

# Bobby Calves: The game changers within New Zealand's supply chain

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Kelloggs 2016

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# 1. Executive summary

There is significant potential for New Zealand to increase its ability to utilise more bobby calves therefore making them a more valued product. It is important that we have a sustainable, viable, ethical and PR friendly value chain. It is also important that NZ Inc. gets this right to maintain farmers/producers' 'social licence' to farm and maintain our positive worldwide perception.

While difficult to calculate, it is estimated that more than \$1 billion is on offer, if we can capture the full value of underutilised bobby calves.

It is acknowledged that farmers all operate different policies with different values, so it is near impossible to make a recommendation that will suit all producers and fit with processors' expectations and resources. There is a range of options which will lead to more prosperous returns for the farmers, processors and overall sector. However, more leadership is needed to make these changes at all points of the industry supply chain.

Key recommendations:

- Increased use of beef genetics across dairy herds
- Increased use of sexed semen across dairy herds
- An integrated dairy beef "profit partnership" supply chain model, where everyone captures the value of the end product
- Uptake of a tool which measures beef performance through the supply chain to allow a feedback loop
- Increased farmer education on what options are available

Dairy farmers are at the start of the value chain, so it is critical that those options are easy for them and do not affect their primary objective, which is producing milk at the highest margin possible.

In implementing any of the above options, it is expected that sacrifices would have to be made and some options do not benefit everyone in the supply chain.

## **2. Foreword**

I was motivated to undertake this project for several reasons. Having been brought up on a sheep and beef farm, I appreciate the value of a profitable supply chain which returns profits back to farmers, which in turn feeds back to rural communities, urban communities and the New Zealand economy. It is important to me that any recommendations are sustainable for future generations and do not compromise – rather, they enhance – New Zealand's high values in areas, such as the environment and animal welfare.

I have a passion for agriculture and especially the beef sector. Recently, there have been animal welfare concerns in the bobby calf space and the general sentiment is that we can do better. But few solutions have been put forward, which is part of my motivation to undertake this report.

Finally, through my role with Beef+ Lamb New Zealand, I see a need for better collaboration across the sector. We can demonstrate a long-term viable industry – for not just the beef industry, but also the dairy industry, which is currently going through challenging times.

## **3. Acknowledgements**

I would like to thank Beef + Lamb New Zealand (B+LNZ) for its support through the programme and freedom to be able to complete this project. Without this, the project would not have been possible.

A big thankyou to the farmers and industry stakeholders who were interviewed and shared their knowledge. You are the key to a successful industry and leaders, as we move towards a sustainable, profitable future and prosperous NZ Inc.

Finally, I would like to thank the Kelloggs team for its support and guidance through this programme – especially Dr Patrick Aldwell, Anne Hindson and Desley Tucker. It has been a whirlwind journey, which has inspired and encouraged me to make a difference with my future endeavours.

## 4. Introduction

There is a significant opportunity coming out of the dairy industry, which is currently producing a by-product that is not being fully utilised.

There are an estimated 5 million lactating dairy cows, of which most produce a calf (B+LNZ, 2016). Typically, dairy farmers will only keep 20% of their calves as replacements for future years. Accounting for losses, this leaves on average 75% of calves surplus to requirements (B+LNZ, 2016). Information gathered from B+LNZ & Dairy NZ suggests that 2.3 million calves are not making it beyond 4 days old. This is where the opportunity lies – to maximise the value of these stock to farmers and the whole supply chain.

Around 60% of calves born in New Zealand are either reared for beef purposes or they join the milking herd. Over time, the number of calves going into the dairy-beef industry has steadily increased. Through improved practices and careful selection of replacement stock, this trend is likely to continue (Dairy NZ, 2016).

Dairy farmers have different approaches to the fate of their surplus stock, but the majority of calves are euthanised at four days old or sold to processing plants as a low value product.

It is important NZ Inc. has a sustainable, viable, ethical and PR friendly value chain. Why? To maintain farmers/producers' 'social licence' to farm and maintain our positive worldwide perception. Current concerns around animal welfare issues within the dairy industry strengthen the argument for change.

The purpose of this report is to investigate whether there are opportunities which can be implemented to increase the returns on this by-product, typically known as "bobby calves". The report investigates this from a farmer's perspective and also looks into supply chain and value chain opportunities. The report concentrates on factors which can be implemented in New Zealand, as time did not allow for inclusion of overseas' opportunities.

## 5. Methodology

This report was compiled using two different research methods.

### 1) Literature review

The first component of the report was a review of literature broadly and specifically relevant to the current and future challenges of the bobby calf industry. It was integral to get an understanding of how the current supply chain operates. Each part of the supply chain was researched to understand the key drivers and opportunities. A SWOT analysis was then done on the whole supply chain to identify key drivers issues within the industry.

Keyword searches were run through the Lincoln University databases and Google Scholar. These results were supplemented by key industry research papers, such as results from sustainable farming fund reports. Additional literature research was undertaken throughout and following the interview stage, where particular research was referred to in the interviews, or where key themes needed further investigation.

### 2) Interviews

A large number of interviews were undertaken. Most were done in person and took about an hour each. The interviewees were identified as leaders or key influencers in a particular area of the project. Interviewee names were sourced from my existing contacts – people I consider to be leaders in a particular field – or recommended by other key people. They were not all from New Zealand, but all were involved in the dairy or beef sector in some capacity. A conscious effort was made to have a fair representation of people across the value chain – dairy farmers, calf rearers, beef producers/finishers, processors and other key industry stakeholders. Ten dairy farmers, four calf rearers and ten beef producers/ finishers were interviewed and also three beef processors. Key industry organisations that were interviewed were representatives from LIC, B+LNZ, Dairy NZ, Ag Research & Lincoln University.

Most people interviewed are not named, to maintain confidence and integrity in their answers and not all comments and opinions are attributed specifically to them. This approach was designed to overcome any hesitations that interviewees may have had with regard to the implications of their opinions being made public, especially if they held representative roles.

All interviewees were given an introduction to the project and an explanation of why the project was been carried out. They were informed that they would be questioned on their thoughts and drivers around making decisions when dealing with bobby calves throughout the supply chain.

Results from the interviews and literature review findings were critically analysed with where they sat on the supply chain. Results concluded from different parts of the supply chain were reviewed to identify positive and negative impacts this had on other parts of the supply chain. Key themes were then identified and new ideas were derived by critiquing opportunities that had come out of the interviews and from personal experience. These were then discussed with key influencers in the industry to act as a proof of concept to determine if ideas generated in theory could practically and successfully be implemented across the supply chain. This information was then fed into the results section of this report and used to inform the structure and content of the discussion.

From there, recommendations have been made which are derived from outcomes of the collation of opinions and research gathered while completing this report.

Time was a limiting factor and there is always scope for an increased sample size to add depth to the report. But the best use of time was made, within the project framework.

## 6. Literature review

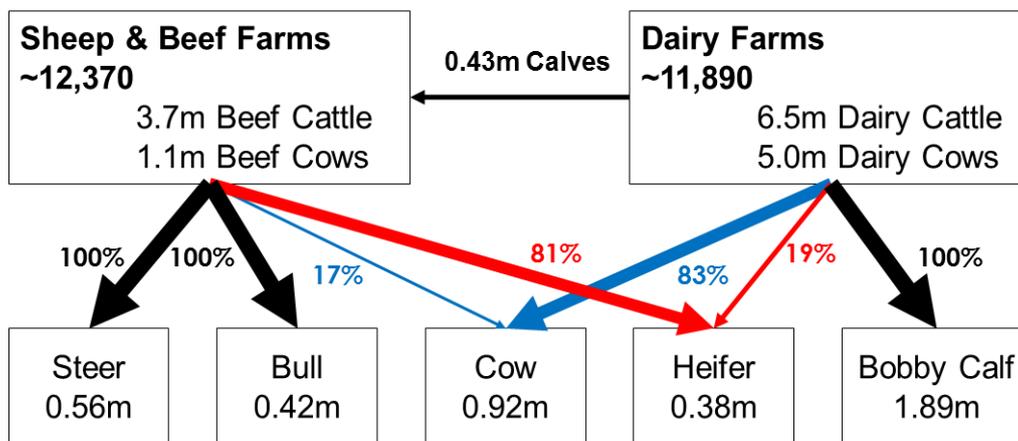
### 6.1 What is a bobby calf?

A bobby calf is an unweaned calf, at least four days old and one that is killed for human or pet food consumption. Most bobby calves are bulls, which are not wanted because they do not provide milk or are not suitable for becoming beef cattle (Hutching, 2016).

### 6.2 Current numbers in the beef supply chain

It is important to understand how many calves are currently being processed and what calves are not utilised at all.

There are several different published figures that estimate the number of calves in the sector. The chart below was developed using B+LNZ Economic Service data and is considered a fair representation of the stock numbers that are in the supply chain.



**Figure 1 Beef value chain domestic supply lines for export slaughter of cattle and calves from dairy and beef farms**

(Davidson, 2014)

Notes:

- Export slaughter numbers are in "million head" for steer, bull, cow, heifer, and bobby calves.
- The arrows link the supplying herds and indicate their respective percentage contribution to the export slaughter numbers.

Around 430,000 bull beef calves from the dairy herd are retained to be raised and finished on sheep and beef farms. When processed at 18 to 24 months old, these contribute to the bull slaughter each year. There are also beef calves left entire and a very small contribution from cull breeding bulls.

Of the 920,000 cows slaughtered, about 83% or 750,000 came from the dairy herd. Of the 380,000 heifers slaughtered, an estimated 19% or 70,000 head came from the dairy herd. In 2012-13, 1.89 million bobby calves were slaughtered and all of them came from the dairy herd (B+LNZ, 2014).

These figures only represent animals that are recorded.

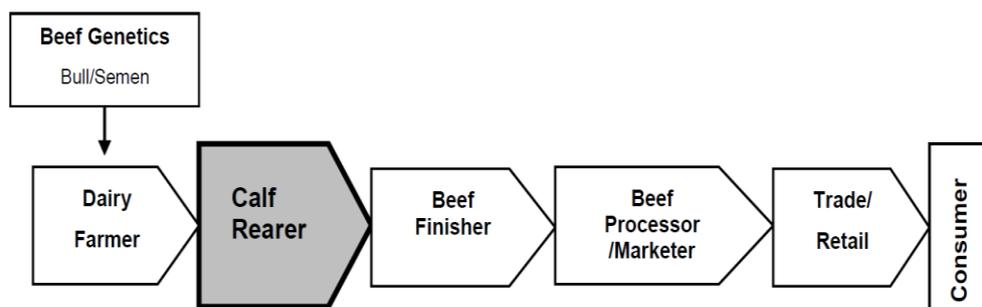
Other information indicates 2.3 million calves are not making it beyond 4 days old (Alan Cook, 2015). However, it is expected some of these are born dead or are not fit for purpose.

### 6.3 Current existing dairy beef supply chain

Understanding how the current supply chain works – from where the bobby calves start in the supply chain, to where they end up as veal or grown out as bulls is very important as it shows all the links in the supply chain.

The diagram below shows how calves typically flow through the supply chain in New Zealand. However, as identified through the interview process, some farmers have dairy farms and also finishing farms so take stock right through until they need to be processed. Landcorp (which was interviewed for this report) is a good example of this and investigating options to increase its dairy-beef integration systems.

Each business plays a critical role, ensuring the end product is produced in a way which up holds the values of NZ Inc. and is sustainable for the future (MAF, Dairy Beef Integration value chain, 2012).



**Figure 2 Typical NZ supply chain model from farmer to consumer**

(MAF, Dairy Beef Integration value chain, 2012)

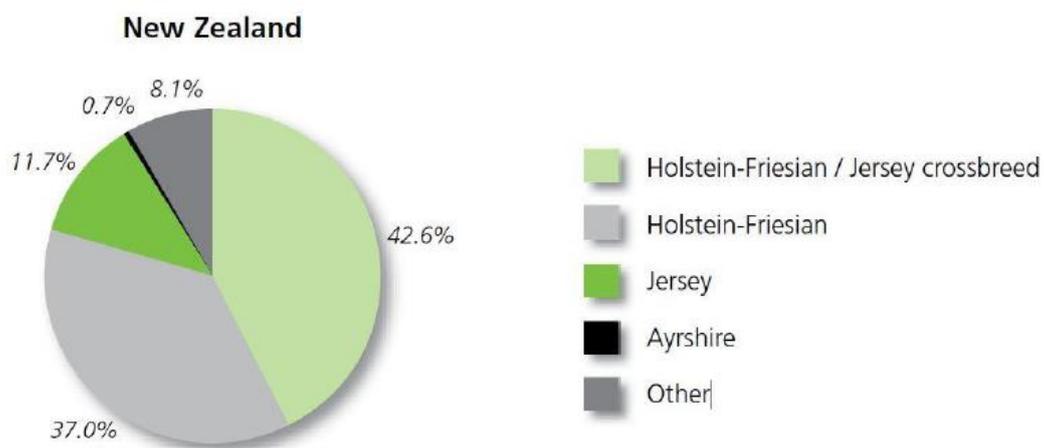
There is no tangible feedback loop in the supply chain. In many cases, the beef finishers do not know where stock they have purchased come from, especially when brought through sale yards or stock agents. The interviews revealed that this was an issue; it is discussed in more depth later in this report.

## 6.4 Current breeds across the national dairy herd

The interviews reinforced that not all calves can be grown into profitable animals. This information is hard to find, as farmers will euthanise these animals straight away – usually based on size or if they have defects.

The New Zealand national dairy herd is broadly split 50:50 between purebred and hybrid (Holstein-Friesian x Jersey) type animals – a significant change from 20 years earlier when herds were predominantly one breed (B+LZ Economic Service data). This is relevant because different breeds – typically anything with Jersey genetics – is more difficult to finish. They do not gain weight as quickly as their Friesian counterparts (Cook, 2015). On average, they also do not yield as much and therefore do not produce as much saleable meat (Brown, 2012).

Having to hold on to stock for longer means profit margins are compromised. These factors mean that beef cattle carrying Jersey genetics or that have clear Jersey markings tend to trade at a significant discount in store markets, compared to equivalent animals exhibiting the markings of more desirable, faster finishing breeds (Cook, 2015).



**Figure 3 Graph of NZ's national dairy herd in breed makeup**

(Beef + Lamb NZ, 2013)

The pie chart shows 11.7% of the national dairy herd is Jersey. Under the current supply chain model, it is not considered economic to finish Jersey calves.

## 6.5 Beef schedule volatility

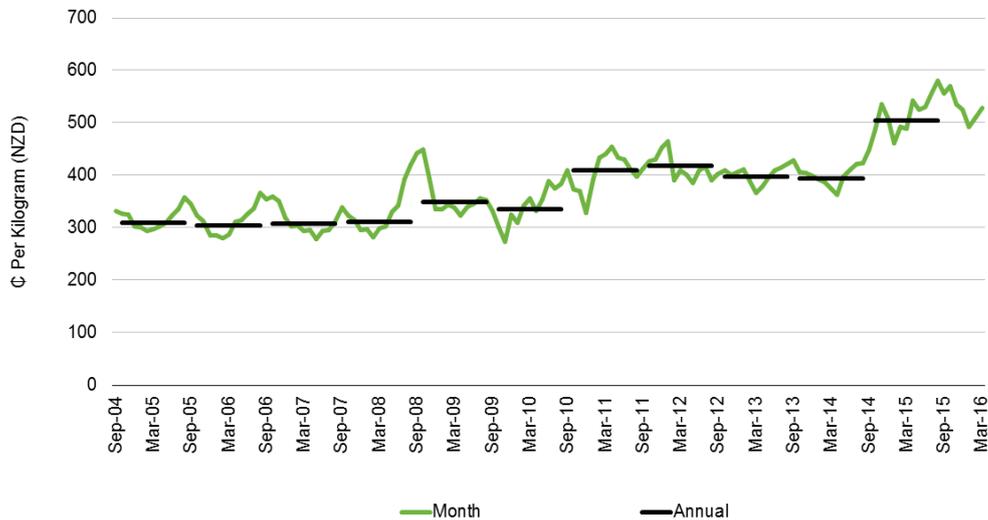
The value of the end product and its volatility is relevant. It demonstrates any opportunities or threats that may be faced in changing the farming system.

The volatility of the store market creates more risk and opportunity for farmers buying and selling regularly on that market, which influences the profit margins (Cook, 2015). The price trends for store cattle are more volatile than meat schedule price indicators.

Store markets are sensitive to climatic and feed conditions. This year, has been a prime example. Prices are sitting very high, due to the expected El-Nino which never eventuated but caused farmers to cull stock early. Then they found they had surplus grass, causing store

prices to go up – a reaction from the processors to try and get stock killed. This is a conclusion made by reviewing B+LNZ new season outlook data.

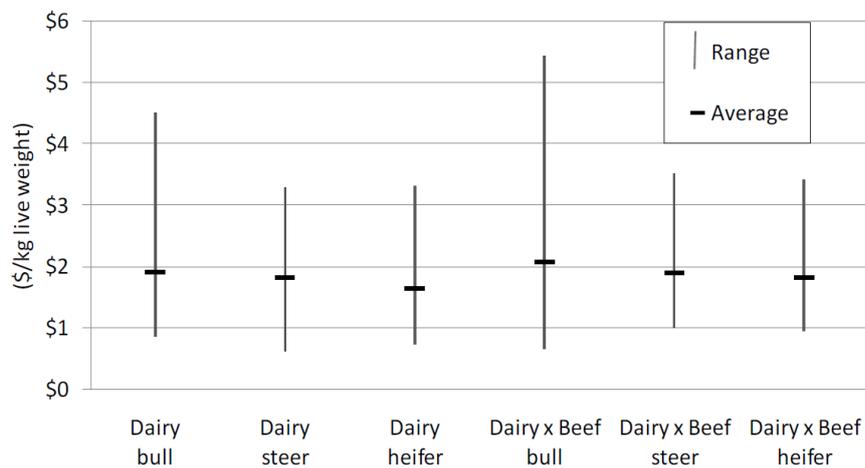
The graphs below demonstrate that the beef schedule in New Zealand has been relatively stable for the past 12 years, compared to other livestock revenue options, such as lamb and milk price indexes.



**Figure 4 Average bull schedule price (M grade 270- 295kg) over the past 10 years**

(B+LNZ, 2016)

The graph below demonstrates there is a variance in the price of weaned calves across heifer/steer/bulls, but the average per kilogram of liveweight is similar.



**Figure 5 Average sale price and range of weaned calves**

(MAF, Dairy Beef Integration value chain, 2012)

## 6.6 Discounts & premiums received for calves

Price received for selling bobby calves is one driver for dairy farmers when choosing how they go about selecting the mating system they are going to use. As discussed previously, premiums and discounted prices are received depending on the breed of animal.

Discounts start at the beginning of the value chain, with significant discrepancies in value appearing in the feeder calf markets (where 4 day old calves are traded and price expectations set for calves traded privately). Bull calves of Holstein Friesian ancestry with white feet and accepted markings can fetch \$100-\$180 (depending on size), while an equivalent calf with colouring that indicates possible Jersey ancestry is regularly discounted by at least 50% on its market value.

Bull and heifer calves from a Hereford sire and a Holstein Friesian dam can fetch from \$120-\$250 and \$100-\$200, respectively. Should those calves feature a coat or markings indicative of possible Jersey genetic influence, the same 50% discount on market value regularly applies (Cook, 2015).

Note that there are significant variations at different markets, even within the same region. This is clear when reviewing the Farmers Weekly beef schedules each week.

The sorts of value discounts described above – based on visual appraisal and assessment – also feature in store market values for cattle at older ages ( 6 months, 12 months, 18 months), though the severity of that discount reduces as animals get older and closer to age of processing. However, the payment schedules available from meat processors (\$ per kilogram of net carcass weight) feature little, if any, breed differentiation – especially for beef destined to be processed in to grinding beef.

Breed premiums are available for Prime schedules for steers and heifers of Angus or Hereford origin. These premiums (typically 10c/kg above the published schedule price) are generally driven by brand programmes set up for specific markets and or contracts and are rarely for products traded on the open market (Cook, 2015).

## 6.7 Value of Wagyu cross

Putting Wagyu over dairy cows was an option investigated, as it was seen to have potential to add value to bobby calves.

The Wagyu breed has been in New Zealand since 1992, with genetics being imported from Japan (originally through USA and Australia) with additional imported Japanese genetics from international Wagyu stud breeders. In some countries, Wagyu is a delicacy, renowned for its fine marbling and flavour (Firstlight Foods, 2016).

At top Japanese markets, it can sell for as much as \$900/kg. More regularly, top-quality Wagyu beef fetches about \$120/kg and costs up to \$62 for a 100g steak (Dunn, 2003).

Fullblood and crossbred Wagyu beef is sold internationally as a superior product with F1 (first cross) at least equalling USDA prime beef grading without any special treatment. Wagyu beef is renowned internationally for its eating quality. Highly marbled beef with excellent tenderness and flavour, Wagyu beef is a favourite in high-end restaurants throughout the world. Wagyu beef is graded by marbling and purity of genetics, with grades from 1 to 9 – 1 is not very marbled, while 9 is highly marbled (Wagyu NZ, 2016).

To be accepted by Firstlight Foods, Wagyu must be graded 4 and above; 4 to 6 is premium grade and 7 to 9 is gold grade (Galloway, 2011).

Wagyu is known for calving ease and lower birth weight calves. Average birthweight in fullblood Wagyu is 32-33kgs, with a range from 22-37kgs and extremes of 19kgs and 40kgs (Wagyu NZ, 2016).

Studies are currently being performed in New Zealand for gestation length in crossbred animals through progeny test trials. The reported gestation length is 283-287 days for fullblood Wagyu. F1 gestation length has not yet been fully researched in New Zealand (Wagyu NZ, 2016).

Wagyu beef animals are slow to mature and require intensive management to achieve the requisite marbling outcome (Galloway, 2011).

After completing the interviews, it was clear that some farmers are very happy with Wagyu-cross stock and the premiums they are receiving. Premiums have been going up every year, starting at 80 cents the first year, \$1.20 the second year and hopes of \$2 above schedule in coming years (Gerard Hickey, Firstlight Foods, personal communication).

For many farming systems, this was not enough to justify the extra time stock had to be on the property, compared to a Friesian cross Hereford, for example. However, if sires with faster growing genetics can be sourced, this could be a viable option for more farmers. If the milk pay-out remains down and beef prices remain relatively high, this option looks more attractive for the whole supply chain.

## 6.8 Value of sexed semen

Coming out of the interviews, many dairy farmers saw sexed semen as the number one game changer for the industry, because it can significantly increase the genetics in their herd for milking attributes. This would have significant effect on bobby calf production.

Gender selected or sexed semen has been commercially available to the dairy industry for almost a decade (Hall J. B. & Glaze Jr, J. B., 2015). However, sexed semen has only recently become commercially available. The availability of sexed semen and concerns about success of the technology has limited its use (thisisdairyfarming, 2015).

There are a number of advantages for dairy farmers of using sexed semen:

- Expand their business by producing more heifers and fewer bulls
- Get more heifers from top genetic merit cows
- Increase numbers of replacements born
- Grow the number of A2 carriers
- Boost the number of heifers to sell to export or domestic markets.

(LIC, 2016)

Recent changes in semen availability and current studies with sexed beef semen are providing insights to the uses, limitations, opportunities and challenges of this technology. This may mean that we see a bigger uptake within the dairy industry (Hall, 2011).

Several large-scale studies in dairy heifers indicate that pregnancy rates are 10% to 20% lower with sexed semen, compared to conventional semen. As typical with lactating dairy cows, pregnancy rates are considerably less in dairy cows than in dairy heifers. Thus the general recommendation that sexed semen should be used preferentially in heifers (thisisdairyfarming, 2015).

The value of sexed semen comes primarily from a greater chance of getting a heifer calf than a bull calf. Where bull calves may be worth only \$50, heifer calves may be worth \$400 (EDIS, 2016). It does however come with some limitations, including a need for straws to be despatched and used daily, as opposed to the standard three-day turnaround for conventional semen (LIC, 2016).

Sexed semen is more expensive than conventional semen. The average premium is approximately \$40 per straw (Debbie Smith, LIC, personal communication).

It is expected that sexed semen will become more cost effective and viable in the future, as technology improves (Hall, 2011).

## **6.9 Value of beef semen**

When interviewing dairy farmers, one of their top priorities is to ensure they have minimal calving problems. This is because calving is the busiest time of the year and losing cows with calving difficulties reduces the profitability.

Calf rearers and beef finishers want stock that come with high growth rate genetics, as this means they can finish stock more quickly and make greater margins.

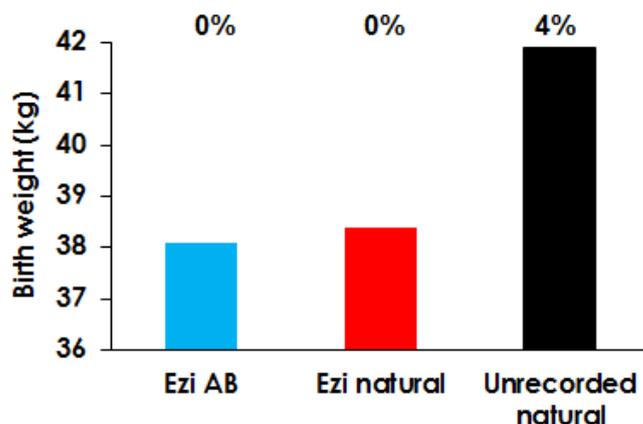
Using a model of the New Zealand beef industry, increasing the proportion of beef "sired" calves in the dairy industry from the current estimated 19% to 29% and reducing the bobby calf kill to reflect those calves being finished adds \$50-60m per year to the beef industry. This is much greater than many other technologies being considered by industry (McDermott et al, 2005).

Beef-cross calves earn a premium of \$100-150 at 4 days old in the North Island – equivalent to the milk cheque from the last month of the season; and \$20-45 in the South Island – equivalent to the milk cheque from the last week of milking (Lineham, 2015).

Most dairy farmers produce from sires of unknown genetic merit, with resulting animals less desirable to rearers and finishers because their potential for growth and meat quality is unknown. New Zealand dairy farmers traditionally mate cows to a high BW AI sires for the first four to six weeks for mating to create herd replacements. The balance of the herd is then mated naturally, with the tendency to mate tail-end cows with Jersey bulls (Lineham, 2015).

A dairy-beef Integration programme was set up to demonstrate the use of sires that meet both of these needs, using "Ezicalve" Hereford bulls, which have good breeding values for calving ease, low birth weights and high growth rates. Low breeding worth cows were inseminated with Ezicalve semen, then followed up with natural mating – a mix of Ezicalve and unrecorded Hereford bulls – and followed the performance of the progeny from birth, through rearing to finishing (Burggraaf, 2016).

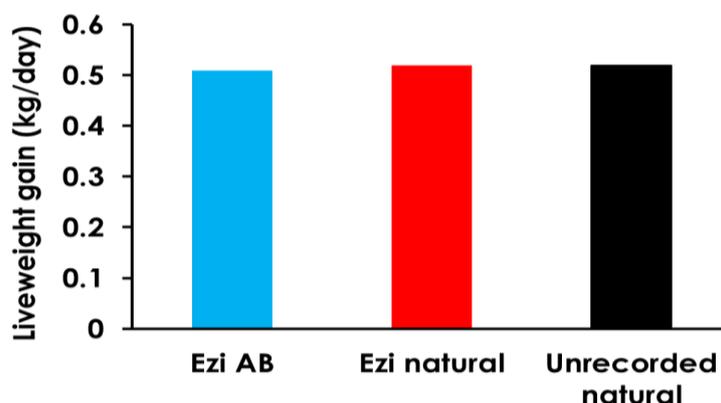
The programme worked on beef calves sired by a proven beef bull that are worth on average around \$70 more than a mixed or straight-bred dairy calf (i.e. average dairy bobby \$50, dairy/beef \$120 which equates to \$70 added value based on last season's figures) (Burggraaf, 2016).



**Figure 6 Graph of the relationship between using Ezicalve genetics and the effect birth weight has on calving ease**

(Burggraaf, 2016)

This graph shows that using easy calf semen reduces the amount of time that cows need to assist with calving, with 4% of cows calved assisted. Calves sired by Ezicalve bulls, whether via AB or natural mating) averaged 3.5 to 4 kg lighter at birth than those sired by unrecorded Hereford bulls.



**Figure 7 Graph of the relationship between using Ezicalve genetics and live weight gained**

(Burggraaf, 2016)

This graph shows liveweight gain during rearing was similar across sire types, growing at about 0.7kg/day. So, despite Ezicalve-sired calves being slightly smaller at birth, they did not take any longer to reach 100kgLW (Burggraaf, 2016).

Around 70% of New Zealand's beef production originates from the dairy industry. Most dairy beef is produced from sires of unknown genetic merit with the resulting animals less desirable to rearers and finishers because their potential for growth and meat quality is unknown (Lineham, 2016).

The main benefits of easy calf and high growth rate semen:

- **Dairy farmers** – easy calving, high quality calves worth around \$70 more
- **Calf rearers/finishers** – faster growing, finish earlier, high carcass value
- **Meat processors** – improved supply of quality table beef

(Burggraaf, 2016)

With a low pay-out, it makes sense for dairy farmers to look at other avenues to make money. This is also helped by the current beef price being higher than normal. Using easy calf genetics with high growth rates that do not affect milk production is a win/win for the dairy farmer – getting a higher price for the calf and the calf rearers and beef finishers also receiving increased profits.

## 6.10 Artificial lactation

Is artificial lactation an option to reduce the number of bobby calves?

There have been several studies over the years attempting to artificially induce lactation in the dairy cow. Induced lactation in non-pregnant cows has been achieved by injection of oestrogen plus progesterone over a seven-day period (Fulkerson & McDowell, 1975). According to Fulkerson & McDowell, “generally, milk yields of cows induced to lactate in this manner have been low and a proportion of cows failed to lactate” (p 183).

Smith & Schanbacher (1973) reported that milk yields of individuals after hormonal induction averaged about 70% of their best previous lactation (McDade, 2015).

It is unknown whether artificial lactation as a result of hormonal treatment would be acceptable to consumers and overseas markets. In general, consumer trends in food tend to be toward more “natural” methods and production strategies (Hughes, 2012). Currently, the EU prohibits meat from animals treated with hormonal growths promotants from being imported into EU member state countries (Ministry for Primary Industries, 2015). The American Cancer Society lists bovine somatotropin as a suspected carcinogen (McDade, 2015).

Due to the animal welfare issues, this option compromises NZ Inc's core values, so it is not considered viable.

## 6.11 Veal production

Veal is the meat of calves. It can be produced from a calf of either sex or any breed, however, most veal comes from young bobby calves. Generally, veal is more expensive than beef from older cattle.

Demand for veal meat is growing globally, but there are still barriers. The trade has suffered because of BSE and the veal industry is mainly a European business – with major producers in France, Italy and Netherlands (Global meat news, 2014).

Richard Brown, director and market analyst of Gira, says the veal market is faced with challenges, particularly in more traditional markets. He notes that it is also said a niche product – fighting for shelf space with other proteins – and is currently struggling (Global meat news, 2014).

The market for high welfare veal in Europe is small but growing. Consumers are starting to understand this is not the traditional white veal produced from calves kept in crates – a system that was banned in the UK in 1990 (Future Farming, 2016).

In 2009, “Good Veal” launched on the New Zealand market. It was New Zealand's first line of home grown Premium Rose Veal, launched by Gourmet Direct. Rose Veal is said to be the latest neat meat on the market. It is high in iron and very low in fat. The animals graze freely to around 6 months of age with their dam, enjoying a natural diet of mother's milk and grass. The meat is tasty, tender and pink (Gourmet Direct, 2016).

There many other calf products . Greenlea – a processor based in the Waikato – sends bobby calf products all over the world. Many edible offal products that are not traditionally consumed in New Zealand are considered a delicacy in other countries. For example, veal tongues are sent to Japan and the Pacific Islands, while hearts are sent to Tahiti and livers to Egypt and the Netherlands. Vells, the abomasum or “stomach” of the calf, are sent to France where they are dried and used to manufacture rennet (Greenlea Bulletin, 2014).

Due to the fact veal is not considered a growth area within New Zealand, it was decided not to further investigate the opportunities that veal and other calf by-products. However, if these products can fetch a high enough margin and if there were larger enough markets to supply, veal could be of huge value to the sector.

## **6.12 Overseas supply chains**

New Zealand calves are mainly produced at one time of the year, in a two-month spring period. This is commonly known as a batch system, or seasonal calving, and is timed to take advantage of pasture as it comes on in warmer months.

Some South American countries, such as Chile and Australia, adopt the same system. It is also part of some Irish systems (Hutching, 2016).

Very few calves are reared for veal in Great Britain, due to low demand for this meat. As a result, a large number are killed shortly after birth (Compassion in world farming, 2016). Dairy farmers (in England) disposed of 80,000 new born calves in 2012. Had they been reared for beef, they would have produced 240,000 tonnes of English Beef (Mole valley farms, 2016). This highlights they have similar issues to New Zealand.

Most other countries with significant dairy industries – such as the United States, Canada, France, United Kingdom, Netherlands and Germany – raise and keep their cows predominantly indoors and feed them on grain or other feed, rather than fresh grass. Therefore they can – and do – have year-round calving. Most calves not wanted as replacements are sent to finishing farms. They do not have the pressure point that New Zealand does of having millions of calves arriving over a short period (Hutching, 2016).

## 7. Findings and discussion

Literature review findings and interviewees' views and opinions were gathered, analysed and presented in this section. Results have been discussed and critically analysed with where they sit on the supply chain and divided up into dairy farmers, calf rearers, beef finishers & processors. Key themes are identified and verbatim quotes have been used to illustrate key points.

Analysis of the supply chain was also done as it is important to understand how this works as any recommendations that are implemented need to fit in with the whole supply chain.

### 7.1 Dairy farmers

It was noted from the outset that any recommendations need to fit in with the dairy farmers' system, as they hold the key to the system working. They produce and sell the initial product, the calf. Dairy farmers make the most critical decisions regarding the genetic make-up of the stock produced for the beef and veal industry.

Why don't dairy farmers make the most of their bobby calves and what are their key drivers in terms of calf policies?

The main factors are:

- **Financial benefit** – In comparison to producing milk, rearing calves and finishing them does not stack up financially compared to using grass to produce milk. Depending on the calf price versus the milk pay-out, bobby calf income could range from 2-14% of earnings before tax, interest & rent.
- **Time & labour** – Rearing calves takes a lot of time during a busy period of year.
- **Lack of infrastructure** – Rearing calves requires a lot of infrastructure and rearing more calves on top of replacements means more yard space and milk feeding systems which is not seen to make more money.

So what are dairy farmers' decisions based on, when mating their cows.

After reviewing the interviews & literature review with the dairy producers, there are five main themes:

1) **Calving ease** – Calving ease is the measure of the ability of the cow to calve down. Economically, ease of calving is one of the most important factors for future profit, especially for first-calf heifers. A high incidence of difficult calvings can reduce herd profitability through increased direct and indirect costs. Direct costs are veterinary fees, cow or calf death and extra labour. Indirect costs are not as clear cut, but include decreased reproductive performance, milk yield and calf health, as well as a reduced future productivity of the new born.

2) **Gestation length** – Dairy farmers know that the more days cows are in milk, the more profitable their business. They look for genetics that can increase the lactation length of their cows.

3) **Value of product at the end** – Bobby calve sales contribute a very small portion of a dairy farmers' income, so any decision made around calving (i.e. sires used) is based on maximising milk production. According to previous work done on dairy-beef integration chains, it takes between \$30-\$50 extra per bobby calf for a dairy farmer to consider changing his/her behaviour – and the change must not negatively affect other factors mentioned above.

4) **Trust** – This was also mentioned many times through the interview process. Dairy farmers want to be sure that the bulls/semen they are putting over their cows will result in calving ease, while maximising milk production.

5) **Time** – A huge limiting factor. Traditionally, the calving period is the busiest period of year for dairy farmers and is when they feel most under stress and have less disposable time.

This quote summarised many of the dairy farmers' attitude towards bobby calves:

***“My main aim is to produce milk. Meat production and bobby calves are secondary to that. However, any extra income through calves would be great – as long as it did not compete for my resources of producing milk.” – Dairy farmer***

Dairy farmers also indicated that the use of sex semen would be of huge value to them. Benefits of the use of this technology are highlighted in the literature review.

It is anticipated that we will see sexed semen come into the industry, as technology improves, the cost comes down and the viability increases as found from the literature review.

This quote was taken from the LIC website, it summarises the current attitudes on sex semen which came out of the interview process.

***“It's a more expensive option than a conventional semen straw, so it's not for everyone, but many farmers have been quick to work out the financial benefits from the increased investment, and how it can help them achieve their business goals faster.” – LIC website***

To conclude this section it was found there are always going to be bobby calves, unless their value increases enormously. Landcorp has investigated a zero bobby calves policy, but consider it unviable at this time. But there is a belief the industry can do a lot better by implementing practices identified in the conclusions and recommendations sections of this report.

## 7.2 Calf rearers

It was found calf rearers are not in a strong position, as they are predominately price takers and struggle to offer incentives to dairy farmers.

Calf rearers typically purchase calves directly from dairy farms or purchase at local sales yards. Prices can range from \$40 to \$400 for a 40kgLW calf.

Calf rearers prefer beef-cross calves because these calves are more valuable to the beef industry. They typically have a faster growth rate as a calf, and grow better post-weaning than pure dairy breeds. Rearers also perceive beef-cross calves to be hardier than Friesian calves. The beef-cross calves offer greater flexibility in end-use – male calves can be grown as bulls or steers; heifers can be grown for finishing or used within beef breeding herds. Because the calves are more valuable and offer flexibility, the sale price for weaned calves is typically higher than for Friesians, sometimes by more than \$100/head. The level of this premium varies considerably around the country.

However, rearers are sometimes wary of rearing beef-cross calves. The purchase price can be too high and there is no guaranteed premium at the time of sale. This is especially the case if they do not have a contract with a finisher. Some rearers have difficulty sourcing sufficient calves to make a saleable line of weaned calves. Furthermore, many beef-cross

calves become available too late in the season, because they are largely from cows naturally mated to a “beef-type” bull. This makes them difficult to sell because they will most likely require a second winter to finish.

The four main factors which influence calf rearers and/or finishers when purchasing stock:

- 1) **General health** – It is important stock are of good health and don't show any signs of checks from disease or any other stresses i.e. scours.
- 2) **Frame** – Calves with larger solid frames tend to grow into bigger animals with greater potential to make higher margins.
- 3) **Markings** – Producers look at the patterns on the calves as this gives an indication of genetic potential. For example, a Friesian mated with an Angus has different markings than a Friesian crossed with a Jersey.
- 4) **Price** – Farmers want to make sure they can make a margin on the animal being purchased. This price can change seasonally and is largely governed by the schedule processors are offering at the time.

This quote was taken from an interview. It illustrates the lack of collaboration in the supply chain and the fact calf rearers don't believe they are getting their fair share of value when selling their stock:

***“I have a vision of a cartoon drawing of two guys holding a box of Speights underneath each other's arm. One of them a calf rearer, and the other a beef finisher, with the caption “Let's make this fair for the both of us”. It's clear at the moment the value chain is imbalanced and if it keeps going like this, there will be no calf rearers left”. – Calf rearer***

### 7.3 Beef finishers

Beef finishers target dairy-beef cross cattle because they are earlier maturing (with a higher growth rate than pure dairy cattle), achieve a higher meat yield and produce better quality beef. These cattle also offer the finisher greater flexibility as stock finished early generally means there are greater opportunities with markets these animals can be sold into. Beef-type cattle can also tolerate harsher conditions than dairy-type cattle.

However, just like rearers, finishers are sometimes cautious of dairy-beef cross calves. Their greatest concern is whether the weaners are “true to label”, reflecting the possibility of the weaners having Jersey genetics or a low growth rate sire. This illustrates the lack of information supplied from farmer to farmer.

Other concerns include the dairy-beef cross calves being younger than Friesian bulls, therefore requiring a second winter to finish as steers. Furthermore, there is often no price difference at the time of slaughter between bulls and steers, with the price based on carcass weight, not meat yield.

Finishers are looking for the same thing as calf rearers: because the finishers dictate their needs to the rearers. They are looking for healthy animals with good frames and good markings – at the lowest purchase price possible.

A great quote which summarised a key theme:

***“You can't beat buying good stock at the start. There is no point in trying to save money by buying cheap, lesser quality as they will cost you more in the long run” – Calf rearer & beef finisher***

The use of sale yards can sometimes create a distortion in prices. It was mentioned by multiple interviewees that the sale yards create an “emotional” buying of cattle. This is important to note, as people are not necessarily paying the true value of stock. For example, bigger established farmers were able to outbid new and/or smaller farmers, pushing the price of stock up. It was also discussed that farmers loved going to the sale and getting a bargain. This often meant that sellers of the stock were selling for less than the cost to produce the stock to that point.

***“Selling stock through the sale yards is a flawed concept, in that farmers don’t actually pay the market value. The aim of the game is to look after yourself and not everyone in the value chain.” – Beef processor***

This was the case this year. Calf rearers found it hard to sell stock with the predicted El-nino. There are several factors that can change the price and buying pattern of farmers and processors, which can affect a lot of farmers – especially farmers with low resilience in their system (for example, if they have a high debt to equity ratio).

Another issue that was highlighted through the literature review was that with the way the current supply chain works, most farmers do not know the genetic heritage of the stock they are purchasing let alone the property they have come from. This is because most stock are bought through the sale yards and or through stock agents. There is a lot of guess work when purchasing calves at either 40kgLW or 250kgLW.

It was found through the interviews a lot of dairy/dairy support farmers are using a programme called MINDA which is said to “identify profit making and profit taking animals”.

According to the MINDA website, it:

- Makes better management decisions
- Increases profit opportunities
- Increases farm productivity
- Increases market options for livestock
- Improves herd genetic progress
- Develops a strong audit trail for traceability.

(LIC, 2016)

MINDA also has the ability to record:

- Liveweights
- Sales
- Health treatments/vaccinations
- Purchases
- Deaths
- Matings
- Birthing

(LIC, 2016)

When interviewing LIC on the potential of using MINDA and the ability to cross this over into the beef industry, they said they had looked into this and recognised that it had potential to add value to the beef industry. This technology is currently predominantly used by dairy farmers for replacement heifers. LIC did not think that there was enough demand to justify producing a product at the moment but did recognise this as a huge opportunity. By changing the current supply chain structure as suggested in further sections would make this more viable.

## 7.4 Processors

Processing has historically been shaped by the supply of stock from farms. (Red Meat Sector Strategy Report (RMSS), 2011). New Zealand expects a high standard of product and stock must be received at the processing plants in the cleanest possible condition. It is the producer's responsibility to ensure that livestock are presented in accordance with the livestock presentation policy.

All companies audit the entire production system of a proportion of their suppliers each year. The main areas that they focus on are listed below. Any changes would need to allow producers to still maintain these high standards.

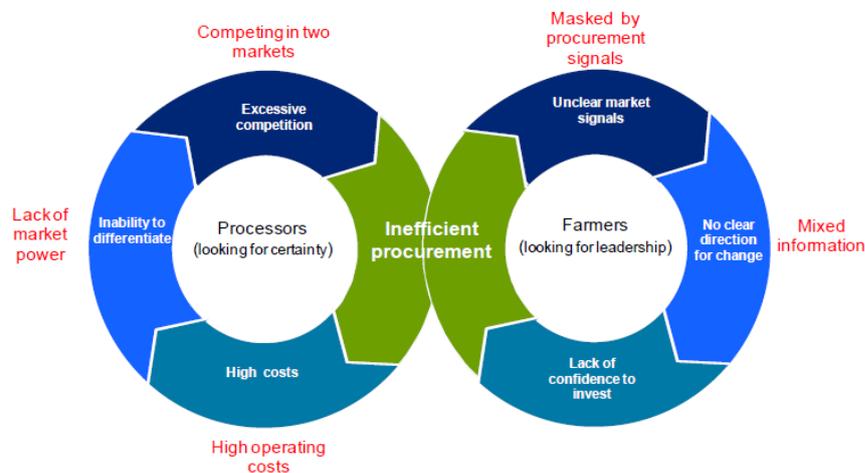
The key challenges for processors (backed up by the RMSS report) are:

- An ability to accurately link production to market demands
- A large, uncoordinated producer group which does not guarantee supply
- Seasonal supply of stock and demand of product changing throughout the year
- A lack of communication from the producers.

A key theme from the literature review and from talking to processors is summed up in this quote from the RMSS report:

***"The key need for processors is certainty of supply to empower them to programme their activities and maximise the value of each component of the animal."*** – Processor

This chart shows how both the needs of the processors and farmers work against each other.



**Figure 8 Current procurement model highlighting inefficiencies**

(RMSS, 2011)

The chart demonstrates the need for a more aligned approach and better information from the farmers – and also the processors feeding back their requirements. (This is discussed in the next section.) Processors have been reluctant to offer long-term price contracts for the supply of finished cattle, because they see the price from conception as a very high risk. This leaves the finisher having an important role in driving change, by communicating the genetics they require to the calf rears and dairy farmers.

## 7.5 Balancing the supply & value chain

After reviewing the key drivers/opportunities for each party within the value chain, it is clear the chain is unbalanced and segmented. No one knows the real price that they are going to achieve when selling bobby calves into beef finishing.

When questioning farmers on what industry structure would be sustainable, it was generally agreed that a more transparent and functional model would be a better fit.

However, this did not reflect everyone's views. It would not be in everyone's best interest to change the current model. Especially from the beef finisher's point of view: they rely on people making poor decisions to make money, by having to sell stock cheap. When looking into B+LNZ Economic Service data and having conversations around key drivers of profitability for the top farmers, making important decisions at the right time is a key driver.

The interviews highlighted Calf rearers would benefit from having a more guaranteed price, as they do not make money by trading stock in the same way that beef finishers do.

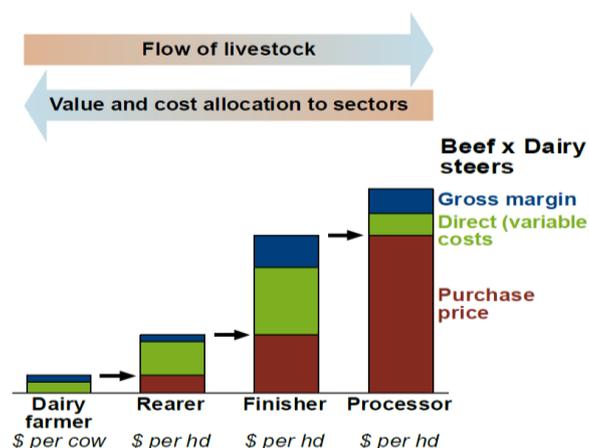
Key reasons identified as to why there is a segmented value chain are:

**Dairy Farmer** – No real motivation to produce a valued calf, as their primary driver is to produce milk cost effectively.

**Calf Rearer** – Price taker and the most sensitive part of the supply chain, with a lot of rearers' profit fluctuating each year and many struggling to make sustainable profit margins.

**Beef Finisher** – Volatility in the price that they are paying to purchase stock and the price they receive when selling stock.

**Processor** – Has no guarantee of supply and is open to external market pressures.



**Figure 9 A typical example of the proportion of margins and costings across the supply chain**

(MAF, Dairy Beef Integration value chain, 2012)

The above table shows the distribution of margin across the value chain. Because there is so much volatility and no guarantee in supply, this structure is unpredictable and difficult for farmers and processors to accurately plan and budget around.

This quote which came out from the interviews and represents many people's feelings towards the current industry structure:

**“It is a cannibalistic structure. Everyone is trying to get a piece of the pie which is killing some farmers. If there is plenty of grass around, farmers are trying to buy cheap stock off other farmers that have to sell. If there is no grass around when farmers need to sell, the processors drop the price killing some farmers. Where is the profitable supply chain in that?” – Beef & sheep farmer**

Having a more transparent supply chain would make it easier for farmers to make more informed decisions at the right time.

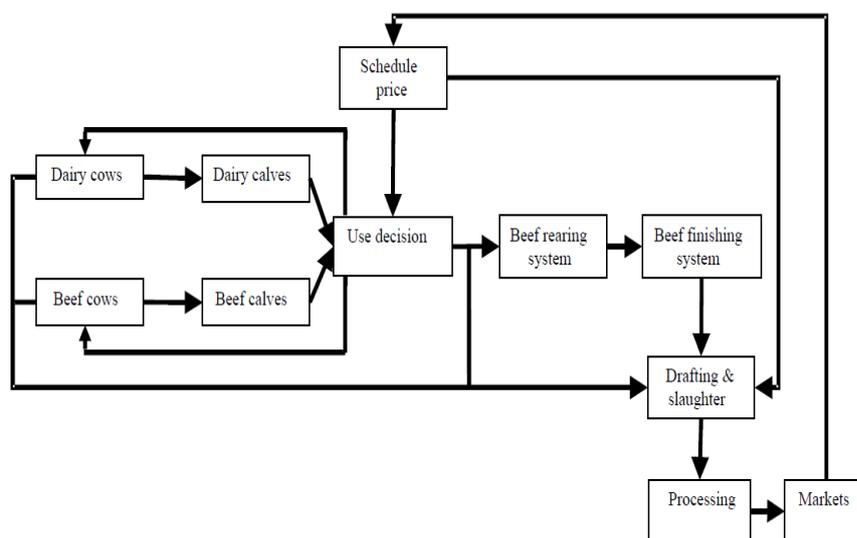
The quote below came out of an interview with a processor. It illustrates the poor communication from processor to farmer, making it hard for everyone to understand what they are working towards.

**“Meat processors typically try to tell farmers as little as possible. I don't think this is going to change overnight, but will be a generational change.” – Beef processor**

After completing the literature review and interviewing people involved in reviewing the red meat sector structure, it was obvious that – to be successful in enabling change – it is crucial that the strategy is owned by all sector stakeholders. Each sector stakeholder has a role to play and is needed to enact the change. The sector needs informed and aligned behavioural change:

- **Informed** – Participants have information, enabling timely decisions, risk management and increased certainty of outcomes.
- **Aligned** – Each participant needs to understand their supply/value chain partners' strategies so their efforts are not wasted through a misalignment of what each participant is trying to achieve.
- **Behavioural change** – Each sector participant needs to do things differently if they want change to happen. This will mean behaving differently and supporting those who can also be seen to be behaving differently.

(Meat Industry Excellence, 2015)



**Figure 10 Conceptual model of how NZ beef industry currently operates**

(McDermott, 2005)

The model shows flows and feedback loops in our current system and that there are no real relationships across the supply chain, making it inefficient. Furthermore, farmers and processors are not well informed.

When comparing the current supply model (above) to the Firstlight Foods model, many people believe Firstlight Foods marketing model is one the entire meat industry should emulate. The idea is that the company is closer to the end users. It builds relationships and has farmers visit the market, while overseas buyers come to New Zealand to look at farming and processing. The farmers are 50% shareholders in the venture. The other 50% is held by Firstlight Foods.

The benefits would be:

- Increased ownership and accountability by farmers
- Increased transparency for farmers and processors
- Better long-term supply focus
- Stable long-term pricing
- Improved breeder/finisher relationships
- Ability to track genetics across the chain
- Increased communication from farmers to processors.

The model is more of a “profit partnership model” – between the dairy farmer, calf rearer, beef finisher and processor. This allows more certainty for all parties, stimulates more trust and fosters better relationships – something that is lacking in the current supply chain.

This model could not work for the whole industry, because there is still a need for trading stock; farmers like to make money by selling through sale yards. But changing the supply chain model over a proportion of the industry – while still allowing flexibility for some trading – would be a positive step towards extracting more value out of bobby calves.

Silver Fern Farms had a similar contract to Firstlight Foods, which was known as the Backbone Prime Beef contract which was well received by farmers. Silver Fern Farms owned the livestock and farmers were paid a weekly rate. This contract is no longer running as the banks were not comfortable with SFF having so much money tied up in livestock through tough times. However this optioned freed up significant capital for investment in other areas of the business for farmers including on-farm improvements, expansion and debt reduction.

Other benefits:

- A guaranteed supply removes the volatility of competing for stock on the open market
- A guaranteed market mitigates risk of fluctuating schedule prices
- All steers are monitored and recorded for health and growth status
- Steers enter the growing and finishing phases with a certified health status and proven growth rates thereby eliminating poor performing steers
- Independent party to weigh and record stock if required
- Provides long-term planning options for crop rotations and regressing
- Provides certainty for budgeting purposes
- Allows the focus to be placed on growing the grass to feed the animals, because all marketing decisions are taken care of
- Silver Fern Farms pays for transport costs and processing levies.

(Silver Fern Farms, 2012)

If more of these models – like Firstlight Foods and Silver Fern Farms – were implemented, it would be of significant benefit to the industry. It would provide a lot more certainty for all parties and reduce or eliminate many of the weaknesses in the current supply chain.

## 7.6 SWOT analysis of the New Zealand dairy beef industry

A SWOT analysis was developed from the literature review, interviews and the discussion above. This was done to highlight strengths, weaknesses, opportunities and threats that exist in the current supply chain. This is important to understand as any recommendations that are implemented need to embrace and build on from what the industry currently has in place.

### *Strengths:*

- Existing processor infrastructure and well established value chains
- Opportunity to create significant value from underutilised bobby calves
- A lot of rearing infrastructure in place
- Less market volatility than many other livestock grazing options
- Industry good organisations which promote best practice.

### *Weaknesses:*

- Variation in profitability/margin at different points in the value chain
- Significant market prejudices and stigmas towards beef animals sourced from dairy genetics
- Excessive competition with processors
- Seasonal variation in supply of stock
- Adoption from dairy farmers, given beef income represents only around 6% of dairy farmers' total income
- Limited scale to grow (restricted land area, competing land use options)
- Ability to link production to market demands

### *Opportunities:*

- Add much more revenue to an existing by-product or resource
- Scale higher volumes through existing channels
- Global forecasts and outlook for beef consumption promising
- Technology uptake like sexed semen & beef genetics
- Create a feedback loop from customers back to the producers
- Even out the supply from producers to processors
- The integration of more beef genetics into the supply chain.

### *Threats:*

- Other land use options
- Publicity/reputational risks for dairy industry around management of newborn calves
- Volatility with the profitability of the dairy and beef industry and the effect this has on different practices
- Biosecurity risks to the sector.

The SWOT analysis illustrates the complexities of the industry and why there is currently a lack of cohesion, this has been highlighted in many sections of this report already. The opportunities for the sector are enormous and are expected to be of huge monetary value to our economy if we can keep improving it.

Weaknesses can be turned into opportunities overtime by implementing practices discussed in the next section, this will also minimise the threats. Threats such as reputational risks will decrease with a more transparent and profitable supply chain model; this will also reduce the amount of land use change. The current supply chain also has plenty of strengths which lays a platform to utilise the opportunities that present them self now and in the future.

Understanding the supply chains enables for more realistic conclusions and recommendations to be put forward, these are discussed below.

## **8. Conclusions**

This section summarises the key conclusions which could be implemented within the supply chain, this has been derived from the previous discussion. As stated before there are a number opportunities within the sector and there is not just one "game changer" which is expected to improve the industry over night.

### **1) Use of sexed semen over the dairy herd**

The use of sexed semen will be the biggest foreseeable game changer for dairy farmers. This has the significant benefit of all replacement progeny coming from their top 20-30% of cows. The two reasons that sexed semen is not widely used in New Zealand is cost and lower conception rates, compared to non-sexed semen.

It is anticipated that we will see sexed semen come into the industry, as technology improves, the cost comes down and the viability increases.

Many farmers said that, if the cost was lower, they would put female straws over their top cows and be prepared to look into beef semen over the rest of their herd or continue the current practice of a follow-up bull. But being cost effective is key and should be continually researched and developed by companies or organisations, such as LIC and Dairy NZ.

### **2) Use of beef genetics over the dairy herd**

The dairy beef-integration project found it is profitable for the whole supply chain, if easy calve beef genetics are used over dairy cows. We have seen, anecdotally, this year an increase in beef semen used over dairy herds, possibly driven by the low milk price forecast and higher beef prices. It is expected that calve sales and beef production of cull cows will make a larger proportion of dairy farmers' income next year. We found there was a lot of stigma around using beef sires, due to stories of farmers having to calve a lot of cows with large calves. However, if these bulls were probably not selected on their genetic merit for easy calving.

Based on both the interviews and literature review, the use of beef semen is expected grow organically as more farmers become aware of the potential increase in profitability. Industry stakeholders – such as Dairy NZ, B+LNZ, LIC and meat processors – have a part to play, making farmers aware of these options.

### **3) Profit pathway supply chain**

The interviews revealed a clear theme – that the whole supply needs to change if we want to make it profitable for all parties. A profit pathway supply chain would be of great benefit and create better relationships across the industry.

This would not suit the whole supply chain, as there is still a need for trading. There are huge seasonal variations within New Zealand which make guarantee of supply of stock too specification difficult. However, a profit pathway supply chain would allow for more

informed, aligned behaviour change, which is needed to maximise and grow out more bobby calves.

#### **4) Feedback on stock performance through the supply chain**

Beef producers are buying calves on markings, frame size, general look, health and price. This is all done on guess work and experience with no known true indicators used. Beef producers talked about using high genetic merit stock – which comes back to the use of beef genetics with high growth rates – but being able to trace genetic merit and have a feedback loop on which stock are doing well.

After interviewing dairy farmers, calf rearers and beef finishers, most agreed that having a feedback loop and being able to use a programme which produced a liveweight report that showed animals growth rates and predicted individual liveweights based on their genetic parentage would advance the sector. They could select from animals with high growth rates and those more efficient at converting feed to liveweight. MINDA is a system currently used with monitoring dairy heifers which could be adapted to be used in the dairy beef industry.

#### **5) Increased education across the supply chain**

Options that have been identified above will need to be extended out to farmers in order for them to be up taken and implemented. Organisations such as B+LNZ and Dairy NZ are in the perfect position to do this. They are considered to be industry good bodies as they do not sell any products or services but, do have a invested interest to make sure the dairy beef sector is profitable and sustainable for future generations. They should be leading the development and conversations for such tools and practices to be implemented across the supply chain.

## 9. Recommendations

There is huge potential for New Zealand to increase its ability to turn excess calves from the dairy industry into a valued product.

Lifting the value of bobby calves would see a large increase in the numbers reared if this was reflected by an increase in the beef schedule.

Implementing change will be difficult, but not impossible. All farmers across the industry have different drivers, so it is hard to come up with a recommendation which will suit all producers and also fit in with processors expectations and resources.

However, there are several options that could be implemented:

1. More guaranteed pricing structure through the whole value chain
2. Increased use of beef genetics and sexed semen across dairy herds
3. An integrated dairy-beef supply chain which is a "profit partnership", where everyone captures the value of the end product
4. Uptake of a tool which measures beef performance through the supply chain to allow a feedback loop.
5. Increased education to producers on available options.

To implement these changes, there is need for leadership and education in the industry. This needs to come from everyone across the sector – from the farmers to industry leaders such as Dairy NZ, B+LNZ and processors.

The dairy farmers are the start of the value chain, so it is critical that any options implemented are easy for them and do not affect their primary objective of producing milk at the highest margin possible.

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# 11. Appendix

## Interview questions – Dairy farmers

What is your current policy for your calves?

What returns would you like to see returned out of your calves and how do you think this can be achieved?

What are your limitations with holding onto your calves?

What opportunities do you see that could be utilised to add value to your calves?

What opportunities do you see in other countries that you think we could utilise?

Why or why not do you think having a relationship with a beef farmer or calf rear would be of benefit?

What different options have you investigated when reviewing your calf policy?

What opportunities or pitfalls do you see with the use of sexed semen?

What opportunities or limitations you can see to maximising value out of your calves?

What are your key values you work to when thinking about your calf operation?

What are your main barriers for changing your system?

## Interview questions - Calf rearers/beef farmers

What is your current policy for your calves?

What different options have you investigated when reviewing your calf policy?

What returns would you like to see returned out of your calves and how do you think this can be achieved?

What are your limitations with holding onto your calves/bulls?

What opportunities do you see that could be utilised to add value to your calves/bulls?

What opportunities do you see in other countries that you think we could utilise?

Why or why not do you think having a relationship with a beef farmer or calf rear would be of benefit?

What opportunities or pitfalls do you see with the use of sexed semen?

What are your key values you work to when thinking about your calf/beef operation?

What are your main barriers for changing your system?

## Interview questions- Processors

What is your current policy with the calves that you process?

What returns would you like to see returned out of your calves and how do you think this can be achieved?

What opportunities do you see that could be utilised to add value to your calves/bulls?

Why or why not do you think having a relationship with a beef farmer or calf rear would be of benefit?

What opportunities do you see in other countries that you think we could utilise?

What opportunities or pitfalls do you see with the use of sexed semen?

What are your key values you work to when thinking about with your calf operation?

What are your main barriers for changing your system?