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Image 1

Lambs on high country New Zealand

Is there a future for strong wool?

Kellogg Rural Leadership Programme

Course 44 2021

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Executive Summary

The purpose of this report is for the reader to gain understanding of the strong wool industry as well as find some guidelines that could work for the future of the industry. To do this there is an overview of the history of the industry, following this an overview of what is currently happening in the industry and finally some thought on what needs to occur in the future to create a booming industry again.

The main goal for this report is to raise awareness for consumers to make the environmentally friendly decision to buy wool and encourage the industry as a whole to stand together, to pull the wool market out of the doldrums and put it back into the flourishing fibre position it deserves to be.

There has been a lot of research into the history as well as the present to gain a broad knowledge of the industry as a whole. In-depth research of what organisations are doing and have done in the past, what factors have impacted the strong wool industry and how the strong wool industry sits within the market. The future component of this report is made up of thoughts of industry leaders and the writers perceived opinions on what the wool industry and eco-friendly consumers need to do to change the future of wool back into its rightfully thriving state.

From this report I hope to encourage innovators to create new markets for strong wool and to get producers and government to invest into wool research and development. Consumers, retailers, producers and industry organisations will need to learn to understand what the needs are and what opportunities are available to increase the demand for the super fibre that is wool.

For the future to be positive for the industry, there needs to be innovation, investment, and collaboration. The industry needs to combine to become a team who work together, who invest within the industry, from the woolshed up, to increase the quality and research and development for the sector and to keep an open mind for innovation within the industry.

To help create a thriving strong wool industry again we need;

Producers to:

- Produce high quality wool
- Employ proper practice in the wool preparation
- Always look for new and different markets and opportunities
- Educate the market of the benefits of using wool in every way we can, so the consumer can make informed, eco-friendly and sustainable choices.

Consumers to:

- Encourage the industry
- Value the product

And most importantly we all need to:

- Buy New Zealand Strong Wool products



Image 2

Lamb in mob looking at camera. 2020

Acknowledgements

I wish to thank the Kellogg Programme Investing Partners for their continued support:

Strategic Partners



Programme Partners



Service Partners



I would also like to thank the constant support of my family especially all the time my mother has put in to helping me within this programme. I also want to acknowledge the support I have from Feilding Agricultural High School as without their encouragement I would not have been able to do the programme at all. Finally, I would like to thank all the facilitators of course 44 for all of their help and for organising and facilitating an exceptional Rural Leaders Course.

Introduction

The wool industry was a mystery to me before I undertook this project. It was a massive learning curve and an excellent opportunity for me to dig deeper into an industry that has so many different aspects to understand - it's no longer knitted jumpers and socks.

Learning about the versatility of the wool fibre industry is very important to me because I believe it is the 'super fibre' that the world needs to repopularise in an effort to save the planet. The catalyst for my interest in the wool industry was working in woolsheds and with the sheep farmers and realising how little I knew about the industry and then finding out how little shearers and farmers new about their own white gold.

How are we going to change this? If the producers of this super fibre don't know a lot about what happens to their wool after it leaves the wool shed, why should the consumer? Could the environmental benefits of wool be a catalyst to start the wool industry up again?

In this report I plan to learn about the history of the wool industry, see how the industry is tracking in the present and see what steps are being taken to secure the future of the wool industry. I want the reader to gain a broad understanding of the wool industry so that when new opportunities come up in the future, we are all educated and prepared to take the chances to create a thriving product again

*Americans see wool as a symbol of an environmentally friendly lifestyle
and emphasise its natural status (Blackmore, et al., 2016)*

In a world where environmental sustainability is a number one priority, how can the wool industry capitalise on the issue to encourage the use of their exceptional natural fibre?

*While wool was once the backbone of the economy, there is little
international demand for the fleeces that once went into carpets and
textiles all over the world (and there are only so many knitted jumpers a
person can own) (Corry, 2019)*

I want to see if and what is the future for the strong wool industry. How can we make the beginning of the above statement, 'wool was once the backbone of the economy' a reality

again? In the future I see the industry taking one of two paths; sink or swim. What efforts can we put in to keep the wool industry alive? How will we make it a booming industry again?

Aims and objectives

In this research I will look to answer the question: is there a future for the strong wool industry?

Within the report I want to explain:

- What has happened previously within the wool industry?
- What is happening currently within the wool industry?
- What can we do to enhance the future of the wool industry?

I want this paper to be used to increase the reader's knowledge of the wool industry as people outside of the industry seem to know very little of what occurs within the industry. A goal is to see what is occurring and what our plans are for the future, to make the reader see that the future for the wool industry could be a good one.

Wool Description

Types of wool

Before we investigate the past, present, and future we need to take a step back and understand why wool is such an important sector and why it deserves to become a major industry again.

Wool has three different types: fine, medium, and strong wool.

Fine wool usually has a micron count of less than 24 micron. It is used in high quality, soft handling fabrics and knitting yarn (Wool Production and Processing, 2021) Fine wool comes from Merino, Oxford, Poll Dorset, Polwarth and Finn sheep (Beef + Lamb NZ, 2019).

These sheep have usually been bred specifically for their fine wool. The market for fine wool is very strong. It is used for top end thermal clothing by big brands, which consumers know well, such as Ice Breaker, North South and the North Face.

Medium wool is usually between 24-31 microns. This wool is used for woollen apparel clothing, knitting yarns and furnishings. Medium wool comes from Corriedale, Ryeland, Perendale, Oxford, Shropshire, Texel, and most crossbred sheep (Beef + Lamb NZ, 2019). The market for medium wool is reasonably weak.

Strong wool is usually a micron count of 31+ micron. It is used for carpets, rugs, and upholstery (The New Zealand Merino Company Ltd. 2021, 2021). The sheep that produce this wool are Borderdale, Border Leicester, Cheviot, Coopworth, Drysdale, East Frisian, English Leicester, Lincoln, and Romney. (Beef + Lamb NZ, 2019) These sheep have usually been bred for their meat rather than their wool.

The market for strong wool is reasonably weak and its biggest competitor is nylon – synthetic carpet really took away the strong wool market over the past thirty years. Strong-wool brands include Swannndri and Cavalier Bremworth carpets

Wool markets strengths and weaknesses

The market for fine wool is the strongest of the three markets. Thanks to all the marketing fine wool brands like Icebreaker, ZQ Merino, North South and all the other fine wool brands have put in to sell their fine wool base layer garments consumers are happy to pay a higher price for their high-quality clothing.

Medium and strong wool markets haven't been strong for many years due to the introduction of cheaper, synthetic materials, such as nylon, as they have been a massive competition especially in strong wools biggest market, carpet. 'While the merino wool market continued to perform, the strong wool sector was in crisis due to competition from synthetic fibres' (Scott, 2021)

Why shear wool at all?

Wool is not only shorn off sheep to provide an income it is also shorn off for animal health. Removing wool from ewes before they lamb is beneficial for the lamb as it then has the best opportunity to get milk off its mother because her udder is more easily visible, it also means the ewe goes to find shelter from cold and wet weather which helps protect the lamb that also has very little wool cover to keep warm.

Another benefit is it means the ewe is much less likely to get cast while lambing, this is a very big threat with wool on because the wool is heavy, and it makes it hard for the ewe to roll back over if she gets stuck on her back when lambing or cast on rough terrain. Being on their backs for long periods can lead to fluid getting into the sheep's lungs which causes death.

Wool is also removed to aid in weight gain as, being cold, the sheep will eat more to keep warm. It is also shorn to be a protection against dags and the nasty threat of fly blow – This is when flies lay eggs in the moist parts of the daggy wool. These eggs hatch into maggots and the maggots grow by eating into the flesh of the sheep which causes great distress to the animal.

Wool used to be the main source of income for the sheep farmer but as the price dropped meat took over as the main income with wool becoming a marginal income stream.

The price of wool has dropped so badly that now shearing often costs more than the return from the wool. This year the sheep with wool on, at the Feilding Stock Sale, were worth less than sheep with wool off - shearing has become an extra expense and is an inconvenience to the farmer to have to organise shearing of the purchased sheep when they get them home.

Quality traits of wool

Wool has multiple good characteristics that, in my opinion, make it a super fibre.

The main benefits of wool are:

1. Natural	2. Renewable
3. Safe	4. Fire retardant
5. Biodegradable	6. Breathable
7. Multi-climate	8. Natural insulator
9. Durable	10. Stain resistant

As much as these are excellent benefits separately it is great to understand why they are better together. For example, if you have wool carpet, it is durable and stain resistant but it is also a great absorber of toxins and moisture which will keep your house drier and cleaner, also if your house were to burn the carpet wouldn't burn half as fast as synthetic carpet and the smoke wool releases is just like burning hair, it will not kill you, where as the smoke of nylon carpets can.

All these benefits create a much safer home, especially one to bring up children and a family in. As the Bremworth Cavalier carpet campaign also states on average nylon carpet is like having 22,000 plastic bags on the floor whereas woollen carpet is biodegradable and will break down much sooner, when finished with, than nylon and everyone can agree, that is a massive benefit for the environment.

In an age when we are all very aware of the importance of environmental sustainability this must mean that woollen carpets must be the choice of the well informed and intentioned consumer.

These characteristics, to me especially, make it a super fibre, in comparison to the substitute material, nylon. Wools benefits are undeniably better and have a much more positive impact on the consumer and the environment than nylon. The most common reason that synthetic carpets are more popular than woollen ones is because of the cheaper price of nylon, but if with investment in marketing, the benefits were fully explained, consumers could understand the reasons to pay a little more.



Image 3

Advertisement for Woolmark 'You can't fake the real thing' Circa 1967

Words from the insert enlarged:

Others use nice words.
 Like colourful. Soft. Light. But that's the point. They talk. Pure new wool is all these things. Pure new wool. Natural-as-the-day-it-was-shorn wool. Touch it. Feel it. Snuggle into it. Ummmmmmmm. Soft and gentle as a lamb, isn't it? Well, after all that's hardly surprising. Pure new wool with the Woolmark is the real thing. And the real thing just can't be faked. No matter how many words are written. Pure new wool. Unmixed with any other fibre. Controlled to international quality standards... Your assurance of the best. Look for the wool mark label.

History of the wool industry

In 1835 New Zealand sent their first ship load of wool to the United Kingdom to be sold. New Zealand's wool became so popular that in 1866 they no longer sent wool to the United Kingdom instead selling the wool in New Zealand, with the United Kingdom sending merchants over to buy the wool.

Between 1916 and 1920 the Crown became the sole buyer and seller of New Zealand wool; this was all at a fixed price and became known as the Commandeer. In 1920 the Commandeer ended, the United Kingdom had 800,000 bales of New Zealand wool along with other wool unsold in store.

To sell the unsold wool without upsetting the market the British Australian Wool Realisation Association Limited (BAWRA) was created who successfully sold all of the wool between 1921 and 1924.

Between World War 1 and World War 2 sheep numbers in New Zealand increased but the wool price decreased significantly.

1938 – Synthetic clothing started to be made (Kativa, 2016)

In 1939 World War 2 started, Britain offered to buy all of New Zealand's wool for the whole war as well as one season after. The fixed price offered was 12.25 dimes per pound but was increased to 13.95 dimes per pound in 1942. However, when the war ended, and the United Kingdom had honoured their deal they had over 10 million bales of unsold wool stockpiled 1 $\frac{3}{4}$ million bales of which were New Zealand wool.

Much like the BAWRA the Joint Organisation (JO) was set up to sell all of the remaining wool without upsetting the market, they offered a minimum price for each wool grade with their main job being to sell the remaining wool however, if necessary, they would buy wool if the auction price was below their reserve price. By 1951 all of the wool had been sold and the organisation was terminated shortly after.

In 1950 Korea and the United States went to war, the United States sought after large quantities of wool for their strategic stockpiling which caused the New Zealand wool price to almost triple overnight from 38 pennies a pound to 88 pennies a pound. To put that into perspective one pound in 1950 is equivalent to \$69.50 today.

1960 - Carpet in the United States was being made on tufting machines from synthetic fibres such as nylon (Patton, 2006)

After this boom the United States put a ceiling price on wool to stabilise the wool market and in 1966 the wool price dropped over 40% overnight.

In 1977 the government introduced a Livestock Incentive Scheme and in 1978 the Land Development Encouragement Loans to encourage farmers to increase their production in

the hopes that increased production would increase local spending, providing more employment and a better standard of living.

This occurred because in 1973, the Oil Crisis started creating massive unemployment and a large slump in the standard of living in New Zealand. Fortunately, at the time the government could see that farming was the way to get out of such a depression and by 1985 both schemes were removed after successfully improving the standard of living and unemployment numbers for the nation.

1982 – Sheep numbers in NZ peaked to 70 million (Deavoll, 2018)

However, when the schemes were removed the returns from farming halved which impacted the sector greatly. ‘Wool value dropped in the 1980’s due to increased competition from synthetic fibres’ (Blackmore, et al., 2016).

As successful as the schemes were, they also had a negative impact. Rather than producing outstanding animals, the schemes incentive changed attitudes to farm more intensively to capitalise on the subsidiary income.

So, while New Zealand was recognised for having such great stock numbers the quality had decreased, it became a quantity versus quality situation. This means that while the numbers in the present have dropped significantly it is arguably a better outcome because the products that we produce are now of a better quality and animal welfare is much more of a priority.

1990-91 – Sheep numbers in NZ decreased to 58 million sheep (Deavoll, 2018)

In 2009 there was a referendum on the Wool Levy in New Zealand. The levy was used to fund industry-good activities such as farm research, monitor farms, training and collecting industry information for its economic service. Whether it was a good or bad decision is up to each individual, but the levy was voted to be removed and since then there has been no industry wide income put into research, development, or training (Basham, 2009). There has been no-one to champion the wool industry because of this vote and this has allowed the industry to slide into decline.

2020- 26 million sheep in New Zealand (Statista, 2020)

A small snippet of shearing history

The sheep industry provides skilled shearers' seasonal work which ties in perfectly around the globe, giving shearers' almost full-time work with an exceptional opportunity to travel around the world which is the ultimate overseas experience.

It is very hard work though with long tough days being spent bent over the sheep. Because of this work ethic it started the world-renowned stereotype of New Zealanders being hard working, with Kiwi ingenuity and an exceptional farming characteristic.

Shearing has been a massive part of New Zealand's national history. The Bowen Method of shearing which is the standard style now was developed by Mr Ivan Bowen in 1953 who broke world records for many years.

Godfrey Bowen, Ivans brother, started shearing schools developing the Bowen Method, it became such a popular style of shearing that Godfrey even went overseas teaching this method and now it is globally acknowledged as the standard method of shearing.

The Bowen Method and the outstanding shearers from New Zealand were the start of our world-renowned stereotype of hard working, smart thinking farmers. Bowen's technique was so special because he took a technique with no style and rhythm and totally mixed it up making it a 'dance', the technique improved wool clips as there was no longer second clips and the sheep and shearer flow together shearing a round sheep with a flat comb without cuts and straining.

It is inspirational to know that a kiwi from Te Puke saw something that was not quite right and rather than not questioning it and going with the flow tried different techniques and methods to create something that worked better for the shearer, the farmer and, most importantly, the welfare of the sheep.

After looking at these important dates and events I notice there seems to be a continuous up and down flow of the industry, it seems to be stuck in a fluctuating market. The wool price soared to a pound for a pound of wool in 1950 to a minimal price of \$1.10 for a kilogram today.

Sheep numbers dropped from 70 million in 1982 to a minimal 26 million today because income from sheep farming being only meat with the loss of secondary income from wool makes other forms of farming on the same land more profitable. If something is not done this decline in numbers will continue.

‘The first bale from the shed would pay the shearer’s, the rest will pay off the mortgage’ is very much a phrase from the past now. However, when looking back at the history there is a great sense of pride in what the past farmers have achieved. How incredible that a little country deep in the South Pacific, could and still does produce such outstanding products, especially wool.

Wool is arguably the most sustainable, renewable, incredible super fibre on the planet – yet over the years we have let its inherent value slip away

– Tom O’Sullivan (Campaign for Wool, 2021)



Image 4
Image of a farmer from Waituna West, Manawatu transporting wool bales with Horse and cart Circa 1909

Wool Industry at present

At present the wool industry has many different branches.

There are the brokers such as PGG Wool, NZ Merino, NZ Wools and Wools of NZ. There are also private merchants, both the brokers and the merchants aim to get the best price for the farmers wool however the demand for the wool is small while the supply is large in comparison.

CP Wool and WNZ have recently merged together in the hope that a cooperative relationship may increase profits down the supply chain.

Strong wool at time of writing is worth \$3/kg on average. The standard supply chain for wool to go from farmer to retailer looks a bit like this:

‘It’s been a complex commodity supply chain from grower to broker, exporter, scoured, importer, spinner, carpet manufacturer, retailer, consumer’ (Scott, 2021).

As you can imagine that is a lot of hands for the wool to go through to produce the end product, excluding all the transportation. It is easy to see why a carpet that costs the consumer \$80-\$109/sqm can filter back to \$3/kg for the farmer and New Zealand produces more wool than demanded so while

the farmers that sell their wool to carpet manufacturers may receive \$3 in return there are multiple farmers receiving much

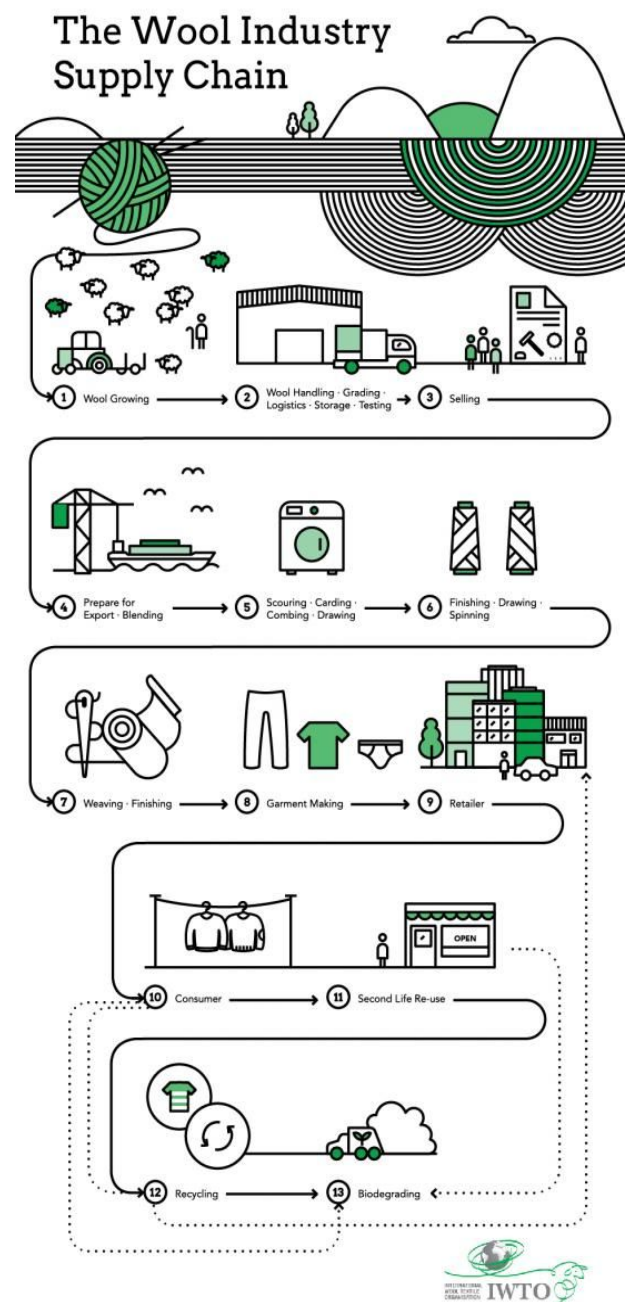


Image 5

Image of supply chain for the wool industry

less and some are even unable to sell their wool. Nylon carpet has become a massive competition to wool as it only costs \$50-\$79/sqm. When compared to wool carpet with just price in mind it is clear to see why demand is so low.

Within the wool industry at the moment there is a lot going on in the research and development branch by individual companies.

A big driver seems to be finding more markets for the super fibre.

- Wool Research Organisation of New Zealand (WRONZ) has started a new path with Wool Industry Research Limited (WIRL) which has developed a way for wool to be used as Particles, Powders and Pigments (PPP). This means that wool can be used in its smallest form as powders and liquids such as cosmetics and paint.
- Logan Williams of NZ Merino has developed a product trade marked as Keravos. This is a way of processing wool combined with corn starch into a by-polymer which can be used with injection moulding to create a plastic substitute. It is an eco-friendly, biodegradable plastic substitute which can use any type of wool and can be bought straight from the farmer, no supply chain needed. The by-polymer at present is being used to make boats, kayaks, chilly bins, and knife handles but seems to have endless opportunities as to what it can be made into in the future.
- Terra Lana have started a company that uses wool for insulation. Not only is it better for the environment it is much safer for humans too. The insulation can be used for in-house insulation but also smaller scale such as in chilly bins and to keep food cool inside grocery/mail services such as My Food Bag.
- Woolchemy have developed a treatment that when added to the wool creates a superior wet ability, super absorbent wool blend which can be used for washable underwear, sanitary pads, pet products, mother and baby products, cleaning and beauty products, washable bed pads and athleisure apparel all being sold with a positive environmental story to tell.
- Barron Surfboards have created woollen surfboards by replacing the fibreglass with a woollen substitute to make more eco friendly surfboards.

- Woolmark have been working with overseas designers using 3D printed wool material which is only in start up phase now but could be a growing material in the future.
- Honest Wolf is a brand started in Hunterville which uses the strong wool from their farm to produce high quality bags, wallets, laptop sleeves and hats. This is just an example of farmers creating outstanding products with their own wool.



Image 6

Advertisement image of the new woolen surfboards 'Barron Surfboards'. 2021

There are also groups/organisations researching, planning, and encouraging the wool industry at present, such as:

The Campaign for Wool (Patron: HRH the Prince of Wales), along with other companies have started up the Wool in Schools Initiative, educating school students, our future consumers, of the benefits of wool.

Strong Wool Action Group (SWAG) is a group of industry leaders that are actively looking for ways to improve the status of the wool industry. They are also offering support for wool industry members to help grow their businesses that could grow into internationally known brands.

Wools of New Zealand has also recently merged with Primary Wool Co. who have just bought out CP Wool to create a co-operative functioning as Wools of New Zealand. 'Being able to own a product from pasture to shelf will give some power back to the shareholder, 'When WNZ keeps the ownership of the product right along the value chain, we can capture the value back to the grower' (Scott, 2021)

Literature review

In Annette Scott's report written in The Farmers Weekly (23/8/2021), 'An exciting new chapter for wool', R Young says, 'There's been too much fragmentation for too long' and J Parsons adds 'Linking growers to consumers through a more integrated supply chain with the scale of both companies (Wools of New Zealand and Primary Wool Co) will help break the industry model that has failed growers for many years.' (Scott, 2021) It seems that the wool industries model of multiple different hands and cogs is not working as well as it could, thus fragmentation within the industry has become a problem.

However, at time of writing the wheels are starting to spin, Scott's report was written as a media release about the news that Wools of New Zealand (WNZ) and Primary Wool Co-op have joined forces as a new cooperative known as Wools of New Zealand (Scott, 2021).

In the ThisNZLife report Astino sheep breeder Andy Ramsden says, 'The way forward is two-fold, transitioning to innovate new breeds that are branded and controlled, and forming partnerships with manufacturers such as Lanaco (a multinational air filter company focused on producing wool fit to make their air filters) which has the global reach and marketing capability to earn a premium' (Corry, 2019).

In a 2020 Government statement Agricultural Minister Damian O'Connor claims "we need to understand where investment and collaboration is required" (O'Connor, 2020). It seems to be of general consensus that to move forward we need to join forces along the whole supply chain and work together to make a positive change within the industry.

'Our strength apart has been good but together we can change the game' (Scott, 2021) From this Wools of New Zealand was proud to announce their new partnership 'launching a partnership with New Zealand's largest flooring retailer, Flooring Xtra, in July'. (Scott, 2021) Wools of New Zealand now owns the wool from farmer to retailer, one step away from the customer.

In Annette Scotts report 'New dawn for strong wool' Beetham states 'We are really pleased to see industry players work together to end fragmentation and concentrate on driving extra value from the superior attributes we all know that strong wool contains'. (Scott, 2021)

In a 2016 exegesis written by Amy Blackmore, Annabelle Fitzgerald and Avaya Moody 'Wool Fresh Nature's Innovation' 'Hearle claims 'Research and development of synthetic fibres has given them a competitive edge over wool'' (Blackmore, et al., 2016) and O'Connor states 'a grim, but accurate, picture of a sustained lack of investment and breakdown of wool industry structures' showing that while the industry could've been in a better position, lack of investment has allowed our competition to get ahead. (O'Connor, 2020)

In response to this O'Connor reported that 'the prime minister and I are bringing forward \$84 million for sustainable food and fibre (SFF) funding for innovative and creative projects' (O'Connor, 2020) In Scott's report 'New dawn for strong wool' she claims 'investment is coming from the Ministry of Primary Industries (MPI) to fund further product lines and commercial development as part of the wider New Uses for Wool Programme' 'MPI is contributing \$1.95 million alongside \$2.92 million from WRONZ' (Scott, 2021).

In the 'Wool Fresh Nature's Innovation' exegesis the writers stated, 'although wool has many beneficial properties, applying further research and development and design can add value to the industry' and 'the wool industry could be strengthened through increased transparency, which would attract more investors interested in innovation' so while its only starting now, there is hope for a positive movement in the future. (Blackmore, et al., 2016)

In ThisNZLife report it is stated that 'Ramsden believes innovation is critical to the longevity of the local wool industry' and this opinion is often repeated. (Corry, 2019) In Scott's report 'An exciting chapter for wool' McWhirter responds 'We are going to increase demand for wool by creating viable commercial business models that will endure over time'. (Scott, 2021)

'While wool was once the backbone of the economy, there is little international demand for the fleeces that once went into carpets and textiles all over the world (and there are only so many knitted jumpers a person can own)' (Corry, 2019) This is the sad reality for the wool industry, as much as woollen carpet and textiles are exceptional we have to create and innovate more uses and markets for the super fibre because we need to increase demand for the oversupply that the industry has.

The industry's response to the lack of innovation has really kicked into gear over the last year, 'Wool Research of New Zealand (WRONZ) today announced its world class research initiative with the Ministry of Business, Innovation and Employment (MBIE) to explore new uses for New Zealand's strong wool which has led to the development of unique wool particles, powders and pigments with global export potential for applications as diverse as cosmetics, printing, luxury goods and personal care' (Scott, 2021).

Innovation really is changing the way consumers are looking at wool, another example of this is within the Wool Fresh exegesis where the writers explain 'Recent innovations such as machine washable wool are slowly affecting consumers behaviours. (Blackmore, et al., 2016)

However, the proof in the pudding will be seen in the future when these steps and actions either improve the state of the wool industry or leave us still searching for answers.

Method

The methodology used for this report involves a literature review and semi structured interviews.

The literature review involves media releases, product design papers, informative reviews, industry reports, government releases and articles on new products.

My plan is to gain a solid understanding of the industry in the past and present and build on this with the future opportunities and how we are going to push the industry into a profitable sector again.

I used thematic analysis to identify the main themes emerging from my analysis and to have a thorough understanding of the information collected via interviews, reports, books, articles, informative reviews, and research exegesis (Braun, 2006). Seven interviews were undertaken with supply chain members, industry leaders, public and professional. I plan on splitting my findings into three sections: past, present, and future.

Findings

Although the surveys undertaken went completely different ways the same three main ideas came up. Collaboration, investment and innovation.

When I spoke to James Parsons, chair of Wools Of New Zealand, he strongly encouraged collaboration of organisations and collaboration within the supply chain and, once pointed out, it is clear to see why this might be.

Within the supply chain there can be up to 12 hands that the wool goes through before it becomes an end product, as well as this there is transportation and storage costs which all quickly add up and often filter down to a minimum return to the producer. If there was a way, we could shorten or combine the supply chain to be passed through less processors and produced into an end product the impact on the supply chain would be major and the cost to produce a commodity could be reduced.

Also, as was released after the survey, Wools of New Zealand and Primary Wool Co-Operative have merged together to become one wool co-operative known as Wools of New Zealand. This will be beneficial as working together helps both organisations become a stronger team, they are no longer competing against each other instead working together to achieve the same goals.

Paul Rabone, wool buyer for CP Wool, agrees that competition is often an issue within the wool industry, rather than working together for the best outcome, which is what we all want, we all compete against each other for the best outcome which is not helping to build the sector at all.

To achieve greatness, we need to combine together, competition is good and has a place within the sector but to overcome the bigger issues we have within the industry such as multiple sellers having lower volumes of wool compared to one big seller with high volumes of wool, we need to combine to have a place in the market.

Jeff Grant, chairman of AgResearch, said 'structure is a big part of remaking the future and to go forward we need to restructure from the woolshed onward' so here again is an example of the need for collaboration, lets restructure ourselves into a team that works

together right from the woolshed all the way to the end product to get the best outcome we can for everyone.

Andy Ramsden is a big believer in investment within the strong wool industry. Andy Ramsden and Lanaco, a wool company, have produced Astino sheep, a breed bred for their wool as well as looking for benefits within meat.

The wool is a medium micron wool which is used in air filters, wool is a naturally air filtering fibre and the company have produced these sheep to have better air filtration properties than it already has. NASA has done research and tests on air filters for their aircraft and found that Lanaco's Astino air filters were the best at doing their job, filtering air. This has led to Lanaco being the sole provider of air filters for NASA.

'We've got to put a lot of effort into finding new uses for strong wool' was Andy Ramsden's leaving quote to me and to do this we need to invest in the research and development within the industry to find new purposes for the wool. Jeff Grant also said "There is a major issue with investment" not only in research and development but also with keeping up the standards of the wool we produce.

"To improve New Zealand's wool standings in the market our wool needs to be recognised for its benefits and that begins at the woolshed." How can we expect to get top dollar for our wool when at the woolshed, the very start of the process, standard of preparation, handling and classing has been lowered consistently since the price for the wool has decreased?

Richard Green, Chairman of Agmardt, also agrees that investment is an important part for the industry to step forward, he believes that farmers need to invest in strong wool if they want to be the ones benefiting from the industry.

Along with this Ian Hopkirk said, "The best investing we can do to begin with is, investing in the future." Ian Hopkirk is a wool buyer for PGG Wrightsons, who in his spare time is a wool handling and shearing judge for the shearing shows around the country. He also teaches shearing to high school students also known as 'our future shearers'.

Like others he is doing a great deal of investing his time into the future of the wool industry and that is a great start for the sector, if we don't teach proper practice from the beginning how are we going to expect improvement in the future.

"The worried wealthy is the wool carpet market but that alone won't save us" is a statement from Andy Ramsden which, to me, is a great kick into action for the innovators in the country. "Coarse wool has to find new uses for its uptake".

Richard Young, chairman of Primary Wool Co-Op said that "55% of strong wool is going into floor coverings" so what are we to do with the other 45%? Innovate is the answer, let's find new uses and markets and ideas for the natural super fibre.

Richard told me about a new opportunity within the carpet market that we haven't yet been into, carpet tiles. Carpet tiles are a new product that the synthetic carpet industry has got in behind which is carpet made tiles that are used in heavy duty/high traffic areas. They are beneficial because if a tile gets worn or soiled the one tile can be replaced rather than the whole carpet. These tiles are now a big part of the carpet market but there are only synthetic carpet tiles being made. This is a prime example of a way we could innovate within the markets we already have.

Richard Green has been doing his own innovating, thinking about how we could 'lease' out sheep to consumers who have little to do with the sheep but come shearing they receive their very own sheep's wool spun and delivered to their door for the consumer to do what they please with, this is a great example of value adding and marketing. Not only is it changing the consumers experience, but it is also selling 'cuddly, warm and produced by my own sheep' product so rather than just selling strong wool you would be selling the experience.

Jeff Grant agrees that innovation is a major leader in the success of the strong wool industry but does see the issue we are struggling with that innovations at present only use up 5% volume of the Strong Wool market which isn't a large enough amount to shift the market.

To begin to make a change we need to use at least 10% volume of strong wool and by the time we get to 15%+ the price is expected to increase.” However, at this stage we are still trying to address the oversupply issue, not yet raising the price so there is a lot of steps needed to get to the end result.

Thematic Analysis

Three main themes seem to arise when reading reports, articles, releases and speaking to industry leaders regarding the wool industry. These three themes are fragmentation/collaboration, investment, and innovation of the strong wool sector. Each of these have a massive impact on the strong wool industry.

For example, the industry has been very fragmented and ever so competitive within the sector and this needs to change if strong wool is to make a comeback. To do this, organisations, sections of the supply chain and products and markets need to combine to strengthen the industry as a whole.

Collaboration will enable the industry to use each other’s strengths and reduce the weaknesses of each other which can only be a good thing.

Investment is something the industry has been lacking for a long time and the impact of this has become very noticeable. Investment is needed for research and development as well as innovation and improvements. It is our greatest chance to improve research and development to gain a competitive edge on competition such as synthetic fibres, we need to use the investment to find new uses, markets and qualities to be used to benefit the sector.

Innovation will be a big step forward for the future of the strong wool industry, it is a way for the industry to find new markets for the super fibre. Although carpets, upholstery and outer garments are a large chunk of what strong wool is used for the industry has to find new markets for strong wool to counter the large over supply of strong wool and a way to do that is with innovation.

There are innovators doing this right now and we need to support and encourage them so that we can overcome the large over supply issue creating buyer tension for the super fibre.

Discussion - The Future of the Wool Industry

As New Zealand is a country founded on sheep farming, creating strategic direction for the growth of wool is as natural as the fibre itself (Campaign for Wool, 2021)

Based on my findings my perspective is that the future of the wool industry is to become a coherent, co-operative system built on the strengths of collaboration, investment and innovation.

In my opinion, the way forward for the industry is innovation. 'Research and Development of synthetic fibres has given them a competitive edge over wool' (Blackmore, et al., 2016). As well as changing marketing strategy to appeal to a bigger market.

An example of another industry that has changed its marketing strategy to encompass more people in the past is the cotton denim industry. In the past jeans were only a cowboy/western 'wrangler' market used for their durability, they weren't happy with just the one market and re-invented themselves into the fashion market and are now a commodity that almost everyone has a pair, if not two pairs of. How can the wool industry open themselves up to more markets like this?

'The latest initiative was a marketing campaign, the Campaign for Wool, aimed at raising awareness among consumers about the sustainability credentials of wool compared to synthetic fibres to capitalise on the increasing demand for environmentally friendly products. (Campaign for Wool, 2021)

Rather than staying stagnant we have to be prepared to keep moving forward, keep changing and trialing, keep opening up markets and opportunities through innovation.

These innovations can come from many places:

- Through finding new markets to sell wool such as cosmetics and insulation
- Through new innovations within our supply chain, such as innovating new machinery to shorten the supply chain or finding ways to reduce unnecessary costs, such as transport or multiple hands owning the wool

- Through finding new opportunities within the markets we already have, such as flooring tiles and educating consumers to return to wool because of its benefits.

At this stage most of the new innovations are at the Innovation-Early Adoptors stage on the innovation curve:

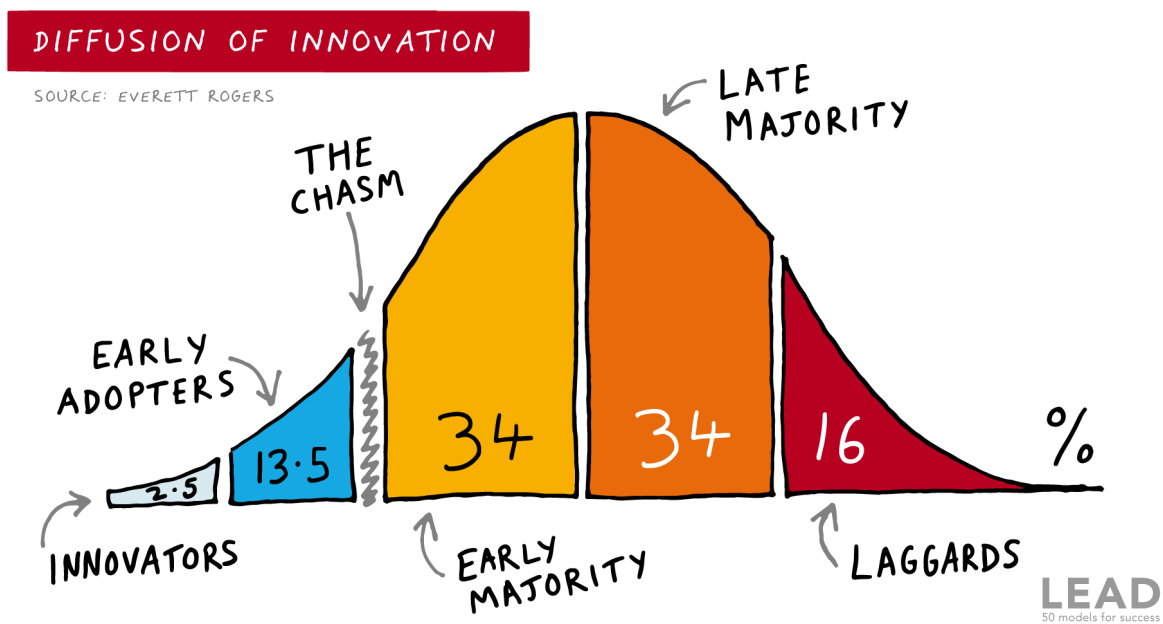


Image 7

Diffusion of Innovation curve

In the past innovations have occurred which have got past the innovators and early-adaptors segments but fallen into 'the chasm' and not made it to the early majority section or onwards. This is often due to price; how can we find a use for wool that isn't impacted by such a high price?

What we need is a really big push to get us up the curve to see our potential. How are we going to do this?

In my opinion the education from the 'Wool Shed' and gradual knowledge of the super fibre will encourage people to use it increasingly. Also, by making consumers increasingly aware of the environmental impacts of the products they purchase. Especially if we have multiple different markets to sell our wool into, it's positive story should actually advertise itself.

Another issue is that each innovation only uses a small amount of wool, on average up to 5% of the wool supply. To make a big impact on the market we need to be using at least 10% of the wool to even move the market and in an ideal world at least 15%. Is there one innovation that could do this or will we need to have multiple small innovations working on the 'all the one percenters add up' theory.

This is an important area to look at and work on, as a big reason why the wool market is weak is because we have an over-supply and a lower demand for it. If we created a new product or use for strong wool the supply would in effect 'decrease' as more is being used and as supply decreases, demand increases as shown in this graph of the supply demand curve:

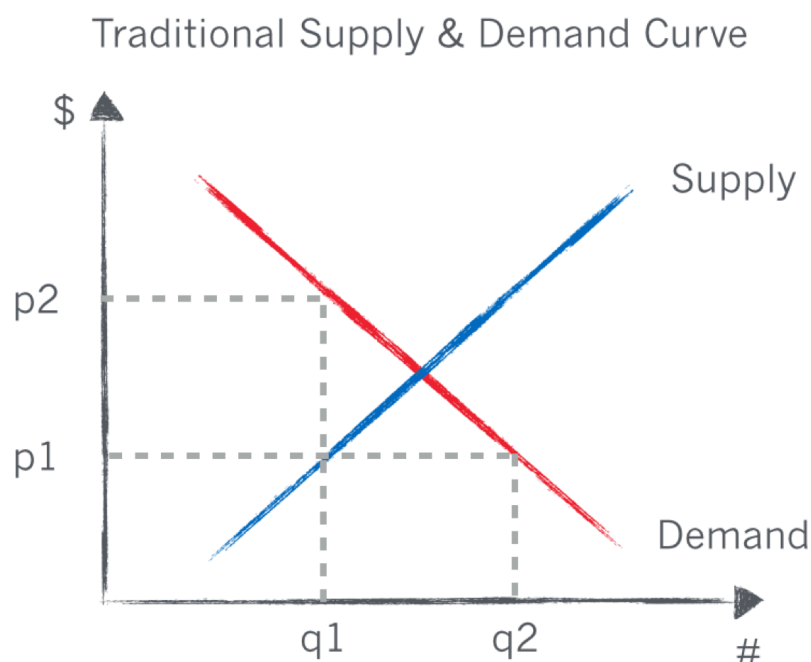


Image 8

Supply and Demand Curve

In this graph there are two points, p_1-q_2 and p_2-q_1 , as well as the equilibrium that I will discuss. Point p_2-q_1 shows that when the supply is low the demand is higher. However, point p_1-q_2 shows that when you have a high supply the demand is lower. In the centre is the meeting point also known as the equilibrium, this is when there is equal supply to demand and is the optimum running point for a business, as you are not in a supply surplus but are also not in a supply deficit both of which are negative towards the running of the business.

At the moment greasy strong wool is at point p_1-q_2 , the supply of strong wool is high while demand is low. 'Total NZ production of strong wool sits at 736,530 bales, with 44,713 bales unsold, effectively accounted oversupply.' 'Buyers can sit back and relax, as they can buy what they want knowing there's 45,000 sitting out there – 45,000 is the size of the problem' (McWhirter to Scott, 2021)

'We have a plan to increase demand by more than 45,000 bales, this will create buyer tension – in the next 12 months we can be on the same path as the housing market' (Scott, 2021). From this we can see that McWhirter has a plan to move strong wool from point p_1-q_2 towards p_2-q_1 stopping at the equilibrium which is the best operating space for the wool industry to be.

There is opportunity within the 'worried wealthy' market, consumers who are prepared to pay extra for commodities that are environmentally friendly, natural, and biodegradable. What can we make wool into that these consumers would be prepared to buy?

This market would be a very good market to sell into as the consumers are inclined and prepared to purchase higher costing commodities, when they find the quality and benefits of their goods they are likely to pass their findings on, slowly marketing the items themselves. This is a step into creating consumer demand, as consumers are likely to buy something recommended to them by an acquaintance.

Looking at the future, our vision is for every bale of New Zealand wool to be made into profitable, sustainable wool products... These products will be sold at a premium price to people who care about the future of our planet – Campaign for Wool (Campaign for Wool, 2021)

The other option is to do nothing and continue to watch the decline of the wool industry, which fits with the saying:

‘Insanity is doing the same thing over and over again expecting different results’ - Albert Einstein

Conclusions

History is a great thing to look back on, to learn from and to develop from. We have seen the struggle the industry has had in the past with constant fluctuating markets and an underdeveloped supply-demand model.

The present is turning towards investment, innovation and working together to improve the outlook for the whole industry.

The three main themes of fragmentation/collaboration, investment and innovation are still going to be the strongest leaders into the future of the strong wool industry. Without them the future looks bleak however if the sector continues to collaborate and invest, and entrepreneurs and innovators continue to look for new ways to use this super fibre the sector as a whole will be in a better place.

Within this report we have seen collaboration of organisations and new products. If the sector continues to work together there will be a stronger force to reckon with, the sector needs to combine as a net to capture all the opportunity missed at present within the markets.

We have also seen the beginning of great investments into the strong wool industry. Investing into research and development is one of the greatest way the sector can move forward, as stated earlier, ‘Research and development of synthetic fibres has given them a

competitive edge over wool' (Blackmore, et al., 2016), to counter this the industry has to catch up on a lot of missed research and development and the only way we can do this is with continued investment.

Innovation is going to be a massive starter for the re-emergence of the industry. The industry has to find new uses and new markets for strong wool and that has already started, innovations such as WRONZ's pigments, particles and powders and Terra Lanna's insulation are just examples of the huge amount of innovation occurring at the moment, long may it continue.

The future has many paths to take and many of these are positive. From all this research I have found that within the industry there is so much occurring that can have a positive impact on the industry.

On the basis of this study, I believe that the strong wool industry will become a thriving industry again. It won't look the same though, there will be new uses for strong wool from a large amount of innovation. Educated early adapters will be the first to get involved, helping with the push up the steep curve but once the industry starts rolling there will be a snowball effect and eventually wool will be on top again. What a beautiful future that could be.

'In wool we have the opportunity to support nature herself. To give back a little of what she gives to us.'

HRH the Prince of Wales

(Campaign for Wool, 2021)



Image 9

Brand for Campaign for Wool and New Zealand Wool. 2020

Recommendations and next steps

Producers need to:

- Produce high quality wool – high quality wool allows farmers to access more premium and therefore more profitable markets. Therefore, increasing returns to the producer which in hand allows re-investment of funds into their business to further improve their product.
- Employment of proper practice in the wool preparation as well as in the woolshed to ensure the wool is of highest quality so it can be sold to a premium market to be used in the production of high-quality commodities.
- Always look for new markets and opportunities - keep an open mind to the new innovations and uses of the wonder fibre. Innovators and entrepreneurs need as much support and encouragement as we can give them. The industry has a stereotype of not having the aspiration to change and adapt to changing market environments and this is an area we need to work on as this will provide more opportunity for the industry.
- Educate the market of the benefits of using wool in every way we can so the consumer can make an informed, eco-friendly, and sustainable choice.

Consumers need to;

- Buy wool – rather than buying synthetic and unsustainable fibres that negatively impact the environment, buy the ultimate natural fibre, which is beneficial to the consumer, the environment, the animal, the farmer, and the country.
- Encourage the industry – New Zealand as a country needs to back the industry that once was the backbone of the economy, so that the industry can bounce back and change the production of wool from being an expense to an added income to the farmer. As well as encouraging sustainable, eco-friendly products to return to the market.

So, choosing a fibre which comes directly from the New Zealand countryside is ultimately going to keep us all happier, healthier, and safer.

– HRH the Prince of Wales (Campaign for Wool, 2021)

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Appendices

Ian Hopkirk,

“What is your view of the wool industry at present?” “How do you see the industry progressing in the future?” “What innovation do you think we need to do more research into?” “What is the biggest catalyst for change in your opinion?” “How do you think we can get involved with the industry?” “What do you think we should learn from history?” “Can you please describe your views on the industry as a whole.”

Paul Rabone

“What is your view of the wool industry at present?” “How do you see the industry progressing in the future?” “What innovation do you think we need to do more research into?” “What is the biggest catalyst for change in your opinion?” “How do you think we can get involved with the industry?” “What do you think we should learn from history?” “Can you please describe your views on the industry as a whole.”

James Parsons

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Andy Ramsden

“What is your view of the wool industry at present?” “How do you see the industry progressing in the future?” “What innovation do you think we need to do more research into?” “What is the biggest catalyst for change in your opinion?” “How do you think we can get involved with the industry?” “What do you think we should learn from history?” “Can you please describe your views on the industry as a whole.”

Richard Green

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Jeff Grant

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Richard Young

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List of acronyms and definitions

Micron – a unit of length equal to one millionth of a metre, used in many technological and scientific fields. This is the unit that wool is measured in.

BAWRA – British Australian Wool Realisation Association

WRONZ – Wool Research Organisation of New Zealand

WIRL – Wool Industry Research Limited

SWAG – Strong Wool Action Group

PPP – Particles, Powders and Pigments

Greasy strong wool – Strong wool when sold in wool bales, unsoured

Tables

1835 – NZ first started to sell wool. It was shipped to the United Kingdom to get sold there.

1866 – NZ started to sell wool in New Zealand, the United Kingdom then had to send wool merchants over here to buy our wool.

1916-20 – The crown became the sole buyer and seller of NZ wool, all at a fixed price. This was known as 'the commandeering'

1920-39 – 'The commandeering' ended. When it ended the United Kingdom had 800,000 bales of NZ wool along with other wool unsold. BAWRA was set up to sell the unsold wool without upsetting the market and sold all of it between 1921-24. Between World War 1 and World War 2 sheep and wool steadily increased but the wool price decreased significantly.

1938 – Synthetic clothing started to be made
<https://www.sciencehistory.org/distillations/synthetic-threads>

1939-52 – It all happened all over again

1950 – Korea and US went into war. The US wanted to buy large quantities of wool for their strategic stockpiles. This caused the wool price in NZ to almost triple from 38 pennies a pound to 88 pennies a pound. Within the 1950-51 term the wool industry bought in £1.4 billion pounds. £1 in 1950 is equivalent to about \$69.50 today.
<https://www.rbnz.govt.nz/monetary-policy/inflation-calculator>

1960 - Carpet in the United States was being made on tufting machines from synthetic fibres such as nylon <https://eh.net/encyclopedia/a-history-of-the-u-s-carpet-industry/>

1966 – After this boom the US put a ceiling price on wool to stabilise the wool market and in 1966 the wool price dropped over 40% overnight.

1977 – The government introduced a Livestock Incentive Scheme to encourage farmers to keep their stock

1978 – The government introduced the Land Development Encouragement Loans to help the farmers develop their land

1982 – Sheep numbers in NZ peaked to 70 million

1975-85 – Wool exports increased by 45%

1985 – The Livestock Incentive Scheme was removed after the increase in wool exports and soon after the returns for sheep dropped by 50%, this was another big blow to the wool industry.

1990 - \$1.3 billion dollars in export wool profit

1990-91 – Sheep numbers in NZ decreased to 58 million sheep

2000 – 12,705 sheep farms in NZ

2009 - Farmers boot out wool levy <https://www.stuff.co.nz/nelson-mail/news/2822497/Farmers-boot-out-wool-levy>

2018 – 6549 sheep farms in NZ. With a wool export profit of \$700 million dollars. <https://www.stuff.co.nz/business/farming/109115281/from-70-million-to-less-than-30-million-where-have-all-the-sheep-gone>

13.4. References of images

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Image 3 - <https://www.alamy.com/stock-photo-1960s-colour-woolmark-advertisement-for-coat-in-pure-new-wool-in-womens-34012892.html>

Image 4-<https://manawatuheritage.pncc.govt.nz/item/cd101675-3f9d-4189-800e-b7a4efd6a5d5>

Image 5 - <https://in.pinterest.com/pin/216032113359472457/>

Image 6 - <https://barronsurfboards.co.nz/pages/woolight>

Image 7-<https://thebrandhopper.com/2020/11/13/marketing-concept-diffusion-of-innovation/>

Image 8-

https://res.cloudinary.com/dzawgnlr/image/upload/q_auto/f_auto/w_auto/traditional_sd_curve.png

Image 9 - <https://nzwool.co.nz/>