The Green and the Black of it

Economic and Environmental Sustainability in the NZ Deer Industry

And the Case for Change

By Ben Anderson

2021 Nuffield Scholar

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I wish to thank the below Investing Partners for their support over my scholarship period and beyond

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No report can be completed without reference material and those that provide it. In this case I wish to pass on my appreciation and thanks to all those that have been kind enough to meet with me and share their knowledge. Someone reminded our scholar group this year that we are blessed with two ears and one mouth, and therefore should use them in the same ratio. I have tried hard to adhere to that advice and have been rewarded with a lot more knowledge and the sense that I don't really know as much as I thought I did. Quite frustrating really…

On the topic of Scholar Groups, to Lynsey, John, Dave and Dan, thank you for your good company, your wise input and your patience while I explained to you my version of the world. The strength of any team is the individuals within it, and I have been lucky to be surrounded by people that have challenged my thinking and introduced me to new ideas. I'm not saying I'm wrong though.

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And very lastly, to my old mate Bruce. Thanks for keeping an eye on the joint while I've been away. I owe you a beer, or several.

2. Table of Contents

Executive Summary

This paper initially set out to determine whether it was possible to better monetise sustainability with the New Zealand Deer Industry. In addition to this, I wanted to understand why NZ deer farmers seemed to achieve such poor returns in comparison to both the end value of their products, and the level of risk they accepted in producing them. And lastly, I wanted to know whether our conventional industry supply chains were going to be fit for purpose in a rapidly changing world.

To achieve this, I undertook a review of existing literature, spoke to industry leaders, academics, public servants, and business owners. Most of these were connected to the primary sector, however perspectives and experience from outside the sector were also sought for insight and comparative purposes.

In doing so I found the following:

- NZ deer farmers, similar to the wider drystock sector, are not profitable in the context of other industries and what are considered average Returns on Capital Employed (ROCE) within NZ. On average, NZ deer farmers achieve approximately 3.4% return on their capital. In comparison, the NZ share market has achieved an average return of 6.5% since 1900. Additionally, our true capital gains are virtually zero once inflation is considered.
- There are a number of macro level risks and trends in existence that are affecting the NZ deer industry now or will do so in the future. It is also likely that we are underestimating them. The risks posed by factors such a climate change, environmental degradation, geopolitical risk, and the rapid emergence of alternative proteins are significant. Each of these has the ability to significantly disrupt our industry, one that is plagued by poor returns and an increasingly unsympathetic public. Our current approach to these trends is largely one of defense and maintaining the course. This must be replaced by a strategy of active risk management and opportunity realisation.
- Our current industry supply chains do indeed place the majority of the risk onto the farmer, noting our conventional position as sellers of raw undifferentiated commodity products into global markets. This ongoing situation forces the industry to accept all production risks and the prevailing market price, while allowing multiple other members of the supply chain to add their margin. This results in farmers receiving as little as 3% of the end value of their velvet. As the range and severity of the risk's deer farmers face increase, it is clear that we can no longer afford the status quo.
- Environmental outcomes and profit are not mutually exclusive. There are currently working examples within NZ of primary sector organisations and businesses that are achieving above average returns and positive environmental outcomes. An example of this is Lake Hawea Station that is achieving a 40% premium over the current industry average for its fine wool on the basis of its carbon zero certification.
- Whilst environmental attributes can be successfully monetized, it is unlikely to be done successfully through a conventional supply value chain. These systems are set up to supply undifferentiated commodities onto the open market and are therefore unlikely to achieve and/or maintain a premium for those attributes, particularly when other agricultural countries are doing the same. Additionally, not all of our end customers place the same value on environmental attributes. To fully leverage positive environmental attributes, it is necessary to fundamentally

change the way we take our products to market. It is also recognised that developing new business models can carry a significant degree of risk and requires a range of competencies outside of those required to run a traditional farming business.

To achieve this, it is recommended that the NZ Deer Farmers Association (DFA) establish a programme of work in coordination with Deer Industry NZ (DINZ) and Central Government, with the purpose of transitioning the industry away from the sale of its products as raw/undifferentiated commodities via conventional supply chains, and towards the establishment of short value chains that are effective in matching value creation with economic return. It is proposed that the programme contain the following key objectives:

(a) Identify and support the establishment of business models and/or industry structures that have the potential to achieve the intent of the project. This work would be initially informed by those models utilised by Spring Sheep, NZ Merino and Zespri.

(b) Identify and promote the utilization of technology and web-based platforms that allow for the identification of consumers and the sale of finished products directly to them.

(c) Identify what environmental attributes can be leveraged by these business models for commercial advantage, noting that the delivery and communication of on-farm environmental outcomes will also be beneficial to the deer industries social licence. The key focus of this objective is turning environmental compliance into economic opportunity.

It is further proposed that financial support for this project by sought from Government, based on its alignment with current political priorities, including addressing climate change through the reduction of on-farm emissions.

It is well understood by the author that many of findings contained within this report are not new, and that attempting to both capture and create more value from NZ's agriculture products has long been an area of focus. However, our environment today is different from yesterday. We now have the knowledge, the examples, and the tools necessary to take our products to market more profitably and achieve better environmental outcomes. We as farmers, should no longer let existing structures, interests and thinking continue to dictate what we are paid and how much risk we accept in turn.

1. Introduction

As I entered the Nuffield Scholarship programme, I was in the middle of a two-year drought that was described by those with a long history in the region as a 'one in a hundred-year event'. This, combined with the outbreak of Covid, the collapse of the global restaurant trade, as well as the need for farmers within my catchment to apply for a resource consent to farm, led to me questioning the sense of doing what I did. Why after all, was I trucking stock to the processor on the promise that I would be paid an unknown amount for them at an unknown time, when meat at the supermarket was selling at an all-time high? Why was I being asked to spend thousands of dollars on environmental compliance and works when not a single extra dollar in premium was being returned to me for my efforts? And my biggest question of all, why did I own the primary means of production, being the land and stock, and yet have the terms of trade dictated to me on an annual basis?

Coming from a previous career which was all about managing risk, it seemed to be the definition of insanity to be standing on a hill praying for rain and wondering how much I might get paid for my endeavors, if anything. I also struggled to understand why our environmental work was only being driven by compliance, when every piece of research was telling us about the economic potential of environmentally sustainable foods. It left me wondering whether it was actually possible to meeting our environmental obligations without also addressing the basic mechanisms of how we take our goods to our customers. After all, it's hard to be green when you're not in the black.

Problems of course, are a matter of perspective. Perspectives will vary dependent on all sorts of things, such as one's culture, their past experiences, their politics, as well as their current circumstances. None of us will look at the same issue in exactly the same way, which is why it is so hard to get a consensus on what the actual problems are, let alone how to fix them.

From my personal perspective, I began to see the deer industry, along with the rest of the drystock sector as carrying an extremely high level of risk, without the usual high returns ordinarily expected to balance it. This is in comparison to some of the high value horticulture crops such as cherries, which are well known as high risk/high return. This perspective was driven by my earlier careers in the military and the risk management industry. In these environments, risk is welcomed, so long as you clearly understand what it is, know how to manage it and there is a reward at the end that justifies the endeavor. Using a risk/reward-based lens on our conventional industry business models is a useful exercise, as it forces us to examine which parts of value chain accept what level of risk, how much value they are creating, and how much of the end product value they are taking in return.

In the crisis management industry, there is a term called 'Horizon Scanning'. Horizon Scanning involves constantly looking forward to identify emerging trends and drivers of change that are likely to impact on you. The sooner you can identify these factors, without cognitive bias, the more time you have to decide how you want to deal with them. In other words, do you want to ride the wave, or hope it's not a real wave and accept the risk of being buried by it? A good example of this is Kodak and the advent of the digital camera.

The challenge I see right now is that there a number of mega trends already in existence that already are or have the potential to cause significant damage to our industry. I would argue some of them also present great opportunity. As I look around the wider agriculture sector right now, I see some people and organisations forging ahead and embracing those opportunities that they see being provided by our future environment. Equally, I also see people and organisations who believe that these new trends are

nothing more than aberrations and that ultimately 'staying the course' is the most sensible approach. There are significant amounts of quality information available which can guide our decision as to which approach to take is best, and ultimately the market will decide which approach was correct.

2. Research methodology

To guide my research, it was necessary to set myself some specific questions, noting that these processes tend to become a journey and that one question often leads to another. My initial questions included:

- Was it possible to better monetise sustainability within the NZ deer industry?
- Why did NZ deer farmers appear to achieve such poor returns in comparison to the end value of their products, and the level of risk they accepted in producing them?
- And lastly, were our conventional industry value chains going to be capable of providing fair and sustainable returns to its farmers in a rapidly changing world?

To achieve this, I would undertake of review of existing literature on these subject areas, speak to industry leaders, academics, public servants, farmers, and other business owners. Most of these people would be connected to the primary sector, however I also wanted to get experiences and perspectives from outside the sector for both insight and comparative purposes.

To structure my thinking and findings, I needed to first clearly define the problem. From there I wanted to set out the major issues and associated risks that were either impacting on our industry now, and/or were likely to impact upon us in the future. Then I wanted to look at what opportunities were available to us and would be effective in both addressing those issues identified and improving our farm gate returns. After all, one should never waste a good crisis!

It was important at this point not to just cite theoretical opportunities, but to actually identify business models that met my defined success criteria, *being above industry average farm gate returns and improved environmental outcomes*. At this point I would also set any key tools available to us now that didn't exist previously. This is important as I am not the first deer farmer to attempt to drive industry change and there are plenty of scars out there to prove it. However, there is an old military saying that is pertinent here. It asks the question 'Has the situation changed? And if so, so what?' Just maybe there was now a nexus of pain and opportunity that would be sufficient to break old habits and establish new ones.

3. Sharks in the water….

What I want to do in this early section of the paper is set out what I can consider to be the key trends that have the most potential to impact upon our sector going forward. I will also attempt to go beyond describing the trend, and discuss the 'so what'? Asking this question repeatedly forces us to go the next step in our thinking, gain better information and therefore make more informed decisions.

To that end, lets climb the mast and take a look at what's ahead of us.

3.1 Climate change

The most pressing of these (in my opinion) is climate change. Ever since I have known farmers, the issue of climate change has met with a degree of skepticism. More typically it is seen as something that is either not happening, or if it is happening, then it is something that happens naturally and therefore not worth doing anything about. Apparently 1 in 5 New Zealanders currently do not believe in Climate Change. I would guess this number would be higher within the farming sector, even though we are more attuned to our seasons and climate than other occupations.

Climate change can be a natural process, however the warming we are experiencing today is conclusively recognised as being driven by human activities, 'primarily due to burning fossil fuels that generate greenhouse gas emissions'[i]. This is graphically illustrated in *Figure 1* below, drawn from the Intergovernmental Panel on Climate Changes sixth assessment report. Regrettably, climate change and our sectors contribution to it is, as Al Gore puts it, 'An Inconvenient Truth'[ii] .

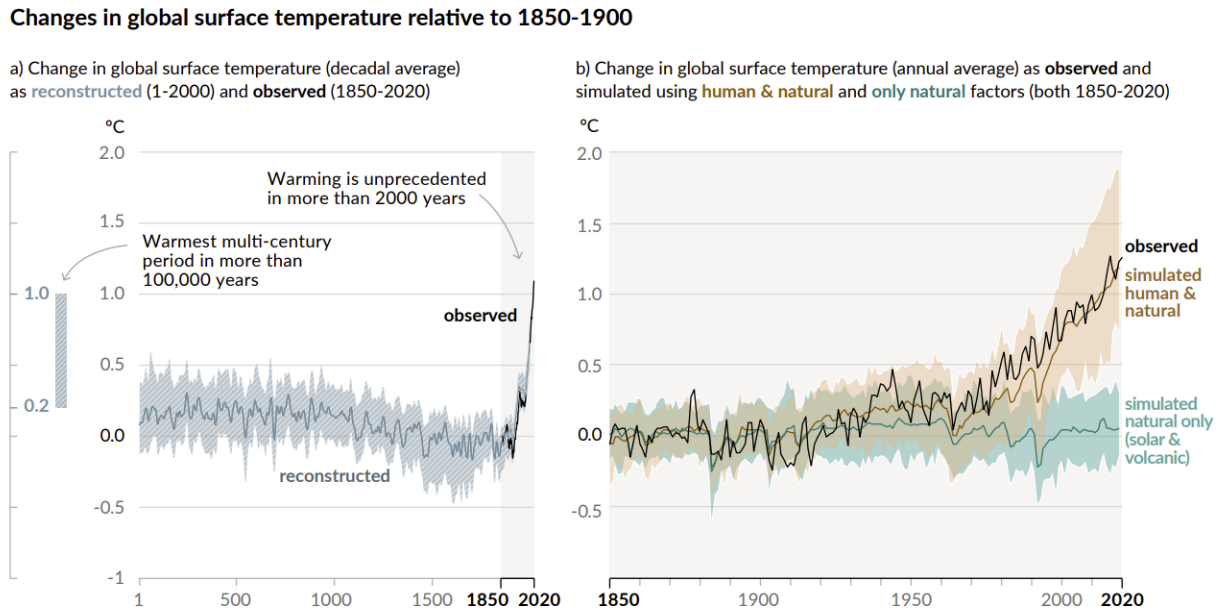


Figure 1: Changes in global surface temperature relative to 1850-1900

So, what will the impacts of climate change be on our industry, and the sector as a whole? From a climatic perspective, New Zealand will be impacted much as the rest of the world with increasing 'droughts, water scarcity, severe fires, rising sea levels, flooding, catastrophic storms and declining biodiversity'[iii]. However exact impacts will vary dependent on how successful the world is in mitigating climate change, as well as where in NZ it is that you live.

From a Hawkes Bay perspective, the long-term forecast is not great. As Figure 2 illustrates under a 'midway' climate change scenario, the historical drought frequency for the region increases from approx. 3-4% to 10-17.5%, depending in which district you live. In line with this, temperatures will rise approx. 2.1 degrees and rainfall will drop between 2 and 10%, again depending on where you live[iv]. For

a region already beset by drought, this is grim news. To put this into a financial context, the 2019 drought cost the Hawkes Bay region between $27 million and $35 million in lost GDP[v]

We already seeing '100 year' events on an almost annual basis. Whether it be the 2021 Canterbury/West Coast floods, Tornados in Auckland, or the 2020 drought in the Hawkes Bay, climate change is already here and its impacts whether they be environmental, social or economic are only going to worsen.

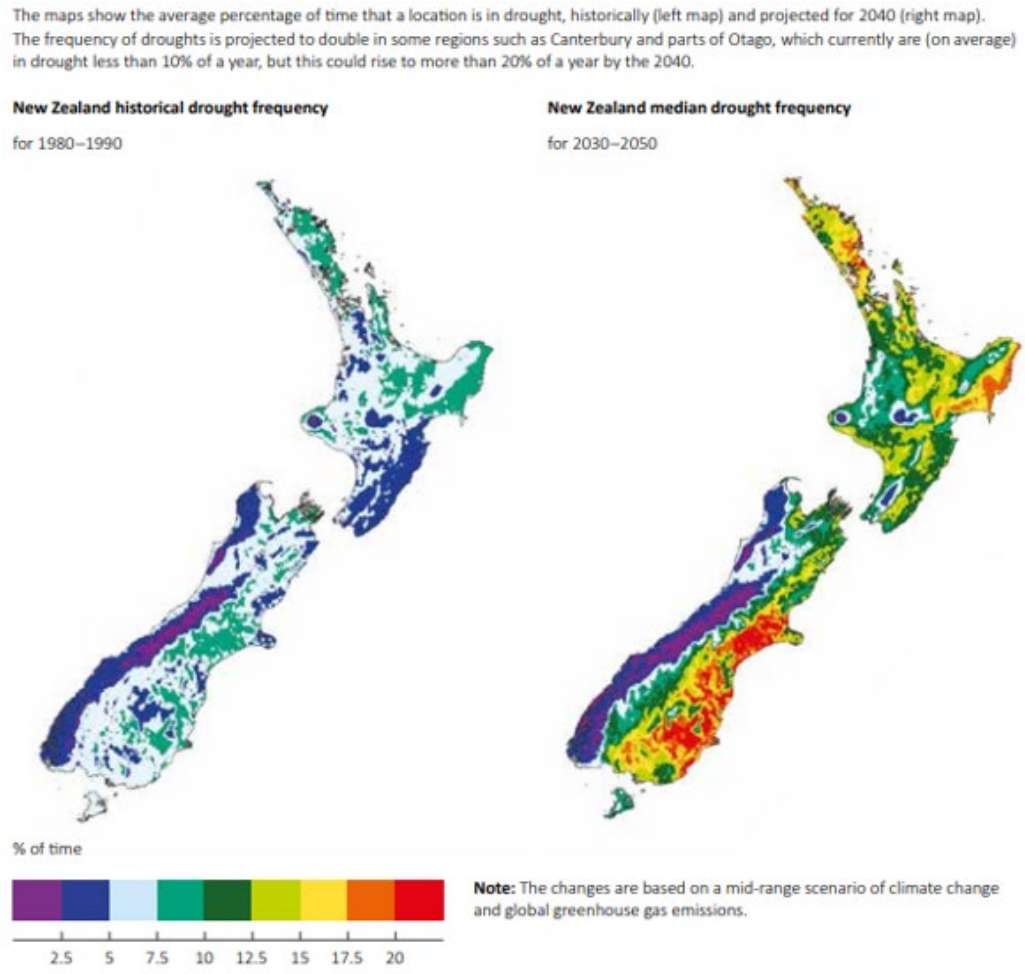


Figure 2: Projected changes in drought frequency (NIWA)

In addition to climatic impacts, the social and global response to climate change will be equally consequential. The European Union and the United States are now both proposing to set levies on foreign goods that aren't subject to carbon pricing in their home countries. Although NZ agriculture products may avoid this penalty if those countries are satisfied that our greenhouse gases are already being effectively taxed, either scenario results in NZ farmers having to pay for the greenhouse gases that they emit.

Socially, there is an increasing expectation, both at home and overseas that all industries must play their part in reducing greenhouse gas emissions. From a consumer perspective, this is evidenced by a recent KANTAR NZTE value segmentation report. The report canvassed food and beverage consumers

from NZ's major international markets, being China, Japan, Singapore, Australia, the USA and the UK. The report highlighted the growing importance of the 'Ethical' segment which influences their decision making, as per *Figure 3* below. The term ethical being defined as 'purchase decisions driven by ethical, environmental or social issues'[vi]. The KANTAR report also found the sustainability-focussed Ethical and On Trend segments tend to deliver higher value.

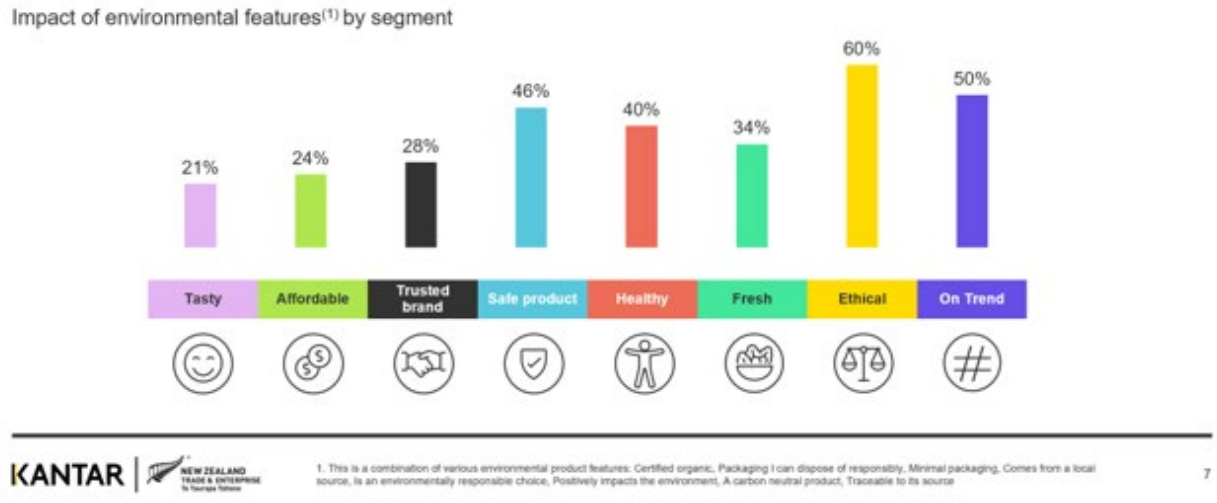


Figure 3: KANTAR NZTE Value Segmentation Report (March 2021)

3.2 Water and environmental degradation

The quality of NZ's freshwater is topical and of concern to the majority of New Zealanders, with over 82% of New Zealanders surveyed by the NZ Ministry for the Environment (MFE) feeling 'that it is very or extremely important to improve the quality of our water'[vii]. The state of NZ's water has also drawn the attention of international media, an example being the ABC news article 'New Zealand's trouble waters' (2021)[viii]. This report noted that 'Ninety-five to ninety-nine percent of rivers in pastoral, urban and non-native forested areas are polluted above water quality guidelines'[ix].

The NZ MFE's 'Our Freshwater 2020' (2020) found that most rivers in both urban and rural areas are polluted, resulting in the decline of many of our freshwater species, habitats, and ecosystems. These polluted rivers are often unsafe for drinking, swimming, food gathering, as well as cultural activities. Compounding the issue is a reduction and/or change of flow rate in these rivers, as well as the increasing impacts of climate change, through events such as drought, extreme weather events and rising temperatures. Whilst the report makes clear that the causes of the pollution stem from both and rural environments, it also makes clear that each part of society needs to play their part.

Freshwater regulatory action has already commenced within some regions, through the current governments Essential Freshwater reform package. The measures that regional councils will implement to give effect to the National Policy Statement for Freshwater Management (NPSFM 2020) will impact on farmers and landowners in a variety of ways, including the introduction of bottom-line water quality standards (National Objectives Framework) and the allocation of water quantity and water quality. There may also be new land use control measures introduced on the back of the National Environmental Standards for Freshwater (NES-F) which were introduced in 2020 as a 'stop gap' measure until regional

councils introduce new plans to give effect to the NPSFM 2020 by 2024. These interim land use controls include new intensive winter grazing rules, nitrogen fertiliser limits, the fencing off of waterways and the control of further land use intensification.

Image taken from ABC News: New Zealand's troubled waters (2021)

Whilst adhering to the requirements of the new freshwater rules will take some adjustment, the water issue that has the greatest potential to disrupt both farming and their surrounding communities is that of water security. Whether that be access to stock water on hill country, water for irrigation on the flats, or domestic consumption in the towns, an increase in demand and a decrease in supply leads to an untenable situation in a drying climate.

Under the current Resource Management Act (RMA) water has been allocated under a 'first in first served basis'. The new National Policy Statement for Freshwater Management now requires that water is allocated to meet the needs of river health first, then the health needs of people (i.e., drinking water), then for economic and cultural wellbeing. This is good news for the environment and communities; however, it may prove very challenging for those landowners whose businesses are dependent on their existing water allocation.

3.3 Social Licence

Having a social licence to operate is 'the ability of an organisation to carry out its business because of the confidence society has that it will behave legitimately, with accountability and in a socially and environmentally responsible way'[x]

The term Social Licence to Operate is one more commonly associated with extractive industries such as mining and oil and gas. Industries such as these will often carry negative connotations and they must

work to convince their community that the benefits of their activities outweigh the negatives, thus allowing them to continue to operate. This term has now been picked up by the agricultural sector as we hit the environmental limits of a production-focussed system. Although the environmental impacts of farming are the ones most commonly raised to critique the sector today, social licence also considers factors such as animal welfare, health & safety, and employment practices.

The NZ public's opinion of the sector remains positive on average, with a 2017 UMR poll finding 59% of urban respondents have a positive view of the Sheep & Beef industry. However, this has slipped from 78% of urban respondents who had a positive view of farming in general in 2008[xi]. Whilst the industry has enjoyed a slight uptick in approval during Covid, it is apparent the public remain concerned about the negative environmental externalities of farming.

The recent 'Howl of a Protest' was originally organised by Groundswell NZ in reaction to what it perceived to be unworkable freshwater regulations. The movement has since broadened its mandate to protest against other environmentally restrictive regulations such as biodiversity, climate change and the Crown Pastoral Land Reform Bill. Although it was evident that elements of the new freshwater regulations were unworkable, the reality is that protesting against environmental protections does not align with the expectations of our public, or that of our preferred customer, being the 'conscious consumer'.

Penelope Clark-Hall, a graduate of the 2018 Kellogg Programme researched the topic of social licence in NZ's farming sector. She concluded that NZ's primary sector was 'sitting at the lowest level of acceptance, and on the precipice of its legitimacy being questioned, in light of a diversifying economy and food innovation'.[xii] She further noted that that as 'society's values have evolved and changed, so too have their perceptions of industry'.[xiii] It therefore makes sense that if our industry doesn't actively listen to its society evolve accordingly, then it runs the risk of losing its social licence, and perhaps its end consumers.

The challenge with the Groundswell movement is that it fails to recognise that our government is simply a representation of its voters. It is largely only carrying out their expectations and by protesting in the most visible way possible against environmental rules, they run the risk of alienating themselves further from the majority of NZ society and their end consumer.

Image taken from RNZ article: 'Groundswell exposes rural/urban divide in media (2021)

3.4 Geopolitical risk (and dancing on the head of a pin…)

In 1973, NZ agriculture suffered the major shock of the United Kingdom (UK) joining the European Economic Community (EEC)[xiv]. Up until then NZ had essentially acted as a farm for the UK, with approx half of its exports being shipped there. The separation was painful for NZ farmers, forcing the industry to find new markets for its products. Over time, Free Trade Agreements (FTA's) with other trading partners were established, arguably the most critical of these being that with China, which was signed in 2008.

During this time however, NZ's foreign policy has continued to be aligned with that of other developed democratic nations, such as the UK, Australia, and the United States. This is reflected in NZ's involvement with global organisations such as the United Nations, the World trade Organisations, and from a security perspective, the 'Five Eyes' intelligence grouping.

Image from Financial Times article: New Zealand security chiefs warn of China threat (2017)

As NZ's dependance on trade with China has grown, so has the difficulty in maintaining positive relations both with it and NZ's Five Eyes Partners, being the USA, Britain, Australia and Canada. China has repeatedly demonstrated its willingness to economically punish those of its trading partners who are critical of it, the most recent example of this being Australia. Australia's most recent move to adopt American and British nuclear powered propulsion systems in its submarines under the recently formed 'AUKUS' security alliance reinforces the notion that the world will become increasingly binary over time. This view would eventually require NZ to 'pick a side', which would ultimately be that with the most similar political and social norms to us, being the USA. Others argue that NZ need not be a lapdog for either the USA or China and can continue to walk the middle ground. In either event, NZ would be prudent to diversify its trading partners and not expose itself to the risk of being economically strongarmed by a foreign power.

NZ's deer industry is particularly exposed to the risk of a political and trade breakdown between it and China. At the time of writing, approximately two thirds of its velvet is purchased by China, for either its domestic consumption or further processing and export. For context, deer velvet is now a larger export earner than venison and therefore the financial risk to the industry is significant. The deer industry need only to look at the effect of Covid on the restaurant trade and its dramatic impact on venison prices to understand what this might look like from a velvet perspective.

Currently the ongoing success of the deer industry is almost completely dependent on the ability of NZ's political leaders to maintain a positive relationship with China in the context of a geopolitical status quo. In the era of an increasingly assertive China, this strategy appears unworkable in the longer term.

3.5 Changing consumer preferences (and the problem with meat) ….

Starting a discussion around the future of meat is a great way to pick an argument. From a NZ producer perspective, it is obvious that as the world's population is growing, it will need all the protein it can get. After all, as the world's most efficient farmer isn't it our duty to stick to our knitting, provide as much high-quality red meat as we can and rejoice in our role as a responsible global citizen. All top notch really.

And in reality, there's merit to this argument. The world's population is forecast to increase by a billion by 2030[xv] and there is real concern as to how these additional people will be fed. Added to this there is predicted to be substantial growth in emerging markets such as India and parts of Africa. And yes, we are one of the world's most efficient producers of red meat from a carbon emissions perspective.

Image from Modern Farmer article: This is what humane slaughter looks like. Is it good enough? (2013)

The other side of the argument also has merit. According to The Economist, meat accounts for a sixth of the worlds calorific intake but uses about a third of its crop land, water and grain. This makes it both a drain on the earth's resources and less available than alternative food sources to feed a growing population. And, as well as the known negative externalities of meat production such as water pollution and energy consumption, a 'recent 2017 study into methane claims previous estimates underestimated the methane production of livestock by 11%, suggesting a bigger impact on greenhouse gases from farming than was previously believed'.[xvi]

Aside from the resource and environmental considerations of red meat consumption, is the issue of killing another being for its meat. Humans have been doing this since time began, and while farmers are mostly desensitized to the issue, cutting another animal's head off is beginning to play increasingly poorly with the conscious consumer. The act of killing and butchering an animal is not something that features in most meat advertising, and while most modern consumers know that it must happen, it is also something most want to pretend doesn't.

Recently Beef and lamb NZ (B+LNZ) undertook a project to assess the future of meat. Part of this project involving assessing the forces of disruption in the industry, summarised in *Figure 4* below. From this it is apparent that alternative proteins could well provide the previously unavailable alternative to red meat. Consumers now have the ability to act on their conscience and eat something that increasingly looks and tastes like the real thing, without as many of the negatives that go with it.

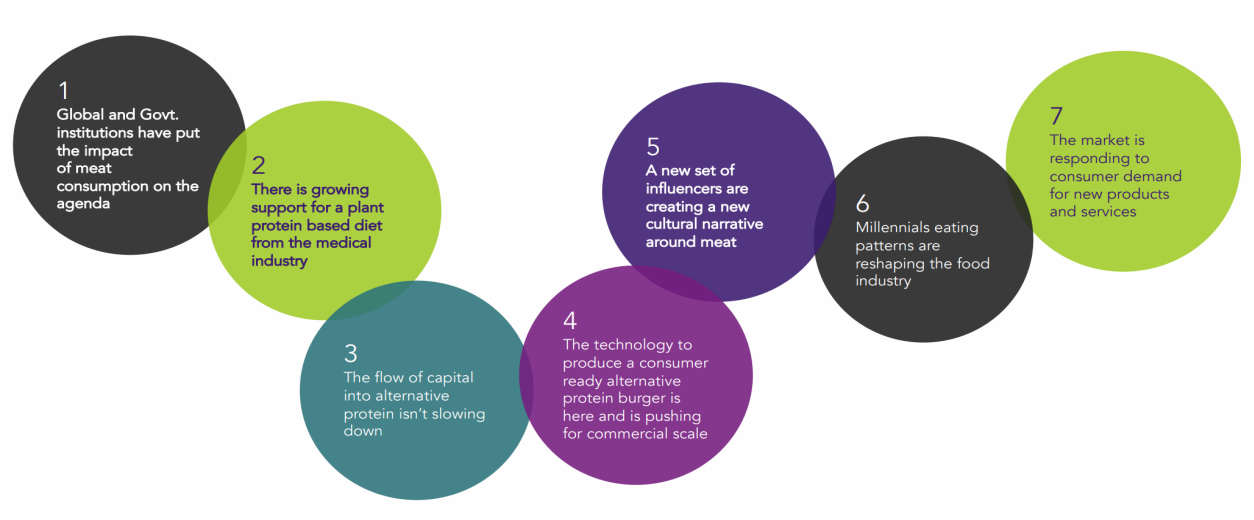


Figure 4: Forces of disruption in the red meat sector (B+LNZ)

This is not to say that a future without red meat is certain, or even probable. There will remain many consumers who will still want to eat real meat, however it is very possible that there will be less of them and that they will choose to eat it less often.

3.6 Profitability

Deer farming, like much of the drystock sector is not very profitable, at least not when you measure the average farmers Return on Capital (ROC). As at 2018, the average NZ deer farmer's ROC was 3.4%, which was slightly higher than the 'all farm types' average of 2.5%[xvii]. This is in comparison with the NZ share market, which has had an average return of 6.5% from 1900 to 2021[xviii]. Therefore, your average deer farmer could earn more than twice as much as what they do on farm by putting their capital in the market and going to the beach.

It is often said that 'farmers capital gains offset the lower return on capital experienced relative to returns in other urban industries and investment'[xix]. While in some cases this is true, depending on farm type, timing of sale etc, the average is a different story. From national survey data compiled in 2018, it was established that average net capital gains, once inflation was factored in, were 'virtually zero'[xx]. This is reinforced by the graph at Figure 4 below, showing grazing land sale data over period 2009 to 2019.

Figure 5: Median prices per hectare for grazing land across New Zealand. Source: www.interest.co.nz (2019)

This all goes a long way to explain why 'off-farm' income ratios are so high, with an average across all farm types of 25%. Off-farm income has also become an increasingly important means of mitigating season risks such as drought and farm gate price fluctuations. It is an interesting observation that a farmer with up to three Million in capital invested in their farm and stock, is unable to pay themselves the same rate as the average truck driver, who doesn't even have to own the truck. Greig, Nuthall, and Old (2018) argue, 'Given the low level of annual return (2.5% on capital), and virtually zero net real capital gains, it is clear that farmers, and their families, must obtain many side benefits from farm life compensating for the low returns. ´

4. So why aren't we more profitable?

Reason #1: Market Power (or lack thereof)

Farmers sell in what is described as a 'perfectly competitive' market[xxi]. Globally, there are a lot of us selling products that are virtually identical and therefore interchangeable, whether it be milk, meat or deer velvet. This means we must accept the prevailing market price and be a 'price taker'. Perfectly competitive markets are not always a bad thing, as theoretically they ensure the most efficient use of resources, keep consumer prices down, yet still allow for a fair return to the farmer providing there is a sufficiently large pool of buyers.

In the real world however, most consumer choices are controlled by an increasingly small group of companies. A recent study conducted by the Guardian newspaper and Food and Water Watch[xxii] found that in the United States that 'a few powerful transnational companies dominate every link of the food supply chain: from seeds and fertilisers to slaughterhouses and supermarkets'. The size and influence of these companies largely determines what farmers grow and how much they get paid. For American farmers, this was 15 cents for every dollar spent in a supermarket.[xxiii]

This data closely correlates with the NZ experience, where most food value is also captured at the retail end. This can be illustrated by the following simple exercise, following the sale of a North Island Steer, to a processor/meat company, and then on to Marx Foods in the United States. Whilst the figures below are conservative and subject to seasonal fluctuations, they highlight the significant value that is created by NZ farmers and processors, but is captured by an overseas retailer, in this case being 76.35% of the

end product price. It should be noted that in this instance Marx foods has not added any value to the product, other than adding it to its inventory.

NZ beef mince value spread as at 9 September 2021		
Supply chain element	*Per kg (NZD)*	*% share*
Farm gate price (NI Steer slaughter price)	$6.10	12%
Processor fee (calculated off average FOB price of $8.00)	$1.90	3.75%
Average shipping/land transport costs (est average)	$4.00	7.9%
Marx foods web sale price	$50.63 NZD (Angus ground beef)	76.35%

Retail power can also be seen in the NZ supermarket duopoly of Countdown and Foodstuffs, with the chains earning approx. 22 to 24% ROC [xxiv]. In 2021 the NZ commerce commission released its draft market study into the supermarket sector. The report found that lack of competition had pushed up prices, while 'pushing excess costs, risks and uncertainty onto suppliers'[xxv]. This shouldn't be surprising though. The 'rules of business are that the party with the power squeezes everyone else's margins'[xxvi]

This point was highlighted by James Parsons (2008 Nuffield Scholar) in his research paper entitled 'Supply Chain Relationships and Value Chain Design'. James stated 'As more power has shifted to the retailers, it is no surprise they have squeezed producers on price. In just four years, from 2003, New Zealand farmers' share of the UK retail price of lamb shrunk 20%. Contributing to the 2007-08's lowest ever sheep and beef farm profit in 50 years, $19,400; worse than the deregulation years of the 80's'.

Looking at the velvet industry, we can see that the same rules largely apply. There are approx. 2000 farms running deer in NZ, growing approximately half the world's velvet supply. Two thirds of NZ's velvet is exported into China, with the remaining third going to South Korea. Between those two countries, there are approx. six major buyers who ultimately set the velvet price each season. Here again deer farmers produce a commodity product that is virtually identical. Again, the price is set for them. At the time of writing, I have already started cutting velvet, yet none of the velvet buyers have yet committed to buying my velvet, nor have they let me know what the price per kg will be. Instead, the velvet buyers wait until one of the major players places their order, and then they all follow suit with prices largely the same.

From a value spread perspective, the farmers share of the end value of a velvet product varies from a minimum of 3%, to maximum of approx 10%, depending on the level of further processing that has gone into the product, how it is marketed and who it is marketed to. This represented by the two examples below. Note that Mountain Red is a NZ product, where Cheon Nok Extract is a South Korean. Both utilise NZ deer velvet.

Mountain Red Deer Velvet Capsules

Estimated farm share: 10%

Cheon Nok Extract (Deer Velvet and Red Ginseng)

Estimated farm value share: 3.5%

Using the above examples, it is evident that we are successful in either creating a valuable product, or the key ingredient in one, however we are not necessarily successful in capturing more of that value at the farm end. It also an irony that so much effort and industry money is spent on best practice behind the farm gate, when the real economic potential lays on the other side of the gate.

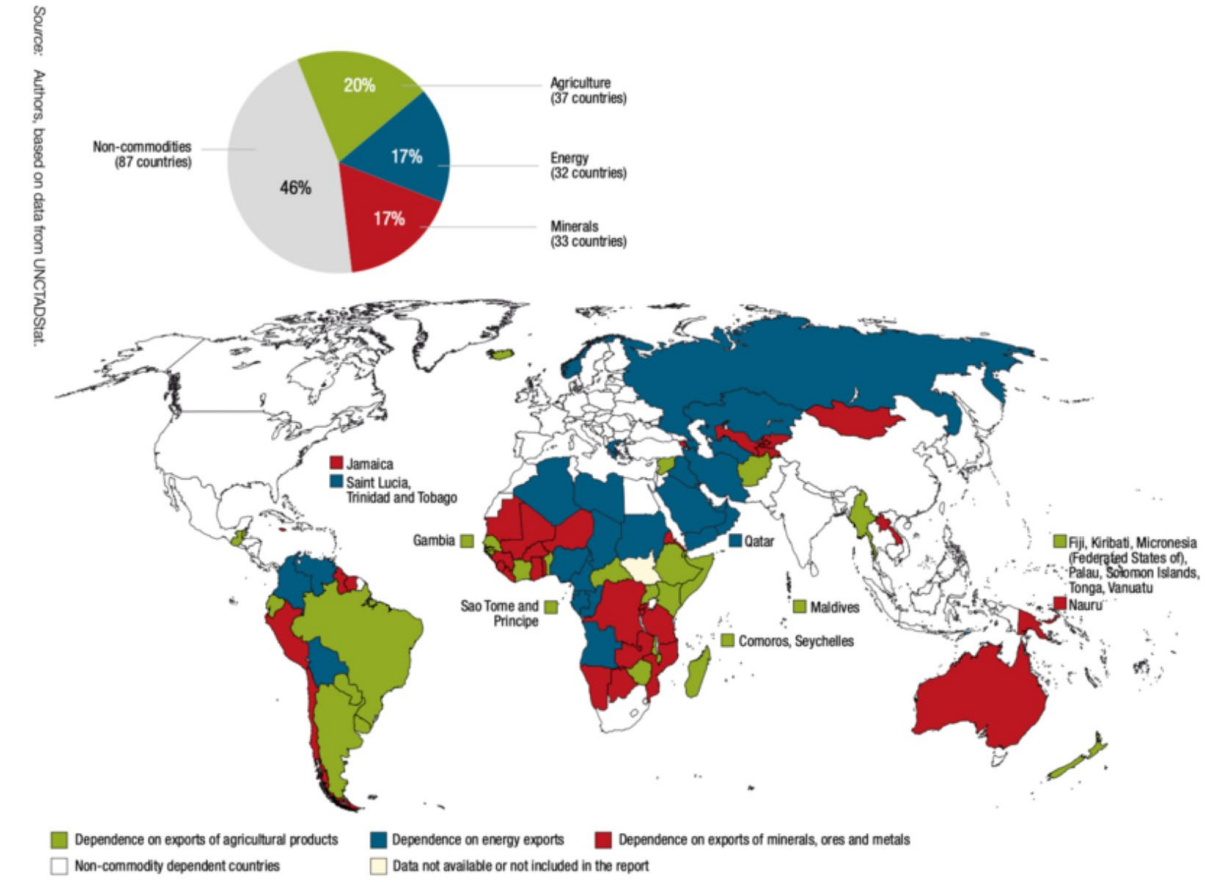
Reason #2: We sell commodities (especially raw and undifferentiated ones)

NZ's approach to agriculture has followed the same trajectory as that as most developing countries. Post colonisation by the English, NZ built its farming industry on supplying raw commodities to Britain. In fact, at this early point NZ was arguably at the leading edge of agriculture and supply chain innovation, being the first country to export frozen meat. Enjoying its guaranteed access to British markets, NZ's agriculture industry successfully underpinned the economy, providing the country with one of the highest GDP per capita rates in the world[xxvii]. Naturally, NZ farmers doubled down on a winning strategy and kept producing the same thing and as much of it as possible.

The NZ food and fiber sector was largely buoyant from this point up until 1973 when Britain joined the European Economic Union, resulting in NZ losing its biggest customer. Further pain came in 1984 with the removal of all agricultural subsidies, resulting in land prices falling by 60%. Despite the pain of reform, NZ agriculture has since become more efficient, innovative and diversified. Farmers adapted to the new trading environment but were still selling raw and largely undifferentiated commodity products, except this time in a free market against other commodity producers.

The World Economic Forum (or WEF) calls this situation, rather unoriginally, 'Commodity Dependence'[xxviii]. In fact, the WEF devotes a full section of its website to the subject entitled 'We must help developing countries escape commodity dependance'. Interestingly, approx 54% of countries are commodity dependent, however only 13% of developed countries are, including New Zealand, Australia, and Norway. The reason the WEF is concerned about countries being in this position is because their economy is not diversified it is therefore at the mercy of international market prices. When a

commodity price downturn occurs, an economic slow turn in these countries typically occurs, with some falling into recession.



Distribution of commodity-dependent and non-dependent countries, 2013–2017. Image: UNCTAD

Figure 6: Distribution of commodity-dependent and non-dependent countries, 2013-2017

Commodity dependence does not just affect a country economically. 'As commodities are the main source of income for many poor countries, the only way to earn more is to produce more. This puts pressure on their natural resources, which compromises sustainability'.[xxix] It is therefore no coincidence that NZ farmers are currently feeling pressure over their impact on the environment, having spent decades focusing on farm productivity.

Another issue common to these countries is that as they open up to international trade, the benefits of trading agricultural commodities are usually not captured by their farmers. Farmers 'are part of the low value-added segments of international food supply chains, and thus get very low returns. This is why a coffee producer who works from sunrise to sunset gets less than 3 % of the price you pay for your morning coffee'[xxx]. Ironically this is almost exactly the same value share that NZ deer farmers receive for products containing deer velvet sold in Korea.

It is also ironic that as a participating member of the WEF, we as country do exactly what we advise other countries not to do. However, it also highlights how hard it is to break free of the status quo.

5. A summary so far….

If you are a deer farmer reading this I suspect you will either be questioning my findings or reaching for the bottle. Which would be fair enough as writing it has been an experience somewhat similar to self-flagellation. Mildly amusing but mostly painful.

It seems the Reserve Bank of NZ shares this sentiment, writing in their 2021 Climate change report that 'agriculture could face drought, a consumer shift towards plant-based protein, intensified regulation (to cut greenhouse gases) and a carbon border adjustment mechanism in key export markets all at the same time'[xxxi]

Combined with persistently poor levels of profitability, it is arguable that there are hard times ahead for our industry.

However, all is not lost and while it is important to set the scene and make the case for change, there is also a real and significant opportunity for NZ's farmers to improve their economic position, whilst doing the right thing by their customers, their environment, their public, and their generations to come.

6. So how can we do things differently?

If we accept that the current situation is less than ideal, then we must look to see what, if anything, can be done differently. Can we move beyond selling raw undifferentiated commodity products into the global market? Can producers actually recapture some of the power in the sales process and take a more equitable share of the end value of the product? To do this I decided to seek out NZ based businesses that were attempting to do just this. I wanted to understand what their business models were, how successful they were, and if so, how much of the value they were capturing was flowing back to the farmer.

I also wanted to further explore the more conventional farming activities that were already out there. Were there any that were already outperforming my industries average? And were they also meeting societies expectations of us as a sector? Afterall, it's easier to adapt one's business to something that already has an established support structure and supply chain in place, even if it does just mean producing the same thing but in a different way.

But firstly, let's look at some alternative ways of doing business.

7. Alternative business models

NZ farmers typically sell their products through commodity platforms and intermediaries. This is largely the same the world over. Our challenge for some time has been trying to earn more than the industry's

average ROC, being 2.5% to 3%. When farmers have looked to do this in the past, they have typically settled on one of four key strategies.

One option is simply to aim to produce the commodity at a lesser price point than the industry average, thus capturing a greater return at the farm gate. Examples of this could include utilising farm inputs such as fertiliser more effectively, adopting new technology, or achieving greater efficiencies through scale. The growing number of large corporate farms in NZ is an example of this.

Another option is to form or join a cooperative, where farmers buy inputs together to leverage better buying power, and/or and sell their products together to access more markets and achieve greater returns. Good examples of this in NZ include Fonterra and Zespri.

A third option is establishing a relationship with a business further along the supply chain. This typically involves establishing an agreement to provide a specific quantity of produce, at a specific level of quality, within a specific time frame. The benefits of this approach can include greater certainty over future income, as well as a more equitable share of the end value. An example of this is Atkins Ranch, which is discussed in more detail later on. A point to note with sharing more of the upside is the requirement to also share more of the downside.

The fourth option or strategy that is commonly adopted is doing more of the functions within the value chain yourself. This may include the further processing of the product, packaging, or even sales and marketing. 'This may sound like an attractive idea. But in order to be successful at taking on these new tasks, farmers must have the equipment and know-how to do them successfully, as well as good financial resources and very strong organisational skills'[xxxii]. One of the critical benefits of this approach is ability to hold and control the relationship with the end consumer.

Although I have outlined four of the more common strategies or approaches, it's important to recognise that there are many variations of a theme. For example, there are food companies such as First Light Foods that are increasingly focusing on direct-to-consumer sales in the United States. They do not want to own parts of the value chain that they are not specialists in but do want to control the relationship with the consumer, thereby better understanding their needs and also capturing the value typically absorbed by a retailer.

8. The potential of E-Commerce

E-commerce involves in its most basic form the buying and selling of goods over the internet. This form of retail has grown exponentially over the last two decades, with global e-commerce sales now in in excess of $3 trillion[xxxiii]. 'This growth is underpinned by a number of factors. These include shifting consumer preferences, growing internet adoption and ever-improving delivery options. For buyers, e-commerce offers a more convenient way to purchase goods and services, while also providing more choice and better deals'[xxxiv].

E-commerce has not yet had the impact in agriculture that it has in other sectors such as clothing and electronics, however that is likely to change in the near future. A report completed by GSMA Intelligence (an association that represents the interests of mobile operators worldwide) on e-commerce in agriculture, found that the up-take of e-commerce in agriculture had been hindered by several reasons, including 'the agri supply chain is often controlled by well-entrenched intermediaries (middlemen); the logistical challenge of handling perishable products is complex; and most consumers still prefer to buy

groceries in-person rather than online, given the inconsistent physical appearance of fresh produce, especially fruit and vegetables. However, this situation is now beginning to shift, as Nuffield Scholar Jason Rolfe established in his 2017 report on 'Developing an Online Sales Strategy for New Zealand Food'. Jason found that 'one in five Chinese shoppers want to buy products from New Zealand, which is currently 156 million people'[xxxv]. Some NZ based agri-businesses are now starting to pursue this model with an example being First Light, which has recently begun selling meat (including venison) directly to consumers via its online store to customers within the United States[xxxvi]. Another example is Alpine Deer's which sells velvet as well as other deer co-products through its Cervidor online store both within NZ and overseas[xxxvii].

Although establishing an e-commerce-based business model does not guarantee success, it does have the potential to disrupt the existing 'middleman' based value chain model as detailed in *Figure 7* below. One of the critical benefits of the e-commerce model is that it allows direct communication between the Farmer and/or e-commerce provider, thereby eliminating the retailer's ability to substitute one brand with another and impose market power. Importantly, the e-commerce model also allows the sales of products via multiple distribution models at the producer's discretion, something that can be important when entering new markets.

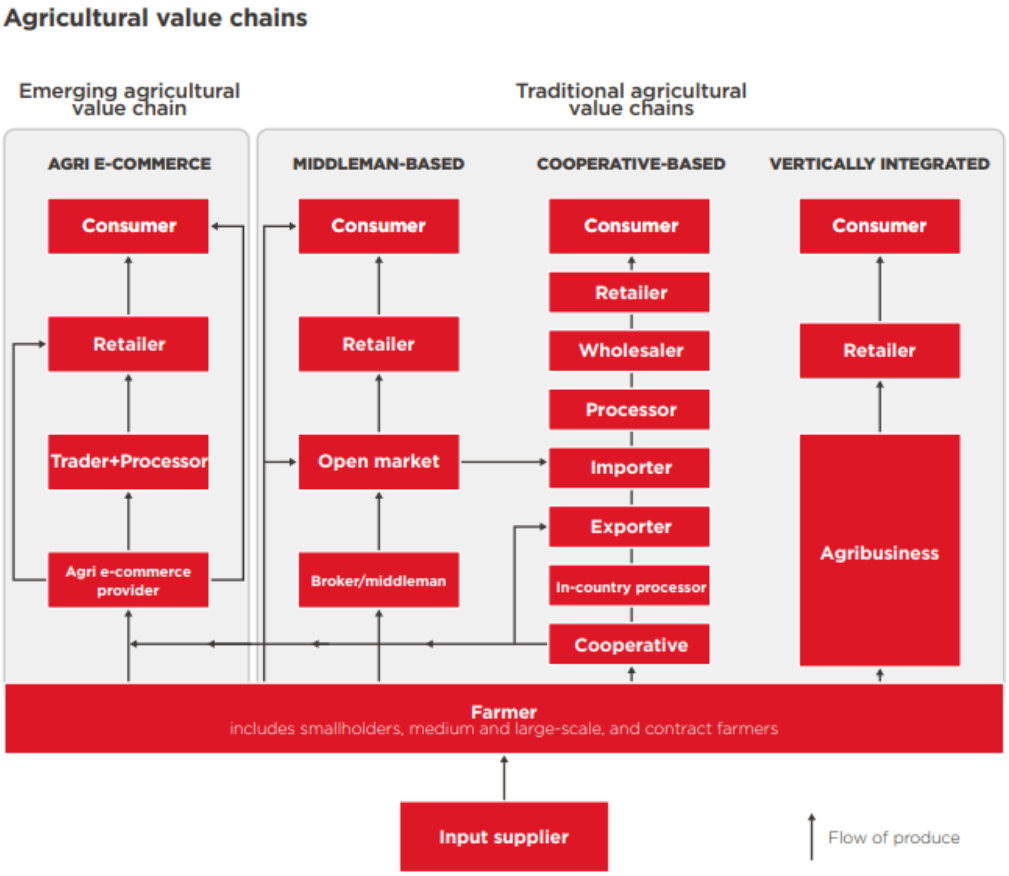


Figure 7: GSMA: Ecommerce in Agriculture: new business models for smallholders' inclusion into the formal economy

9. The power of marketing

Jim Wilkes felt so strongly about the role of marketing in the red meat sector that he wrote his Phd on it. Entitled 'The New Zealand Red Meat Industry: Defined by the past, embedded in the present, blind to the future. An investigation into Marketing Myopia and its links to poor performance and profitability'. Jim is an Australian, and while it rankles to have your weaknesses pointed out to you by an Aussie, his conclusions are hard to argue against.

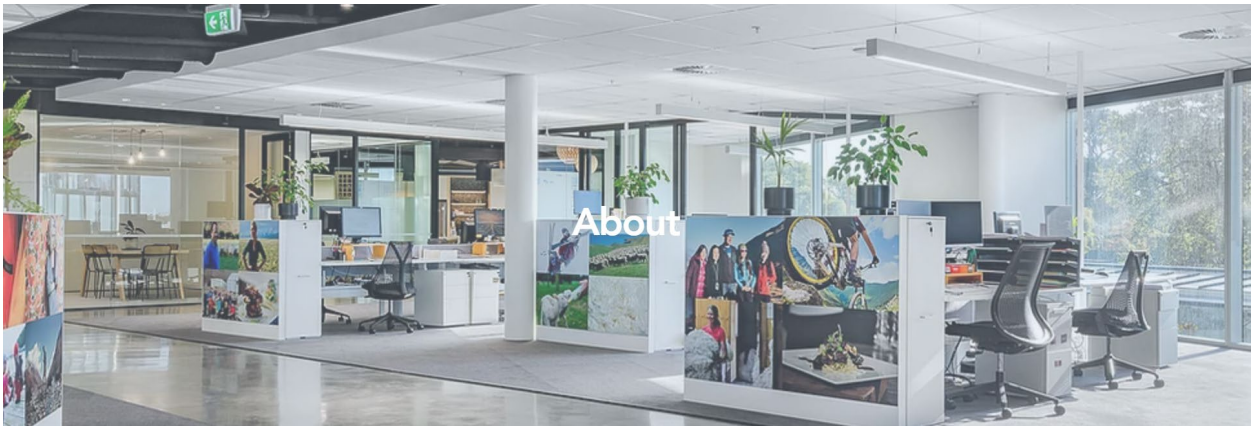
While a thesis is hard to summarise, one of the key points that Jim makes is that the red meat sectors failure to differentiate its product from that of its competitor has cost it billions. 'If consumers cannot differentiate between one product and another product, they will automatically default to selecting the product offering the lowest price'[xxxviii]. Not only this, it enablers distributors and retailers to easily substitute one product for another as a means of exerting purchasing power over the supplier.

To Jim, it almost appears as if the entire industry has been designed by the end user to keep prices down. He states 'where are the industry's strong brands? Where are the industry's marketers? And where are the industry's profits?[xxxix]

"You need brand equity for differentiation, for a price premium, for brand loyalty and a host of other strategic advantages. Equally important, without a strong brand, you are vulnerable to retailers, competitors, suppliers and long-term sustainability uncertainty"[xl]

Very few companies understand the power of marketing as well as NZ Merino, as demonstrated in the case study below.

Case Study 1: NZ Merino



The New Zealand Merino Company (NZM) was formed in 1995 by Merino growers facing 'rising production costs and unstable/unsustainable prices for their fine wool'[xli]. NZM's strategy fundamentally differed from the conventional method of taking NZ's wool to market, which was based around contracts and fixed commodity pricing, with significant annual volatility. Instead, NZM planned to identify brands 'operating in particular market segments and aligning them with specific attributes of NZ Merino that could enhance their value to their end-use customers'[xlii]. This radically different approach to the sale of wool met with significant resistance from established industry players, and in particular the

NZ Wool Board. Partly, this resistance was driven by belief in a series of prevalent industry myths[xliii]: These include:

- There will only be one price for wool – the commodity price;
- The contract prices will only ever equal the average commodity price;
- The market will not honour contracts when the commodity market fluctuates in their favour;
- Fibre ingredients cannot be differentiated;
- Any value added will be captured by others further through the supply chain;
- Growers get little or no value from investments in marketing.

Over time, NZM's approach has proven to be correct. While strong wool has continued to flounder, NZM has provided sustainable financial returns to its growers, not only in comparison to strong wool, but also to the wider fine wool market within NZ. NZM's focus on being the connector, or enabling function between the brands and the growers, has allowed its brand partners to sell their products at a premium price, capturing the potential value of a product that is both high quality and environmentally sustainable. Additionally, NZM facilitates the connection between the brand and the grower themselves, providing a level of traceability and connection to the land that the end consumer values.

In terms of returns to the grower, Dave Maslen (NZM's GM for Markets and Sustainability) tells me that NZM pays its growers better than the market average 75% of the time, and less than the market average 25% of the time. As a result, it currently holds approximately 75% of NZ's fine wool market. More than '50% of this volume changes hands through direct supply contracts, some of which extend up to 10 years in the future. As a result, NZM growers have greater price stability that allows them to more effectively manage their farms and make important capital investment decisions. In exchange, NZM brand partners receive sustainable pricing, guaranteed supply, consistency of supply, traceability, and fit-for-purpose processing consignments'[xliv].

Keeping all elements of the value chain happy is critical to NZM's viability. As Dave states 'If there is a single element of the supply chain that is not making money then the chain is broken'.

Case Study 2: Atkins Ranch

Atkins Ranch was started by Wairarapa farmers John Atkins and Phil Guscott in 1989. Atkins Ranch began with a very different business model from the status quo. Instead of their lamb via the existing value chain, John and Phil decided to sell direct to consumers in the USA. Now operating an office and processing plant in San Francisco, Atkins Ranch sell their lamb to the Whole foods market, being the world's largest retailer of natural and organic foods.

To meet the needs of their market segment, Atkins Ranch aim to supply their lamb 'all year round io discerning customers who demand high-quality, antibiotic free, 100% grass-fed GMO-free lamb'[xlv].

Those who join the Atkins Ranch producer group elect 'to effectively become the exporter with associated ownership, risk and margins'[xlvi]. In return, producers must commit to producing their lamb as per the supply criteria below:

SUPPLY CRITERIA

- 100% grass fed
- Never been on a feedlot
- Never been fed any feed containing animal by-products
- Never ingested feed from genetically engineered grasses
- Never been fed grain
- Never been administered antibiotics or Artificial Growth Hormones
- Finishing lambs must have the Atkins Ranch antibiotic status and 100% grass fed declaration from the ranch of origin kept on file
- All producers must be Atkins Ranch On Farm Quality Assured to the Pasture Raised level. Atkins Ranch has an updated On Farm Quality Assurance programme, aligned with the Global Animal Partnership (GAP) 5-Step animal welfare rating. The GAP 5-Step programme has been embraced by one of our major North American customers. Atkins Ranch producers will need to be GAP certified to Step 4 to be eligible for the Whole Foods Market Family to Family supply programme.

Figure 8: Atkins Ranch Website (2021)

From a financial perspective, Atkins Ranch producers receive 100% of the current market schedule (at the week of processing) six to eight weeks after the animals are processed. This is in comparison to the usual two-week payment period followed by the traditional meat company model. The upside is that Atkins ranch producers then receive a proportionate share of the company's profit, which is paid out in mid-December.

Case Study 3: Spring Sheep Milk

'Spring Sheep Milk Co was started with a clear aim to do better dairy and, to provide tastier, gentler and more nutritious alternative to goat or cow's milk'[xlvii]. Founded in 2015, Spring Sheep is a joint venture between Pamu (formerly Landcorp) and SLC. SLC being a marketing company that specializes in taking the best NZ products to consumers all over the world.

Although only six years old, the company is now supplied by 16 farms, running a total of 12,000 sheep, making it the southern hemisphere's largest sheep milking company. This rapid growth has been aided in large part by SLC's decision to partner with Pamu. This relationship has provided the company with the ability to make long term strategic decisions and invest with confidence.

Although the company has had to pivot in the products it took to market, it has currently settled on high value infant formulas and milk powders. Key to the company's ability to rapidly pivot is the decision not to invest in manufacturing infrastructure unless absolutely necessary. By toll processing instead, it has kept capital free to invest in marketing. Tellingly, for every dollar spent by Spring Sheep on infrastructure, close to a dollar more is spent on marketing, primarily within the Asian market.

From a supplier's perspective, making the shift to sheep milking and supplying Spring Sheep is financially attractive. The company's General Manager of Milk Supply Thomas McDonald points out that their suppliers achieve between $3000-4000 Effective farm Surplus (EFS) per hectare, which betters that provided by conventional dairy.

Sheep milk is becoming increasingly popular from a consumer perspective for a number of reasons. It contains nearly twice the protein and calcium of cow's milk, it contains all essential amino acids at greater concentrations than that of cows and goats, and it contains only A2-type proteins which reportedly makes it more digestible than conventional A1 type proteins.

There are also environmental benefits associated with sheep milking. A recent study conducted by AgResearch found 'that in comparison to a typical dairy cow farm in similar environments that the nitrogen can be reduced by between 10-50 percent'[xlviii]. This is because sheep urine patches are smaller than those of cows, allowing it to be spread more evenly and providing a greater opportunity for the

plants to utilise the nutrients. In addition, because of their smaller size, sheep pug the ground less than cattle and therefore do less damage to the soil structure.

Sheep milking remains a fledgling industry within NZ, however it ticks a number of boxes for producers, consumers, and society. Economically, it can be more profitable than conventional dairy farming. It is kinder on the environment and it is arguably better for the consumer. Spring Sheep is open about its ambition to become another iconic NZ company such as Zespri. It has started well and its future appears bright.

10. Low Hanging Fruit

Having discussed business models different to the status quo, and looking at examples of them in action, let's look at simpler forms of making better returns than the industry average. These can involve producing the same thing in a different way, producing the same thing and differentiating it, or producing something completely different. At least two of these things will be contentious to some readers for different reasons, however I would encourage the reader to be open minded and consider them on their own merits!

10.1 Regenerative agriculture

The concept of Regenerative Agriculture, or 'Regen Ag' stems from the United States as a response to soils being damaged and, in some cases, lost by intensive cropping practices. Today there are a number of interpretations of the term, however it can generally be considered that where sustainability in agriculture refers to land that is steady and static, regenerative is where the 'soil is restored, biodiversity grows, and water and carbon are absorbed'.[xlix] Within NZ, The Ministry for Primary Industries (MPI has developed a set of principles for Regen Ag, which define it as 'a set of practices that in isolation or collectively, may result in improved outcomes for our productive land, freshwater and marine environment, our climate, our animals, and for the people that grow and consume our food and fibre products'.

In 2020, B+LNZ and New Zealand Wine (NZW) commissioned Alpha Foods 'to understand the current state and future market potential of regenerative agriculture in food and wine within three of NZ's international markets – the United States, Germany and the United Kingdom'[l]. The key findings of the research included:

- Regenerative agriculture, though still in its infancy, is gathering momentum and is set to become a significant trend in food and fibre products internationally
- Brands and multinational business are starting to follow farmers leads in the uptake of regenerative agriculture
- While the concept of regenerative agriculture has yet to properly take hold among consumers as a driver of their choices, there is a bright future for consumer interest in regenerative agriculture
- Consumers may be willing to pay more for regeneratively produced food, especially if science can show it tastes better, is better for you – and is better for the environment. There are opportunities to link regenerative agriculture with solutions to climate change.

- There is a lack of a clear definition of 'regenerative agriculture' at present but the current definitions align with the way NZ sheep and beef farmers farm. We also need to examine other aspects to 'regenerative' that may be worth adapting.
- There is a significant opportunity for the New Zealand red meat sector to position itself to take advantage of this trend. We will need to:
  (a) Define what 'regenerative' means in a New Zealand context
  (b) Ensure 'regenerative' attributes are built into our New Zealand story – in particular Taste Pure Nature
  (c) Have verifiable and relevant standards of 'regenerative agriculture' to link in with international supply chains and underpin the story
  (d) Ensure any approaches and claims are backed by science.

		Before learning about regenerative agriculture	After learning about regenerative agriculture
Proportion willing to pay 20% more for sustainably produced food	United Kingdom	36%	56%
	Germany	40%	42%
Proportion willing to pay 30% more for sustainably produced food	United States	19%	30%
	Germany	20%	28%

Figure 9: B+LNZ Regenerative Agriculture: Market Scan and Consumer Insights Report (2021)

The table above demonstrates the potential premium that may be obtained for regeneratively produced food. Although the value chains into these markets have yet to be fully established, it is sensible to look strongly at providing food to customer in the way they want it, especially if they will pay more as a result. From an environmental perspective, regenerative farming involves the utilization of less fertiliser, the improvement of soil and less environmental degradation.

Regenerative farming can also result in less farm expenses due primarily to decreased fertilizer inputs, resulting in an improved ROC, even without receiving any premiums from the end product. This point is debated however, as some industry voices see not using fertilisers such as Superphosphate as unsustainable in the long term. However, this may be a necessary transition as the worlds phosphate rock reserves decline and the costs to extract them rise.

10.2 Forestry

I include forestry in this paper, because although it is not particularly revolutionary, in the right location it can improve the economic and environmental performance of a farm.

Plantation forestry has become a dirty word for many within the farming sector. This sentiment is largely driven through largescale conversion of what has been traditional sheep and beef country into pine forest – something that has been going on since the 1970s and probably earlier. It is well recognised that forestry can have a negative impact on rural communities[li] , mainly through the reduction of local jobs that it provides compared to sheep and beef.

However, research recently completed by Wairarapa based consultancy Baker Ag clearly shows the opportunity presented by forestry and associated carbon sequestration as part of an integrated land management approach[lii]. Baker Ag used an average Wairarapa 'summer dry' 850 ha hill country farm to model the integration of forestry using four different scenarios:

- Scenario 1 – 850ha sheep and beef farm (status quo);
- Scenario 2 – 750 ha sheep and beef farm + 100 ha space -planted poplars registered in the ETS;
- Scenario 3 – 750 ha sheep and beef farm + 100 ha of production Pinus radiata forestry registered in the ETS;
- Scenario 4 – 750ha sheep and beef farm + 100ha of 'carbon only' forestry i.e. forest is never harvested.

To take into account the uneven income spread of forestry versus the animal returns sheep and beef, the study utilised a Net Present Value (NPV) investment model using a discount rate of 4.5%. For baseline purposes, the study utilised a typical 3-year average Effective farm Surplus (EFS) of $316 per/ha and a return on capital of 3.1% (which is marginally above the industry average). To account for the discounted sale value of land converted into forestry, all scenarios used an initial purchase value of $10,000 per ha. For the scenario that involved the conversion of land into production forestry, that portion of land was later valued at $3,500 per ha. For the scenario that involved the conversion of land into permanent forestry, that portion of land was later valued at $1,400 per ha. No capital gain was assumed under any scenario.

All forestry establishment, maintenance and extraction costs were modelled using current industry averages for comparable hill country. It was also assumed that the forest was 150km from port and that cartage was $0.25/km. The price of carbon was set at $65 per tonne throughout. Over a 60-year period, (being 2 x forestry harvests) the results were as follows:

Scenario 1: 850ha sheep and beef farm (status quo)

Scenario 1 results	NPV	NPV $/ha	Net Profit (non-disc)	Net profit $/ha
Total	-$2082,071	-$2,449	$16,384,600	$19,276
Average per year for 60 years	-$34,701	-$41	$273,077	$321

Scenario 2: 750 ha sheep and beef farm + 100 ha space -planted poplars registered in the ETS

Scenario 1 results	NPV	NPV $/ha	Net Profit (non-disc)	Net profit $/ha
Total	-$798,581	-$940	$20,580,006	$24,212
Average per year for 60 years	-$13,310	-$16	$343,000	$404

Scenario 3: 750 ha sheep and beef farm + 100 ha of production Pinus radiata forestry registered in the ETS

Scenario 1 results	NPV	NPV $/ha	Net Profit (non-disc)	Net profit $/ha
Total	-$118,611	-$140	$21,074,055	$24,793
Average per year for 60 years	-$977	-$2	$351,234	$413

Scenario 4: 750ha sheep and beef farm + 100ha of 'carbon only' forestry

Scenario 1 results	NPV	NPV $/ha	Net Profit (non-disc)	Net profit $/ha
Total	$2,399,214	$2823	$25,871,253	$30,437
Average per year for 60 years	$39,987	$47	$431,188	$507

From these results, Baker Ag calculated that by allocating 12% of the farm area to a forestry/carbon land use, it has the potential to increase the annual net income across the whole farming business by between 26% and 58%. Most of this increase was from carbon revenue. Importantly, the study found that if it looked at carbon farming in isolation, its NPV is around $700 per ha, compared to status quo sheep and beef at -$41 per ha.

The risk of course is that carbon farming is a new industry that has been regulated into existence. As is often cited 'It has been brought in with the stroke of a pen and can be taken out with the stroke of a pen'[liii] Whilst it appears likely to stay for the foreseeable future, for how long and at what price is anyone's guess. That said, the opportunity is significant and there is strong argument to include it as part of the overall farming system.

From a purely timber perspective, the argument for it can also be compelling dependent on the forests distance to port, topography and management of the forest. For comparative purposes, an assessment was recently completed by Saathof Forestry Services on our own predominantly medium contour farm, located approx 87km from Napier Port. Currently running deer (with a focus on velvet) and cattle, the property returns on average approx $300-$400 EFS per hectare. It has no access to water for irrigation and is increasingly prone to drought. The assessment found that placing approx 67 ha of the farm into forestry would provide an annualized net return from that area of approx $1439 EFS per ha (utilising a 7% discount rate), based on average timber returns over the last five quarters. This does not include carbon income.

10.3 Carbon Zero Certification

Globally, many businesses are electing to undertake carbon zero certification**,** however doing so in a farming context is relatively new. The first NZ farm to achieve this distinction is lake Hawea Station which will be discussed further in the case study below. From what we have discovered so far, measuring and reducing your farms carbon footprint is already becoming a requirement and is very likely to become a prerequisite for exporting produce into many of our biggest markets. That said, there is also strong evidence to suggest that a premium can and is being achieved from independently certified carbon neutral commodities and products.

Fonterra launched the country's first carbon zero milk in 2020, then followed up with a carbon zero butter for its customers in the United States. Poultry company Ingham's has gained carbon zero certification for its free-range chicken, while Yealands Wine group has certified its entire range. Although it is not known what level of price premium these companies have managed to achieve for their efforts, many have reported cost savings through actions such as reduced packaging and supply chain optimization.

At the time of writing, Silver Fern Farms had just announced its launch of its first carbon-zero certified range of beef in the United States. Although grower premiums have not been specified, Silver Fern Farms CEO Simon Limmer has said that the product will be priced at a premium, which will flow through to the farmers who supply the product.

However, what is known is that Lake Hawea is achieving a sizeable premium for its carbon zero wool, which we will cover now.

Case Study 4: Lake Hawea Station

Lake Hawea Station comprises approx 6500 hectares on the shores of Lake Hawea. Owned by Geoff and Justine Ross, the station holds the distinction of being the first farm in NZ to be independently certified as being carbon zero. Justine Ross says "the biggest koha Lake Hawea Station can make to the world is to sequester more carbon than we emit. For us, we call this Carbon Clear and not only does it contribute to the worlds battle against climate change, it provides us with a way to create more value for the wool and meat we market off-shore"[liv].

The carbon zero certification has enabled the station to sell its fine merino wool to brands such as All Birds and Sheep Inc, capturing an approx 40% premium over current commodity pricing. It achieves this premium because the carbon zero certification provides it with a competitive advantage over other brands. Interestingly, Lake Hawea Station hasn't reduced its stocking rate to achieve its carbon zero status. In fact, it has increased its stock numbers and wool clip, whilst planting more trees and retiring marginal land.

Lake Hawea Station is also now being run in accordance with regenerative principles. Although it doesn't yet have the numbers to prove the economic benefits of this approach versus conventional farming, Finn Ross is confident that the numbers will stack up, both from a cost reduction and marketing perspective.

Although not highlighted by the Ross's themselves, one of the key reasons they have been successful in leveraging the economic benefits of their carbon zero status is Geoff's strong background in marketing. Geoff was the founder of 42 Below and is currently the Executive Chair of the Moa Brewing Company. This experience has provided the station with a comparative advantage over other farming businesses in its ability to identify the opportunity and communicate the value of its products to its customers. However, that's not to say that what they have done can't be replicated by others. In Geoff's words, "Given New Zealand is largely a pastoral farming system and that so many of NZ farms have significant bush and native tree lots, this country has a significant competitive advantage over other agricultural nations, by providing carbon positive food and fibre. As consumers the world over move buying preference, NZ has an early advantage. As long as we know this information and communicate the carbon positive way we farm here. Not to mention that over 40% of our country's land mass is sheep and beef farms — to have that huge part of our country being carbon positive would be a big step change in our country's overall carbon footprint".[lv]

11. Back to the Deer Industry

The NZ Deer Industry has utilised supply chains for its venison that are virtually identical to that of the rest of the red meat sector, as illustrated by *Figure 9* below. The market for venison has typically been confined to Europe, and in particular the German game market. This has slowly evolved to include the United States and more recently China.

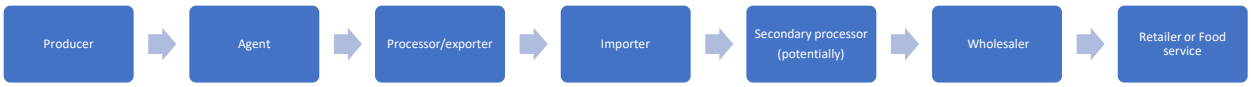


Figure 9: Typical NZ venison value chain (developed in consultation with DINZ)

In terms of velvet, and as mentioned earlier, approximately two thirds of NZ's goes to China for either domestic consumption or further processing and export. Almost all of the remaining third goes to South Korea. This is illustrated by *Figure 10* below. Whilst venison used to be the industry's biggest earner, this position is now held by velvet, reflecting the role of deer velvet in the growing Asian nutraceutical market.

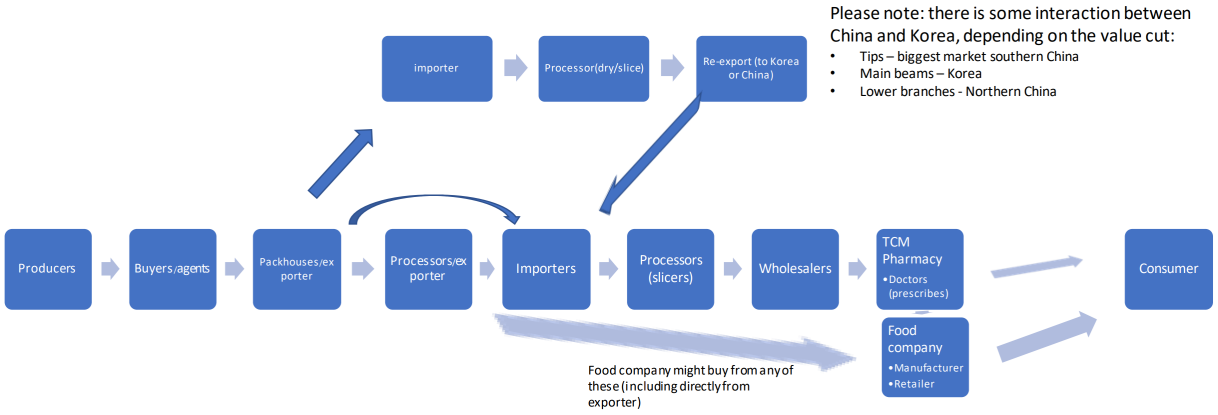


Figure 10: Typical NZ velvet value chain (developed in consultation with DINZ)

What is also common to both venison and velvet is that they are both typically sold as raw and largely undifferentiated commodity products. They therefore suffer the same fate as other commodities in that they are affected by commodity price downturns and that the majority of value is captured at the retail end. Although significant effort has been made by the deer industry to promote and distinguish its product in the global market, these fundamental issues remain in force. This point is illustrated by the low and often volatile returns achieved by the industries farmers.

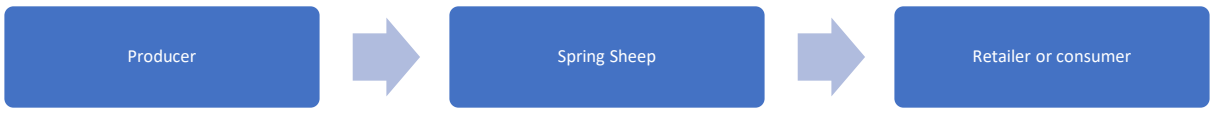


Figure 11: Spring Sheep Value Chain (derived from Spring Sheep Case Study)

The Spring Sheep Model is clearly different, and as we have discussed earlier, more profitable for those within it. Whilst there are many other functions involved in creating the end product and getting it to the end consumer, the key point is that these additional functions are carried out under Spring Sheep's control. The chain is noticeably short (as per *Figure 11* above), allowing for the business to talk directly to the consumer. This ensures that the power is retained by Spring Sheep and that the returns reflect the value that each component in the chain creates. As a result, Spring Sheep is able to pay its producers more via a system of forward supply contracts.

The Spring Sheep model is relevant to the deer industry, and in particular velvet, because Asia is also their biggest market. They have been successful in creating additional value and communicating that value directly to the end consumer. They have also been successful in riding out potentially catastrophic events such as Covid by having multiple distribution channels and multiple markets in place. This diversification of risk being in direct contrast to that of our velvet industry.

12. Conclusion

Within the NZ Deer Industry there is much to admire. Its people are innovative, resourceful, and resilient. Information is shared willingly and success is celebrated. Our products are healthy, nutritious, and highly valued in certain markets. There is much to be positive about.

Despite this, I am concerned about the industry's future. I worry that we as a collective do not fully understand the extent of how our markets, our natural environment, and the society in which we live are evolving. I also worry that the means by which we take our products to market are bedded in the previous century. What was fit for purpose then is no longer fit for purpose now. We leave the vast majority of the value that we create for someone else to capture, selling undifferentiated commodity products to a series of traders who have a vested interest in keeping the producer and the consumer apart. This, being the exact definition of what the United Nations advises poor developing agrarian nations not to do.

From an environmental perspective, while many of our farmers have been careful and diligent custodians of our land, our most vocal representatives are successfully creating the perception that we care little about our climate, our water quality and the biodiversity that surrounds us. This despite what our markets want, and our society telling us they demand.

This approach is reflected in the Deer Industries financial performance. NZ deer farmers receive an average of 3.4% return on their capital. This is in contrast to the NZ stock market which has averaged 6.5% since 1900. For our velvet, we receive between 3% and 10% of the end value of the product. Our ongoing focus on simply being the worlds 'most efficient and productive farmers' is not serving us well. If it was, our environment would be healthier, our social licence would not be under threat and we would be financially better off.

The need to reduce our Greenhouse Gas (GHG) emissions will be challenging for most deer farmers because they have little financial 'headroom' to play with and most deer farms are already run as low

input systems. Even if deer farmers were to avoid paying for their emissions at a national level, our international markets are increasing establishing mechanisms to either penalize or block products that do not meet increasingly stringent GHG criteria.

The industry must therefore become more profitable if it is to remain viable. We can no longer afford the status quo.

However, with every crisis comes opportunity. When I commenced my research, I was of the opinion that sustainability could be monetized and that doing so would lead to better environmental outcomes and better returns at the farm gate. What I have found is that while there is indeed economic value to be found through sustainability, these premiums are often captured by 'first movers' as consumers grow to expect all products to carry such standards. Whilst sustainability is an essential attribute, and ultimately a 'ticket to the game', the real opportunity lays in how we take our products to market.

As opposed to selling undifferentiated commodity products via ineffective value chains, we need to find ways of providing our end customers with what they want via a value chain that is both effective and equitable. Examples already exist of how this can be done, whether it be via a single desk model such as Zespri, or providing high value products direct to consumers such as Spring Sheep, or acting as an integrated sales, marketing and innovation company such as NZ Merino. All of these examples have successfully provided above average returns to their growers, through brands that are recognizable and strive to deliver exactly what their consumers want.

These businesses are true success stories but are not necessarily easy to emulate. Zespri owes much of its success to its ability to operate as a single selling desk. NZ Merino was launched with the assistance of producer levies and Spring Sheep was financially supported by Pamu, its 50% shareholder. This is not to say that any of their paths to success were easy, because they weren't. However, if the industry is to do something similar it will require strong leadership, the appropriate expertise and access to sufficient 'patient' capital.

One of the key tools available to us in driving change is technology. Technology is currently disrupting markets across every sector and the deer industry has the ability to use it to its advantage. Technology allows us to reach out and talk directly to our consumers at a fraction of the cost of what it used to, to understand what they actually want and value. It can help us tell our stories, build our brands, create products, prove provenance, and finally sell those products as far down the value chain as we choose.

My final point is regarding change. Change is a constant. As Winston Churchill once said, "If you're still doing things the same way you were doing them 10 years ago, you're doing it wrong". Ironically, we NZ farmers haven't fundamentally changed the way we take our products to market since 1882. The consumer, climatic, social, and regulatory changes that we are currently experiencing are causing farmer's pain. The silver lining to this pain is the leverage it can bring to create the change we need.

13. My recommendations to the Deer Industry

It is recommended that the NZ Deer Farmers Association (DFA) establish a project in coordination with Deer Industry NZ (DINZ) with the purpose of transitioning the industry away from the sale of its products as raw/undifferentiated commodities via conventional supply chains, and towards the establishment of short value chains that are effective in both generating value and distributing it proportionately. It is proposed that the project contain the following key objectives:

(a) Identify and support the establishment of business models and/or industry structures that have the potential to achieve the intent of the project. This work would be initially informed by those models utilised by Spring Sheep, NZ Merino and Zespri.

(b) Identify and promote the utilization of technology and web-based platforms that allow for the identification of optimal consumers and the sale of finished products directly to them.

(c) Identify what environmental attributes can be leveraged by these business models for commercial advantage, noting that the delivery and communication of on-farm environmental outcomes will also be beneficial to the deer industries social licence. The key focus of this objective is turning environmental compliance into economic opportunity.

It is further proposed that financial support for this project by sought from Government, based on its alignment with current political priorities, including addressing climate change through the reduction of on-farm emissions.

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