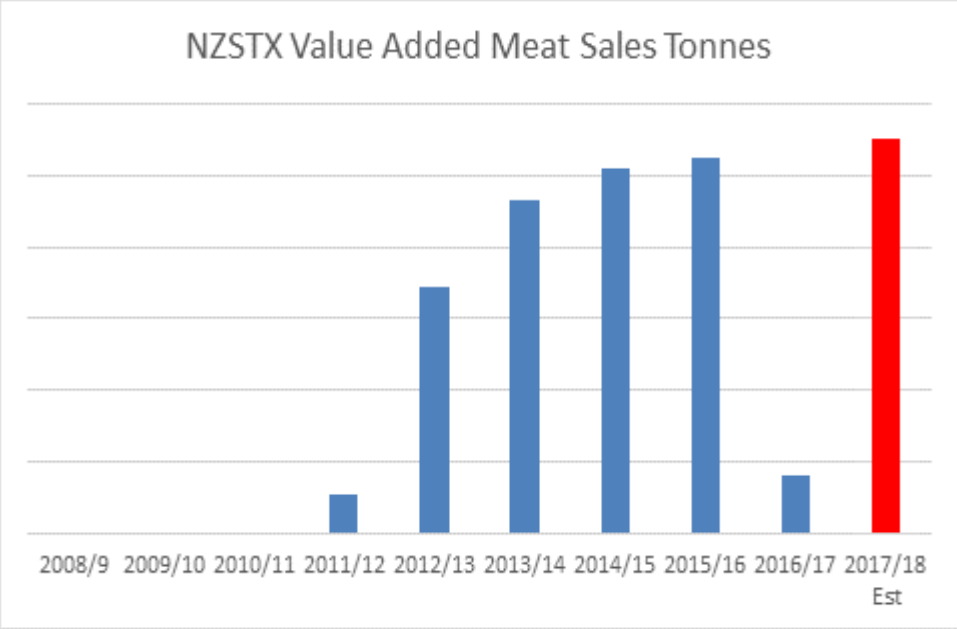
Figure 13. The percentage of NZM sales sold by contract versus auction (2009/10 to 2017/18).

Meat

6.0.15 The meat component of the NZSTX programme commenced in the 2011/12 year, when the SILERE brand and a joint venture arrangement, Alpine Origin Merino Limited (AOM), was established between NZM and Silver Fern Farms. Silver Fern Farms exited the AOM arrangement in July 2016, and was replaced in the joint venture by the Alliance Group. Alliance formally acquired 50% of the shares in AOM in June 2017.

6.0.16 Figure 14 shows the level of branded sales for the AOM programme. As a consequence of the change in programme partners, volumes for the 2016/17 season have been a lot lower than previously. We are confident that, with the 'reboot' of the programme, we will quickly return to previous levels of activity and this will provide a foundation for further growth in volumes associated with the programme.

Reference OLM SO4: Increased demand from consumers for FFM sheep products



Source: Silver Fern Farms, Alliance, NZM

Figure 14. Tonnes of meat from sub-28 micron sheep sold through the Alpine Origin Merino (AOM) programme (2008/9-2017/18).

7.0 INDUSTRY ADOPTION OF FFM PRODUCTION AND VALUE PROPOSITION FOR STRONG-WOOL GROWERS CHANGING TO FFM PRODUCTION

7.0.1 Our expectation is that post-2020 (a minimum of three years after the cessation of the core Production Science work) we will start to see an acceleration in adoption of NZSTX on-farm outcomes leading to a tipping point where volumes start to build to the projected 2029 levels (figure 15).

7.0.2 At present, small numbers of strong-wool growers in both the North and South Islands are trialling fine-wool breeding. Working with these growers has reinforced that there are multiple factors at play in any farming decision – it is about more than simply a change in breeding – from the scale of the property to the perceived success of existing operation, right through to the personal drivers of the individuals that make up the decision-making team in each farming business.

7.0.3 Figure 15 below shows that NZM is building business relationships with increasing numbers of strong-wool growers (including large-scale operations in both the North and South Islands), some of whom are trialling fine-wool breeding (with a small number already committed to converting a significant proportion of their flock to fine-wool breeding) and NZM has confidence that momentum will build as the results of the Production Science programme (coupled with strong market signals) continue to improve the value proposition.

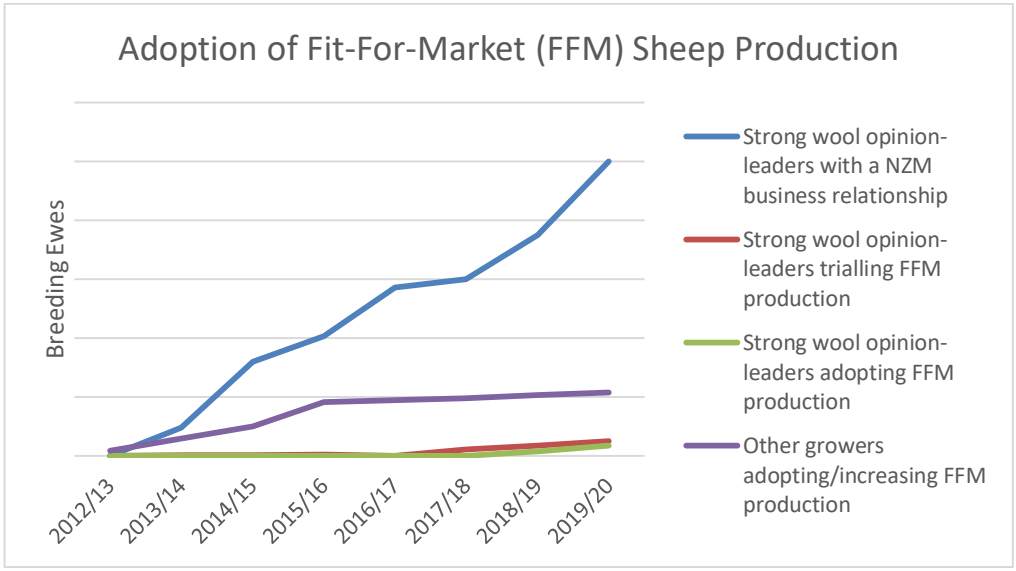


Figure 15. The projected trajectory for (1) influencing strong-wool sheep growers and (2) effecting transition towards more FFM sheep production in New Zealand:

8.0 POST-NZSTX PLAN

8.0.1 **Production Science:** Production Science is a critical area in terms of enabling the production increases that must happen over time if our long-term NZSTX objectives are to be achieved. Significant work continues to be done on ensuring the market signals to support NZSTX are in place and that the right economic drivers for growers are in place to incentivise FFM production. Increases in supply must now follow.

8.0.2 NZM and our grower suppliers are committed to ensuring that the momentum generated by NZSTX activities continues in the post-PGP-funded environment and, to that end, have committed to ongoing grower-funding of the Production Science work programme. The key areas of investment are the CPT, further development (and commercialisation) of the breeding value for footrot, supporting breeders with the use of EBVs and continuing to assist growers implement management changes to improve the performance of their fine-wool sheep farming businesses.

8.0.3 The Fibre and Meat & Other components of the NZSTX programme formally finished on 30 June 2015.

Fibre: The Fibre component is at the heart of the NZM business and all NZSTX initiatives for fibre have continued, fully funded by NZM and our growers. As noted in this report, there have been significant successes recorded in the past two years (e.g. the $45 million Reda contract, the launch of Allbirds shoes using NZM-sourced fine-wool fibre, and the new $100 million, 10-year contract with Icebreaker). We expect this successful trajectory to continue, leveraging the platform that NZSTX has created and the continued investment being made in the market by NZM and our growers to grow demand for FFM fibre.

8.0.4 **Meat & Other:** The post-NZSTX plan for Meat & Other is focussed on the development of a new partnership with Alliance to drive AOM (and the SILERE brand) forward. NZSTX meat activities will continue, fully funded by NZM, Alliance and our growers. 'Other' activities, primarily leather and lanolin were found to be uneconomic and were stopped some years ago. We have no current plans to resurrect activity in these areas; however, we remain open to revisiting these initiatives should market conditions change and new opportunities present themselves.

9.0 SUMMARY OF THE INVESTMENT MADE IN NZSTX

9.0.1 **Investment:** Table 3 below summarises the investment made in NZSTX over the seven years of the programme.

Table 3. Summary of the annual expenditure and investment made in NZSTX.

	Year One 2010/11 $000	Year Two 2011/12 $000	Year Three 2012/13 $000	Year Four 2013/14 $000	Year Five 2014/15 $000	Year Six 2015/16 $000	Year Seven 2016/17 $000	Total Spent $000
Project 1 – Fibre	1,941	3,331	3,438	1,341	1,279	-	-	11,330
Project 2 – Meat & Other	651	1,239	1,132	1,132	728	-	-	4,882
Project 3 – Production Science	782	1,660	4,074	3,162	2,503	2,576	1,963	16,720
Total Expenditure	**3,374**	**6,230**	**8,644**	**5,635**	**4,510**	**2,576**	**1,963**	**32,932**
Total PGP Funding	**1,687**	**3,115**	**4,322**	**2,817**	**2,255**	**1,288**	**982**	**16,466**

9.0.2 The original figure approved for PGP investment in NZSTX was $15.15 million; of this, $14.16 million had been used by the end of year five (the original end date of the programme). The approved PGP funding for the year six and seven extension of the programme was $2.52 million; of this, $2.26 million was used.

10.0 EXTERNAL REVIEWS OF NZSTX

10.0.1 **External reviews:** Two external reviews of the NZSTX programme have been undertaken.

10.0.2 **PricewaterhouseCoopers review:** The first review was completed by PricewaterhouseCoopers in March 2014 (mid-term), and concluded that NZSTX 'is a worthwhile programme that has the potential to substantially transform the sheep industry and improve economic outcomes in the sector'. The review also noted that there was merit in a two-year extension of the Production Science component of NZSTX, which was agreed to by the programme partners for years six and seven.

10.0.3 **Nimmo-Bell review:** The second review was an interim evaluation of Project 1 (Fibre) and Project 2 (Meat and Other) completed by Nimmo-Bell in February 2016. This review noted that 'Progress to date has been very encouraging built on key supply chain relationships between NZM, growers and brand partners.' The Nimmo-Bell report also highlighted the spillover benefits resulting from NZSTX, in particular NZM's role within Te Hono:

'NZM's business model is an example to other primary industry entities wishing to move from a commodity to customer values approach. The active collaboration with business leaders and especially Māori is laying a platform for a different kind of future than the production push mentality of the past'.

1.0.17 **End of programme evaluation:** An independent evaluation of the completed programme will be undertaken by MPI in 2018 and the results of this will be made available publicly.

11.0 SPILLOVER BENEFITS

11.0.1 Throughout the lifetime of NZSTX, there have been important spillover benefits from the programme. The outcome logic model (refer figure 5) contains a number of specific spillover benefits desired from the NZSTX programme. Table 4 summarises key acheivements under each of the outcome logic model headings.

Table 4. Spillover benefits for the NZSTX programme, with reference to the outcome logic model for the programme.

Desired spillover benefits identified in the NZSTX outcome logic model	**Commentary**
Extension of fit-for-market thinking to the New Zealand strong wool sector	The success of NZSTX has been the catalyst for the W[3] PGP programme to extend fit-for-market thinking into the strong wool sector. Fit-for-market thinking has also been extended further into the fine wool sector also, with NZM competitors adopting NZSTX thinking and offering contracts to their grower clients.
Increased international expertise and capability within the New Zealand primary sector	We are particularly thrilled with the calibre of young talent that we have been able to bring into NZM as a result of NZSTX. Some of which have now moved on to other New Zealand primary sector entities. We note the employment of Dr Mark Ferguson by NZM as part of NZSTX and the expertise that he brought to NZSTX that simply was not available in this country. Increasing the attractiveness of the New Zealand primary sector, particularly for young graduates coming into the industry, is a key focus of Te Hono and the Te Hono projects[4].
Strengthened R&D capability and improved linkages between researchers, commercial organisations and markets	NZM has worked with many R&D organisations both in New Zealand and internationally as part of the NZSTX programme. One of the projects arising out of this year's Te Hono bootcamp is specifically focussed on collaborative technology opportunities in the primary sector.
Increased consumer knowledge about premium New Zealand primary industry products	The genesis for Te Hono was the desire to extend NZSTX and fit-for-market thinking into the broader New Zealand primary sector. In the same way, market insight work undertaking by Team USA[5] focussed on the premium consumers that the programme participants were all targeting.

[4] Te Hono is a collaborative movement that includes over 220 influential leaders representing 80% of New Zealand's primary sector. In addition, Te Hono counts leaders from across government amongst its alumni, which is crucial to its success. Te Hono's key mission is moving the New Zealand primary sector from being 'price takers to market shapers'.

[5] Team USA is a collaborative body of leading primary sector companies who have jointly undertaken market empathy work to better understand consumer needs around premium products in the US market.

Desired spillover benefits identified in the NZSTX outcome logic model	Commentary
	Over the coming year our expectation is that an in-market presence will be established in the USA and, through this, targeted high net-worth US consumers will be exposed to value-added New Zealand primary products. This initiative, The Bach USA, is being led by NZM, will be a collaborative in-market footprint in the USA for primary sector businesses.
Improved environmental practices	ZQ is now a requirement for all key NZM branded contracts. This has led to improved practices on-farm in terms of the environment and animal welfare. The Waka Aotearoa[6] group has a focus on developing 'gold standard' environmental practices and being seen to be leaders in adoption of these. The Te Hono water and positioning projects are also focussed on improving environmental practices in the New Zealand primary sector.
New Zealand rural communities are supported through more profitable farming	The analysis of the benefits of the NZSTX project to date shows significant value-add due to a growing fine-wool sector. This value flows through to rural communities. Te Hono's aim of taking the primary sector from being 'price takers' to 'market shapers' is all about capturing more value for our primary produce, that ultimately then flows back to producers and rural communities.
Enhanced reputation of New Zealand's primary industries	ZQ is now leading the world in ethical wool, and through this is positioning the New Zealand fine wool sector. The Te Hono water and positioning projects are focussed on New Zealand's primary sector reputation. The aim is for New Zealand to be a global exemplar.
Collaborative partnerships across the primary sector, including between PGP programmes	Te Hono, Te Hono projects, Team USA and Waka Aotearoa are each the result of stronger relationships across New Zealand's primary sector and with government agencies fostered by the PGP initiative. We note that many of the Te Hono participants are also PGP programme partners.

[6] Waka Aotearoa is a group of leading pastoral producers (across sheep, beef and dairy production) who first came together in July 2016. This group is committed to prototyping and executing on farm innovations, new value chain approaches to market and gold standards for environmental stewardship, health and safety, and animal welfare.