



Kellogg Rural Scholars Series

*Vol. 4, December 2023*

# Red Meat Insights

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Prepared for Beef + Lamb New Zealand



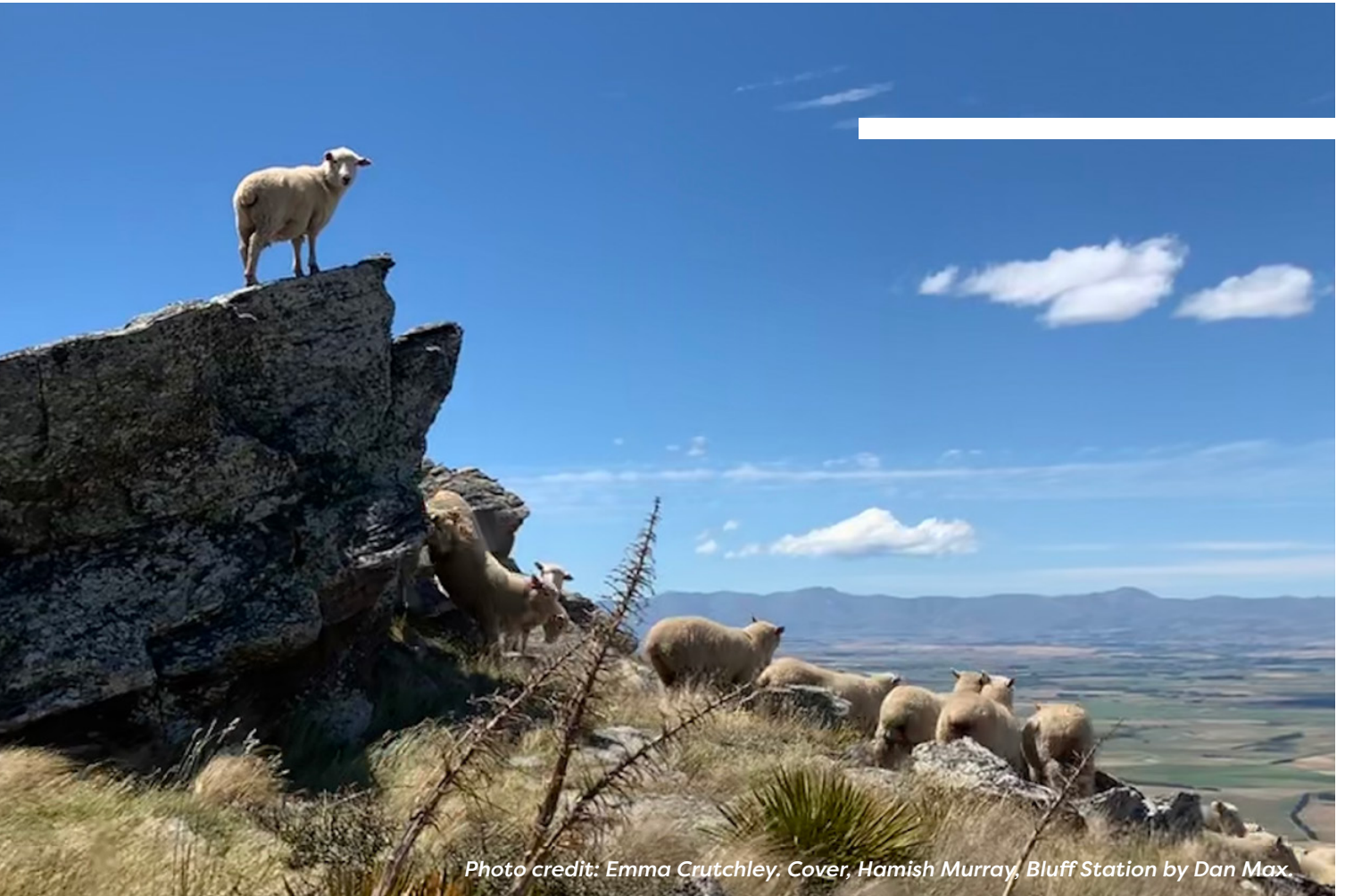
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# Introduction.

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New Zealand's food and fibre sector is full of capable, and purpose driven people.

Supported by an incredible group of partners, the New Zealand Rural Leadership Trust is privileged to be entrusted with growing many of these people on their leadership journey.

A key aspect of the rural leadership approach is research-based scholarship. The clarity of thought and confidence this approach promotes is transformative.

The set of reports précised on the following pages are penned by Scholars from the Kellogg Rural Leadership Programme.

Many Kellogg and Nuffield Scholars go on to live their research. They build businesses. They advance community and social enterprises.

They influence policy and advocate for animal and environmental outcomes, informed by an ability for critical analysis and their own research-fueled passion.

In the following pages we are pleased to précis 14 research reports by Kellogg Scholars. The full reports can be found at <https://ruralleaders.co.nz/kellogg-our-insights/>

The reports traverse topics as wide and timely as blockchain for red meat traceability, land use diversification, carbon neutral red meat, alternative proteins, and red meat processing.

These reports are written by people living and working in our food and fibre sector.

Ngā mihi,

**Lisa Rogers**

and the NZ Rural Leaders Team



*Photo credit, Dan Steele, Blue Duck Station.*

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# Understanding the perspective of New Zealand sheep and beef farmers: Effects on the market orientation and farm performance in the red meat industry.



Ange McFetridge

July 2015

With debate surrounding the structure and strategy of the New Zealand red meat industry, the time is right to explore constructs around the market orientation and performance of New Zealand sheep and beef farmers.

Market orientation was determined by studying customer orientation, competitor orientation and inter-functional coordination. These factors were considered alongside cooperative membership, level of education attained and ownership of sheep through the marketing channel.

Results indicate that there are some moderate differences between cooperative and non-cooperative members. There was no statistical difference between various levels of education attained and ownership of sheep through the marketing channel using principal components analysis, MANOVA and discriminant function analysis.

Redundancy analysis was used to analyse the variability in market orientation in relation to ten variables being price, production, quality, relationships, planning, innovation, learning entrepreneurship, trust and commitment. Planning, performance and relationships were the most powerful variables.

The theoretical framework and model was applied to a usable sample of 131 sheep and beef farmers from all regions of New Zealand and is a study which is a preliminary step to gain insights for more in-depth empirical research in the near future.



[https://ruralleaders.co.nz/understanding-the-perspective-of-new-zealand-sheep-and-beef-farmers-some-effects-on-the-market-orientation-and-farm-performance-in-the-read-meat-industry-ange-mcfetridge/](https://ruralleaders.co.nz/understanding-the-perspective-of-new-zealand-sheep-and-beef-farmers-some-effects-on-the-market-orientation-and-farm-performance-in-the-red-meat-industry-ange-mcfetridge/)



# Plant and three vege.



**Andy Wards**

*April 2022*

To feed a world population of over 9 billion in 2050 it is highly likely that we will need to see growth in all protein categories rather than the dominance of one over another.

This report reviews the current literature and media narrative around the subject of plant-based proteins and the position they have taken in the protein market space. It outlines the background and importance of the NZ Red Meat industry and why this continues to be a highly valuable sector.

It analyses recent research into amino acid profiles in red meat and discusses some of the points made around the health questions often formed in consumer minds. We now have a society made up of a range of lifestyle diets, where new words such as flexitarian have developed, and veganism is not so far from the mainstream.

Red meat will continue to be a vital source of nutrient dense protein. The Covid 19 pandemic has enhanced people's confidence in their home-cooking abilities, and they have sought out higher value premium red meat products to complement their menus.

Red meat has symbolic qualities which makes it a key component for festive occasions and social celebrations.

Plant proteins will cement their place in the retail food cabinet as well as in the food service and ingredients sectors. They offer a genuine alternative to red meat protein and will be an essential contributor to overall protein requirements of a growing global population with a focus on human nutrition and environmental impacts.

Red meat farmers and processors should be confident in their industry's future and continue to invest in technology, people, minimising their environmental impact, and targeted consumer marketing.

Meat alternatives have an important place in the industry to further engage consumers in new and different ways. When it comes to animal protein vs plant protein it is an "AND" story, supported by growth in the entire protein category.



<https://ruralleaders.co.nz/plant-and-three-veg/>

# Partial land use diversification for long term sustainability and resilience of sheep and beef farms.



Lucy Murray

July 2023

This project was completed to understand if sheep and beef farmers in NZ can use partial land use diversification to improve environmental sustainability and farm business resilience.

The reason this was studied is because farmers in New Zealand are facing environmental, social, institutional, and financial pressures.

Many sheep and beef farmers will likely need to make adaptations to their farm systems to remain profitable, improve environmental sustainability and to create more resilient farm systems for the future. One way of adapting the farm systems is through land use diversification.

A literature review was completed, and a series of farmers and industry professionals were interviewed. This data was then assessed through thematic analysis.

Diversification for agriculture is defined as the addition of another source of farm-based income to the existing income stream and it includes the introduction of additional farming enterprises.

Land use diversification can have numerous benefits in sheep and beef farms including, enhanced environmental outcomes, improved profitability and cash flow,

enhanced farm resilience, more succession opportunities and a better integrated farm system.

The downfalls highlighted were increased risk to the farm system during development and early stages of land use change, and the initial financial outlay for development and increased complexity.

To reduce the risks of land use change, a comprehensive planning process is required. Some key steps include business planning and goal setting, understanding the biophysical resources, farm planning, matching the land use to land use capacity, climate and soil conditions, farm system modelling and evaluation and trialling.

If farmers in New Zealand can successfully transition their sheep and beef farms to diversified land use systems, it will likely transform the sheep and beef industry throughout the country to overcome environmental challenges and create long term sustainable and resilient farm systems.

Some recommendations to farmers assess the farm as if it is a blank canvas and understand different land use opportunities within the farm system. More research needs to be done on land use options available for different regions.



<https://ruralleaders.co.nz/partial-land-use-diversification-for-long-term-sustainability-and-resilience-of-sheep-and-beef-farms/>



## Conclusions

This study proved that partial land use diversification is a real option, one which sheep and beef farmers should consider for overcoming social, environmental, regulatory and financial pressures.

To de-risk the process of land use diversification, research and planning are crucial. Matching the land use to the capability of the biophysical resources is important for ensuring that there are no negative consequences to the environment.

If land use change is well planned and researched it will transform farm systems through improved long term financial performance, improved environmental outcomes and increased farm resilience.

There is potential to collaborate with other like-minded farmers and create cooperative models for the sharing of infrastructure, resources, and expertise, however more research needs to be done on this. Overall land use diversification is very important for the agricultural sector in New Zealand.

## Recommendations include:

- Landowners should assess their farm as if it is a blank canvas, identify production and profitability and limitations of different land management units. This will aid in realising the opportunities and inefficiencies within the farm system.
- Research the different land use options you are considering, understand the requirements of the crop and the biophysical resources of your land to ensure you match the land use to the capability of the land.
- Develop tools which outline land use options and suit the local climate. These could be developed and maintained by regional councils with the use of local climate data and research into land use options.
- Collaboration could be considered with like-minded farmers to build scale and share resources when changes are made to land use. If they decide to do this investigation planning into corporate governance models is recommended.



# What is New Zealand's red meat marketing strategy in China?



Johanna Olsen

April 2022

China has traditionally been perceived by the New Zealand red meat industry as a destination for large volumes of secondary cuts. However, after four visits to China over the period 2012-2019, I felt that New Zealand still didn't fully recognise the extent of change and opportunity for our red meat represented by steady economic growth in China.

This project set out to investigate the research questions of "What is our strategy in China?" and "How do we target the premium end of the market?"

China is New Zealand's largest export market for red meat by both volume and value. It is important that we demonstrate our commitment to the market by exploring and investing in our opportunities there. There is some rhetoric about putting "all our eggs in one basket" in China. So that we are less exposed to reliance on shifting high volumes into this market, it is important to maximise the value we get from our product in China.

This project consisted of a literature review of current New Zealand market activity in China and interviews with a number of industry stakeholders. A thematic analysis methodology was used to distill key themes from the interviews.

Currently, there is an overwhelmingly positive disposition among New Zealand's red meat exporters due to exceptional growth in both demand and pricing from China. However, this mustn't be confused with New Zealand success in the premium space.

Lamb can be found on the menu at some high-end and Michelin star restaurants and the most recognised brands include Coastal

Spring Lamb and Lumina Lamb. New Zealand Beef is not a premium product in China. One of the key challenges in marketing our meat in China is the fact that almost all meat is sold at the border, and we largely lose control of it there. This makes it difficult to ensure consistency of product and supply

Strategy for premium red meat in China needs to start with the product. Recognisable "premium" brands must have a story, not just a label. This must be backed by consistent product quality and consistent supply.

There is a real opportunity for meat companies to find and scale their niches. This requires a stripped-back approach focused on consistency of product and supply first. Smaller producers such as Coastal Spring Lamb have proven that "starting and scaling" can reap great rewards and larger meat companies are identifying similar opportunities. However, the scale of most New Zealand meat companies doesn't lend itself to this approach.

Identifying markets that can be supplied directly (not selling to distributors) is a potential opportunity. Currently, this is not a suitable strategy for most New Zealand meat companies. However, this blue-sky approach with "premium brands" would enable price discovery, increased market insight, increased margins. While complex, boutique meat-producing operations gaining a premium from a great story and traceability information is something we might see in future.



<https://ruralleaders.co.nz/what-is-new-zealands-red-meat-marketing-strategy-in-china/>



# From supply chain to value chain. Understanding the mindset needed to transition for lamb producers.



**Matt Smith**

*January 2023*

Disruption has become a constant condition of doing business. The businesses that are more likely to thrive are those that can not only respond by adapting to continuous change but also become the drivers of that change.

The landscape of farming in New Zealand is evolving. Previously it has relied on low-cost competitive advantage. This has been achieved by either increasing productivity or reducing costs, but it is now becoming more difficult to maintain this.

Adding value to the lamb that we produce is seen as a way to adapt to this change and is seen as a pathway forward for lamb producers.

This report seeks to understand some of the existing lamb-selling strategies and the mindset of lamb producers. It then examines how to change from a supply chain strategy to a value chain strategy and what that means for the farmer.

A literature review was undertaken to further understand the research topic. Nineteen semi-structured interviews were undertaken with participants either connected to the Lumina Lamb programme or with a deep understanding of value chains.

Some lamb producers have the same selling strategy that they have always employed whilst others are naturally curious and seeking opportunities, to increase returns and build resilience which leads them to be attracted to a customer-led value chain.

This relates fundamentally to a farmer's

mindset and the reason 'why'. Which was driven by an understanding of the customer, the chef. Lumina Farmers valued their connection with the chefs. The key to Lumina's success today is based on communication and transparency of the whole value chain and the ability for farmers to be part of a producer group with similar values.

Farmers valued the connection with other like-minded farmers, the collaboration and opportunity to learn from each other, were powerful, motivating and encouraged farmers to join the Lumina programme. To enable this change, the use of incentives in areas that need behavioural change that benefit the whole value chain would be the biggest challenge for growth.

## Recommendations

This report outlines recommendations for companies trying to transition from producing a commodity product to a premium product. Some of these findings will be directed at the Lumina programme, but the concept will have relevance to other sectors and programmes.

To achieve the organisation's goals Lumina leaders, need to:

1. Actively seek to understand the farmer's current selling strategy and their mindset:



Report not live at time of publication. Search 'Matt Smith' at <https://ruralleaders.co.nz/kellogg-our-insights/>

When looking to bring new farmers into the Lumina programme, the initial focus of the discussion should be to get an understanding of the farmer's existing selling policies and why their motivations for choosing that strategy. The transition to supplying a premium product could require a change in values and mindset by the farmer.

2. Connect the farmer to the Customer:

Build an attractive connection between Lumina farmers and their customer.

3. Utilise the power of the champions in the Lumina community:

Encourage interaction amongst the farmers of the group, express the benefits of collaboration, to build on the strength that the programme already has.

Champion farmers as Lumina ambassadors, which will create an environment of excellence.

4. Develop a Road Map for farmers to understand the pathway into the Lumina programme:

Outline the different pathways on how to join the Lumina programme with clear systems in place that outline the requirements and identify the risks and opportunities. And expectations?



# How might Rangitīkei sheep and beef farmers futureproof their land?



Grace McLeay

July 2023

Farmers adapt to the weather as part of their everyday decision-making on farm. Evidence suggests that, for New Zealand, the climate will change more significantly in the years between 2040 and 2090. How might Manawatū-Rangitīkei sheep and beef farmers adapt to the changing climate and futureproof their land?

The purpose of this report is to translate scientific climate modelling into practical contexts for Manawatū-Rangitīkei sheep and beef farmers and consultants.

This report aims to provide knowledge of:

1. Climate change predictions within the century.
2. What risks and opportunities are associated with climate change predictions.
3. What practical short to long-term actions could be considered that might future-proof farming businesses?

The methodology involved a literature review, followed by semi-structured interviews which formed qualitative research into futureproofing solutions.

## The key findings are four climatic attribute changes to be aware of:

1. The frequency and intensity of drought.
  - a. By mid-century, a rainfall deficit of 50mm – 75mm per year.
2. The number of ‘hot days’ over 25C.
  - a. By mid-century an increase of ‘hot days’ over 25C, between 40% and 100% per year.
3. The frequency and intensity of adverse and compounding weather events.
  - a. El Niño and La Niña natural weather cycles exacerbated by climatic changes globally.
  - b. More severe adverse weather events, their frequency requiring more research.
4. An increase in temperature.
  - a. By the end of the century, an increase of 0.7C – 3.1C under the Representative Concentration Pathway’s (RCP) 2.6 and 8.5.

## Recommendations to Manawatū-Rangitīkei sheep and beef farmers and consultants:

1. Use credible, trusted, and up-to-date sources of information to inform opinions about the changing climate.
2. Learn from advisors who collaborate closely with the scientific community and can translate data into meaningful, practical contexts.
3. Assess the current farming system concerning the top four climatic attribute changes and identify relevant, attainable, short to long-term actions, that may futureproof the business.
4. Build financial resiliency to be able to absorb hits and invest in futureproofing mitigation solutions.
5. Identify primary land use resources and their potential alternate use, if the existing system needs to change in the future.



<https://ruralleaders.co.nz/how-might-manawatu-rangitikei-sheep-and-beef-farmers-futureproof-their-land/>

# Carbon neutral red meat brand - vision and viability.



Siobhan O'Malley

December 2018

The vision for how supply criteria of this product would need to be met is modelled on milk and wool supplier criteria from added value brands. The certification of the carbon neutral status of the product would be determined by an external auditor, in this case, carbonZero administered by EnviroMark.

In order to establish demand for this product attribute, Google Trends and BuzzSumo were searched for relevant interest levels from worldwide consumers. These searches showed that little interest existed in carbon neutral food, let alone red meat products. Consumers were more likely to link red meat to climate change in a negative association, than to be seeking out products that could be carbon neutral.

Domestic, New Zealand-based demand for this type of product offering was measured using a Minimum Viable Product Approach. This researcher used a website landing page complete with email address catcher, a Facebook business page and a series of targeted Facebook and Instagram advertisements that reached over 22,000 individuals measured the response and interest from kiwi consumers. The result of this testing generated some emails, but broadly little traction or active interest.

Finally, a literature survey was used to assess the idea of creating and marketing a carbon neutral red meat product to send offshore.

Pivotal to this research was a Beef+Lamb study of consumer preferences in California, USA and Shanghai, China.

Further studies had looked at the concept of carbon labelling, with the assumption that this will be widespread in the medium term. This research highlighted that while a segment of consumers are interested in buying carbon neutral or low carbon food, they may not be interested enough to spend more to buy it, and also that on its own the carbon neutral attribute does not meet enough consumer needs to be an attractive offering and needs to be combined with other attributes that consumers are demanding.

So the recommendations are for market testing to continue to overseas and domestic markets to gauge the moment that consumers are looking for this type of product offering. New Zealand needs to make sure that our companies are adopting internationally recognised standards for determining carbon neutrality. As this awareness matures, it could quickly affect our access to overseas markets.



<https://ruralleaders.co.nz/carbon-neutral-red-meat-brand-siobhan-omalley/>



# Potential threats to New Zealand deer pet food from international wild deer supplies.



Rob Kidd

July 2018

“The large-scale commercial farming of deer started in New Zealand, and New Zealand remains the world’s largest and most advanced deer farming industry” (DINZ, n.d.).

Recently, a significant increase in demand for pet food products has developed. This has been fuelled by American and European customers buying for pets which are now so highly regarded they are seen as members of the family. This is leading to greater importance being placed upon nutrition, taste and overall wellbeing of the animal, driving the customer to invest in high quality and novelty pet foods.

Venison has been counted as a novelty meat in the pet food ingredient classification. “Venison is seen as a natural, high-quality, lean snack in the pet industry which appeals not only for its nutritional values but because dog owners in particular think it’s something their animal’s ancestors might have eaten” (NZ Farm Life Media, 2016).

Mechanically Deboned Meat (MDM) is the product produced from the crushing and separating of bone from meat. As well as MDM, the organs from deer are able to be added to pet food products in small quantities, enabling labelling claims which indicate to customers that venison is present in the product but also enables a relatively high return per kilogram back to the New

Zealand exporter who in turn can pass these benefits to the New Zealand farmer in the form of higher schedule prices for their livestock.

International pet food manufacturers have signaled however that they are dissatisfied with the cost per kilogram and are therefore searching the globe for alternative sources of venison. It appears that Spain and potentially Australia are able to meet a proportion of this demand, with more investigation required to determine if other nations are able to meet this demand.

What becomes apparent in this is that the disease status of the supplier country plays a significant part in market access. Freedom from Foot and Mouth Disease, Chronic Wasting Disease and BSE prevent the United States of America (US) and in some areas of the European Union (EU) from utilising their own deer population to meet this demand. The key suppliers of venison to the pet food market are at present left to Spain and New Zealand and some internal EU countries.

This poses a threat of substitution, rivalry in the industry and a new entrant threat to the New Zealand farmed-deer industry.



<https://ruralleaders.co.nz/potential-threats-to-new-zealand-deer-pet-food-from-international-wild-deer-supplies-rob-kidd/>





# 'Prime vs Bull'. Making more cents out of the beef industry.



David Kidd

February 2015

The New Zealand (NZ) beef industry traces its origins back to the first European arrivals to NZ. While cattle were initially used as draught oxen to provide food and for the purpose of improving pastures, they are now a major source of export income for NZ farmers.

Today NZ exports chilled and frozen table and manufacturing beef to the major world markets, with the majority of production going to either the manufacturing market of the United States (US) or high value markets in Asia and Europe.

On-farm, farmers make a decision every year as to what class of livestock they will finish over the following 12 months. The traditional beef system has been to retain castrated male and female calves from beef breeding herds, with stock then finished and sold as 'Prime' beef.

Since the 1970's, farmers have developed and maintained the bull beef industry, with male calves retained from the dairy industry for finishing and export, predominantly to the US market. Given that the product from both types of animal are exported to similar markets, the report findings indicate that it is the same external market forces which impact the returns to NZ farmers.

This report explores the major challenges in supplying beef to the world market and the external forces at play. It also investigates the future market outlook for NZ beef, the challenges and opportunities that the beef market faces, and how farmers can best take advantage of these.

## Findings include:

NZ beef production accounts for approximately 8% of cross-border trade making NZ one of the largest beef traders in the world.

Approximately 50% of NZ beef production is exported to the US market as both primal cuts and manufacturing type beef, illustrating the reliance of the industry on this major market. There is a significant amount of work being undertaken both by industry (Beef & Lamb), Government and processors to expand the market for NZ beef and improve prices paid to farmers for livestock. This includes generic provenance marketing, Free Trade Agreements to achieve better access for NZ beef into high value markets and specialist breed based marketing programmes.

Farmers elect to farm either Bulls or Prime Heifers and Steers, or a mixture of both. The report findings indicate that farmers are best to farm stock suited to their specific farming



<https://ruralleaders.co.nz/prime-vs-bull-making-more-cents-out-of-the-beef-industry-david-kidd/>



# How can New Zealand sheep farmers survive drench resistance?



Charles Yule

June 2023

For generations New Zealand sheep farmers have been world leaders in the production of high-quality protein from pasture raised sheep, livestock raised with animal welfare at the forefront of their minds. For sheep to meet production targets, farmers have used anthelmintics (anti worm drench) for 60 years as a tool to control worms in sheep. However due to various management practices on farm, many drenches have lost effectiveness and now drench resistance is becoming more and more common on New Zealand farms.

Currently 27% of New Zealand sheep farmers have triple drench resistance. With only two more drench options on the market, being Zolvix and Startect, farmers are now at risk of developing resistances to these final options. Worldwide consumers demand sheep to be raised in a clean green environment with high animal welfare standards. It is critical that farmers use every tool possible to mitigate the risk of drench resistance and continue to farm sheep in a sustainable way while meeting consumer demands.

As well as animal welfare and the threat to market concerns, drench resistance presents significant financial implications to farmers. Trial work has shown a 14% reduction in potential carcass weight for sheep experiencing drench resistance. For a property marketing 4000 lambs annually, this equates to a \$81,200 reduction in gross farm income from undetected drench resistance.

## Methodology

The methodology comprises of a literature review to provide insight into the current state of drench resistance on sheep farming in New Zealand. This aimed to provide a clearer understanding of what drench resistance is, what causes it and what can be recommended to farmers to mitigate the risk or how farmers can farm with it.

Semi structured interviews were used to gain insights and findings from farmers and industry professionals as to what causes drench resistance and what management practices can be used to mitigate the threat or to farm with it.

## Findings

- Generally, farmers don't invest their time into understanding drench resistance until they discover it, 90% of those interviewed didn't understand drench resistance until it occurred on farm.
- Regardless of farming system, topography and climatic challenges, there is many different management practices that can be used to mitigate the threat of developing drench resistance or successfully farm with it.
- As drench resistance is a scientific area, a key finding was that farmers need multiple experts such as consultants and advisors involved in the business, although this can create inconsistent advice.

## Recommendations include

1. Farmers must carry out FECRT, Pre and Post drench checks to identify current worm challenge and to assess efficacy of drench.
2. Farmers need to engage support into their farming businesses from external advisors who specialize in the field of drench resistance, ideally using more than one from different companies.



Report not live at time of publication. Search 'Charles Yule' at <https://ruralleaders.co.nz/kellogg-our-insights/>

# Retaining rangatahi in the red meat sector.



Isabelle Coates

April 2022

The red meat sector is rooted deeply in New Zealand's culture and epitomises a true testament of resilience. Navigating annual environmental disasters, political tension, disruptive technologies, economic crises, disease outbreaks, changing land use and consumer demands – this durable industry has adapted with rigour over the past century.

Generation Z (born 1995-2010) is an ambitious, empathetic, knowledge-hungry generation flooding the workplace with their creativity, curiosity and tech-savvy skills

The aim of this report is to understand what motivates Generation Z in the workplace, identify their workplace expectations within an on-farm, processing/supply chain context and discover how to bridge the gap between their expectations, and the reality of a workplace within the red meat sector.

The methodology includes a literature review on Generation Z, retention strategies, followed by semi-structured interviews with twelve Gen Z employees and eleven industry leaders working in the red meat sector, to gain insights on their experiences and expectations.

## Key findings

Lifestyle, opportunities for learning, career progression, variety and open/transparent businesses are key drivers for Gen Z wanting to pursue a career in the red meat sector. Low pay, long hours, poor culture/management, and lack of career progression are the top reasons causing young people to leave jobs in the red meat sector.

All Gen Z participants who had a goal of farm ownership planned to leave the red meat sector, change careers, or find other creative ways of building capital to achieve farm ownership.

Within a processing context, Gen Z want opportunities to work on their own project throughout the duration of their rotation around different departments. Employers' experience with Gen Z in the workplace found this generation requires a high level of feedback, they want to be involved in the business and progress quickly. Poor leadership, cost and lack of support were perceived as the greatest barriers for retaining young talent by employers.

## Recommendations include

- Close the gap between employer and employee expectations: employers in the red meat industry need to be clear about what opportunities employees will have to learn, roles they can progress towards within their business and realistic about timeframes.
- Provide more resources and education for young people to learn about pathways into farm ownership. Pathways into farm ownership are not linear.



<https://ruralleaders.co.nz/retaining-rangatahi-in-the-red-meat-sector/>



# Meat without the moo: The life-cycle analysis of alternative proteins.



Suzanne Young

December 2018

Global food systems are experiencing unprecedented changes in the way food is produced, distributed and consumed. Food systems are highly dependent on fossil fuels, emit large quantities of greenhouse gases (GHGs) and significantly contribute to environmental problems (FAO, 2006).

Agricultural farming systems particularly in New Zealand are under increasing pressure given the growing awareness of agriculture's contribution to GHGs and deteriorating water quality.

New Zealand's social, environmental and economic wellbeing is linked with our ability to supply the rest of the world with protein. Animal-based protein production alone accounted for over 60% of our total 2016/17 primary export revenue (Sutton et al., 2018).

A temperate climate combined with advanced production systems make the NZ dairy, sheep and beef industries among the most competitive in the world.

Consequently, increasing world demand for food will be a significant factor in New Zealand's economic growth and prosperity over the next half century (Hilborn and Teller, 2012).


Consumer concerns around the impacts of agriculture on the climate, animal welfare and water quality are increasingly influencing their purchasing decisions as they look to reduce their environmental impact including their contribution to climate change (Goldberg, 2008).

This demand has led scientists to develop alternatives to animal protein from farmed animals. These alternatives have been coined "Alternative Proteins".

This report outlines two types of alternative proteins, these being plant based proteins and cultured meat. Plant based proteins are currently in market, whilst cultured meat is still under development.



<https://ruraleaders.co.nz/meat-without-the-moo-the-life-cycle-analysis-of-alternative-proteins-suzanne-young/>



Cultured meat has the greatest potential to displace traditional farming as if successful it could address the environmental issues created from large scale intensive farming, by growing meat in a laboratory setting. However to be viable and to successfully compete against real meat, cultured meat needs to overcome a number of challenges.

These include issues around public perception, cost, the ability to scale and the ability to deliver on environmental benefits. Significant financial investment is being made into the research and development of alternative proteins and current estimates predict cultured meat will be in market within the next 5 to 10 years.

A Life Cycle Assessment (LCA) was carried out as part of this report comparing the environmental impacts of cultured meat in comparison to NZ Beef. The results showed that production of 100g of cultured meat requires 0.021m<sup>3</sup> water, 0.022m<sup>2</sup> land and emits 0.207 kg CO<sub>2</sub>-eq Greenhouse Gas (GHG) emissions. In comparison to New Zealand Beef, Cultured Meat involves approximately 91% lower GHG emissions, 99% lower land use and 99% lower water use.

Despite high uncertainty, it is concluded that the overall environmental impacts of cultured meat production are substantially lower than those of conventionally produced NZ beef.

Cultured meat is still in the development phase, so it is too soon to know whether cultured meat will be a marketable product, or whether the estimated environmental impacts presented here will be able to be achieved.

In order to remain profitable and sustainable into the future, NZ agriculture needs to work on being the best that we can be in terms of our systems and practices. We need to work collaboratively both as a country and as an industry to market our products with a strong natural, grass-fed message.

We need to target our products to the markets willing to pay the highest prices and look for opportunities to add further value to these products. Furthermore we should look for opportunities to diversify our farming and meat processing operations. Lastly we need to continually invest in NZ agriculture, market research and our communities in order to future proof our industry.

Given the shortfall in the current food supply predictions to feed the worlds growing population by 2050, it is anticipated that there will be room in the market for both alternative proteins and traditionally farmed meat. Nevertheless there is an increasing awareness of the impact of agriculture on the environment, on animals and on human health, which NZ Agriculture needs to stay abreast of.

# Red meat traceability with blockchain: Pasture to plate or pie in the sky?



Will Halliday

July 2022

New Zealand's agricultural industry has a reputation for being at the forefront of technological innovation.

Challenges such as nutrient deficient soils and distance to market have been met with novel fertilisers and refrigerated shipping. World renowned animal welfare standards and freedom from significant agricultural pests and diseases give our farmers significant advantages compared to their overseas counterparts.

It may be a surprise to learn, therefore, that the means of certifying products and providing assurance to global markets continues to rely on a paper-based system. Importers must trust the paperwork provided by the exporter. Exporters must trust the paperwork provided by the producer.

Producers must trust the paperwork provided by the supplier, and so on. This "one up, one down" traceability is becoming less acceptable to the global market, especially when it comes to food safety and claims of provenance.

A potential solution is to adopt blockchain technology, where a decentralised ledger allows supply-chain-wide visibility of product flows and immutable proof of claims.

While blockchain was developed for, and is still chiefly used in, the field of cryptocurrencies, it has found utility in other sectors including finance and supply chain management.

The global diamond trade demands absolute proof of provenance to avoid stones mined using forced labour or where proceeds fund violence – it has found a solution to this using blockchain.

Blockchain has become a technological buzzword which has garnered plenty of attention, confusion, and misunderstanding. The purpose of this research report is to understand what a blockchain is, what it can (and cannot) do, what barriers exist to its adoption in red meat traceability, and what opportunities it presents.



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Analysis of the literature and interviews with industry stakeholders leads to the general conclusion that while blockchain has some significant advantages over traditional, centralised databases, there is doubt as its maturity as a technology.

This represents significant risk to those interested in adopting it, and, coupled with the cost of replacing or upgrading systems across the supply chain, it is widely held that existing systems are fit for purpose and to make a shift to blockchain would represent an unnecessary disruption to the industry. That said, there are potential drivers for blockchain adoption to consider.

Government regulations regarding food safety and animal traceability are updated continually and can require the adoption of new technologies (the NAIT Act 2012 for example).

Import requirements are subject to change, especially in the face of food fraud and the global spread of animal and human diseases. Then there is the industry itself, which has an impressive track record of adopting and adapting technologies for the improvement of sustainability and productivity.

The convergence of blockchain with technologies such as the Internet of Things and machine learning could change the way farmers go about their business altogether. It is therefore recommended that stakeholders in the New Zealand red meat sector keep an open mind to the possibility of adopting blockchain technology and be prepared to invest in further technological innovation as more demands are placed on existing systems.

Being “blockchain-ready” will undoubtedly leave the sector better prepared for the future of global red meat trade.



<https://ruralleaders.co.nz/red-meat-traceability-with-blockchain/>

# Future proofing the red meat processing industry.



**Bridget Newson-McNally**

*November 2021*

In an evolving world, with consumers aging out of the market and new tastes and values emerging with generational change, comes the microscope over New Zealand's export markets. Stemming from strong primary sectors, questions are being asked now not just of animal welfare, food safety, price and provenance but also of sustainability practices.

The aim of this project is to uncover positive contributions being made by meat processors operating in New Zealand's grass-fed red meat sector, and highlight any pressures that may arise in future to shake up the paddock to plate story-telling, to include processor to plate messaging.

In this body of work I aim to identify how meat processors in New Zealand are harnessing their sustainability potential and responsibility, why it is important and how their social licence to operate is affected during this process. To truly understand this, I have conducted interviews with red meat industry leaders to hear their experiences and learn about what action they are taking. I have also looked at literature relating to social licence to operate, sustainability and how our actions alter our supply chain within New Zealand's export significant red meat sector.

The method used to complete this project was qualitative research. Structured interviews designed to get the interviewee thinking not just about the 'what' and 'how' of their changing practices but more so, why?

Why does it matter and how can it be beneficial in each facet of the business.

During my interview research, the main message was resounding. Interviewees viewed their export product as:

- Clean and green
- Pasture-fed
- Antibiotic-free
- Hormone-free

That is how New Zealand agriculture is viewed as a global product and has been for the past 50 years! All of the above reflect the fantastic industry many generations have enjoyed and worked hard to create and maintain, ever since the first shipment of frozen lamb left Port Chalmers on the 15th February 1882. But how are New Zealand's meat processors viewed at the end of that chain, and how do we get the words climate friendly, sustainable, sophisticated and forward thinking onto that list?

There is a level of social, economic and environmental responsibility required of New Zealand red meat processors which will be covered in more detail throughout this report.

#### **Recommendations include:**

- Coopetition models to combat labour shortages and enhance social wellbeing.
- Equity partnerships around topics that matter such as the image depleting bobby calf industry.



<https://ruralleaders.co.nz/bridget-newson-mcnally-future-proofing-the-red-meat-processing-industry-sustainability-at-the-end-of-the-chain/>





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