



## New crops for Southland:

An analysis of the oat milk value chain and potential business models as an exemplar for Southland

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Prepared for:

Thriving Southland

14<sup>th</sup> July, 2022

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## AbacusBio

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# Executive summary

## Project purpose

The purpose of this project was to assess the opportunities for new crops in Southland, using oat milk as an exemplar. This entailed comparing land-use options, building a “New Crop” assessment tool, analysing the oat milk value chain, determining ways to increase margins throughout the value chain, assessing business models and analysing successful primary sector companies as case studies.

## Land-use comparison

The findings from the land-use comparison (economic farm systems modelling - EFS) showed that there is unlikely to be large-scale land-use change for oat milk production in Southland based on today’s returns and the amount of land required for oat milk production:

- The returns to oat growers (spring oats EFS \$800/ha), compared with returns from other crops (spring barley EFS \$1000/ha) and from dairy (EFS \$5120/ha);
- The land needed to produce a litre of oat milk is ~80% less than that required for a litre of cows’ milk.

This is not to say that disruption isn’t coming and it’s important to look beyond today’s returns.

## Drivers of change

Environmentally, oat production does stack up well against ruminant farming and there is increasing social and community pressure driving land-use change. One of the farmers in our workshops stated that most farmers “have one life cycle,” in other words, they have one big drive or change in their career. The next generation of farmers will have different perspectives and different social and financial drivers – perhaps it will be with this group that opportunities, like growing plants for milk production, take flight. Such change will be more likely to come about after a significant shift: this could be in the regulatory environment (making dairying less attractive) or a market shift away from dairy products to alternatives, and/or a significant improvement in returns for cropping farmers through more value creation in the value chain.

## Oat value chain

Our analysis of the oat milk value chain showed that margins were relatively slim across the value chain, particularly after the supermarket margin of 32% was taken into account (based on a \$4.35 per litre price to the consumer). It is also likely that larger food processing companies will enter the oat milk game and compete on price, placing downwards pressure on oat milk margins.

For this reason, it is essential that innovation, differentiation, quality, and cost-effective manufacturing is part of the equation for Southland oat milk.

## Capital investment

A key challenge for any new industry is investment in capital-heavy infrastructure when revenue streams are non-existent or small. The scenario playing out for Southland is that of the building of New Zealand Functional Foods’ contract manufacturing facility. If this comes to fruition, oat milk brand owners will be in a better position to manage costs and quality of product.

The existing oat milk companies have demonstrated that there is demand for oat milk products locally, and potentially there is greater demand and value creation in innovative new plant-blend milk products, such as hemp and oats, or peas and oats. The building of a manufacturing facility is time-critical if value-brands are to be built before such milks become commoditised. The manufacturing facility also needs to be adaptive to continuous innovation, as new products will need to be developed to avoid the “race to the bottom.”

## Business models for farmer involvement

The “Book End” concept as a business model, in relation to oat milk, is compelling: product innovation and brand building at one end, and at the grower end, an evidence-backed environmental story – Zespri and the AllBirds/MerinoNZ model are great exemplars.

Product to market channels are changing quickly. Growing subscription models and direct to consumer selling platforms offer interesting alternatives to traditional wholesale supermarket models. How this is managed will need exploration, to optimise returns throughout the value chain.

The international trends around functional foods and beverages and personalised food and nutrition add to how the production stories and product innovation play out – the opportunities here are significant and fit with New Zealand's strengths in agriculture and science.

During the course of this project, we were able to meet with a Southland iwi representative and a follow-up Kaupapa has been arranged (outside the timeframe of this project). This is an exciting proposition in terms of long-term thinking about land-use, community, and commercial opportunities. There are good prospects for iwi-private-regional collaborations to be supported by the crown.

## Conclusion

Oat milk production will not be a silver bullet for the Southland region in terms of large-scale land-use change and return for farmers, unless there is significant investment in the whole value chain, from production, through manufacturing, to innovation and brand. How this plays out against a backdrop of record dairy prices is hard to predict, recognising that innovation is often driven by necessity - poor returns.

There are signs of disruptive forces in the food and agricultural industries, and we should be inspired by companies such as AllBirds and Zespri, and by the needs of future generations, to invest and be brave in face of the unknown.

## Project purpose

- To determine the feasibility for a profitable oat milk value chain in New Zealand;
  - Incorporating an assessment of existing land-use options with oats;
- To explore opportunities for differentiation of Southland oat milk;
- To explore business models for taking oat milk products to market;
- To develop a tool to assess the potential of other new crops/value chains in Southland.

## Our approach

This project has been multifaceted and as a result, this report pulls together several workstreams and refers to the documents and spreadsheets below that formed the whole project and contributed to the conclusions formed:

- Oat milk value chain literature review (separate document);
- Economic farm surplus model for comparing farm systems (summarised in this document);
- “New Crop” model, a tool for evaluating new crop options in Southland incorporating the “Our Land and Water 6-dimension framework” (separate document);
- Interviews with project participants;
- Oat milk value chain analysis (this document);
- Business model analysis and options (this document).

This project has been supported and co-designed by a farmer working group which has meant changes to what was initially planned, moving the emphasis from on-farm production and environmental assessment to value chain assessment and evaluation of different business model options for oat milk products. The rationale for this was that farmers understood the environmental impact of oat milk in terms of nitrogen and carbon footprint (as was first analysed) and were more interested in how to evaluate the value chain in terms of creating more value for the end-product and for producers.

## Acknowledgement of contributions

The authors of this report wish to acknowledge the contributions of many in the wider industry who were involved as part of the farmer working group or interviewed.

### Farmer Working Group

- Neil Gardyne, cropping, sheep and beef farmer, Southland;
- Grant Campbell sheep and cropping farmer, Southland;
- Jon Pemberton dairy farmer, Southland;
- Alistair Hunt cropping farmer Southland;
- Chris Withy, dairy farmer, Southland;
- Ross McKenzie, dairy farmer, Southland.

### Interview participants

- Adrian Russell, Plant Research (NZ) Ltd;
- Ivan Lawrie and Turi McFarlane, Foundation of Arable Research;
- Justin Riley, New Zealand Functional Foods;
- Steve Canny and Mary-Anne Webber, Great South;
- Maria Bartlett, Te Ao Marama;
- Henry Hawkins, Harraways;
- Tim Ryan, Otis Milk;
- Megan Maw, Boring Milk.

We also acknowledge input from Richard Christie, in his role as the project manager (Christie Consultants).

# Oats in Southland

The total amount of oats grown in New Zealand is estimated to be 12,000T grain oats and 10,000T of general feed oats (2020 data<sup>1</sup>).

Southland provides an ideal climate and soils and is the main oat growing region of New Zealand with the region producing ~50% of total oat production in 2017<sup>2</sup>.

A classification of Southland soils shows that 10,700ha are suitable for oat production (high versatility for production potential and management) however, much of this class of land is in high competition with dairy production (more detail is provided in the literature review document).

## Farm financial and environmental analysis

Cropping offers opportunities to reduce environmental impact (N-loss and GHG emissions) compared to livestock farming and could be considered part of a solution to meet regulatory requirements on farm. However, this is only likely to occur if there is a significant improvement in environmental outcomes with marginal change in farm profit, or with considerable regulatory changes.

In a modelling exercise incorporating oats into a dairy system in Otago (7% of milking platform sown in oats) showed that N<sub>2</sub>O-loss (nitrous oxide) increased by 2% and methane production increased by 1%<sup>3</sup>. However, the model was built around spring-sown oats and from our modelling we show there is greater environmental benefit within a dairy system from autumn-sown oats.

Financial and environmental modelling done in this project, was used to compare the impact of different land uses. In this case we used economic farm surplus (EFS) to measure farm profitability between farm enterprises. EFS is the gross farm revenue, less operating expenses, where non-cash adjustments have been made to ensure that businesses are being compared on an equivalent basis. How the business is financed is not included, leases for animals/land and debt-servicing are excluded from calculations. The variation of EFS across the different enterprises on land that would be suitable for growing oats is shown in Table 1.

Table 1. Alternative land use economic farm surplus (EFS), assumptions made in the modelling are outlined in Appendix 1.

|                     | Dairy    | Winter grazing | Spring Barley | Spring oats | S&B Finishing |
|---------------------|----------|----------------|---------------|-------------|---------------|
| Farm income (\$/ha) | \$10,990 | \$3,900        | \$3,600       | \$3,150     | \$1,700       |
| Farm costs (\$/ha)  | \$5,870  | \$2,300        | \$2,600       | \$2,350     | \$1,050       |
| EFS (\$/ha)         | \$5,120  | \$1,600        | \$1,000       | \$800       | \$650         |

Based on EFS alone there is minimal incentive for livestock farmers to integrate oats into their business model. However, there are environmental benefits with integrating cropping enterprises with livestock farming, including water efficiency (as outlined in the literature review report). GHG emissions from each land-use enterprise vary significantly with livestock farming having a much greater footprint than cropping. This presented an opportunity to analyse the impact on profit for each enterprise when emissions pricing is included. The expected impact of proposed pricing options under the proposed pricing framework of He Waka Eke Noa<sup>4</sup> (HWEN) are presented in Table 2.

<sup>1</sup> Personal communication with Ivan Lawrie from Foundation of Arable Research

<sup>2</sup> <https://figure.nz/chart/t8u1syzhCpY1m5eH-qn9IUv3xbXXoiYmy>

<sup>3</sup> Explore your options – Participatory research, Advanced research adoption project, Dairy NZ, MPI, Ag-research 2021.

<sup>4</sup> He Waka Eke Noa agricultural emissions pricing options consultation document - February 2022

Table 2. Impact of GHG emissions pricing model on enterprise economic farm surplus (EFS)

|                     | <b>Dairy</b> | <b>Winter grazing</b> | <b>Spring Barley</b> | <b>Spring oats</b> | <b>S&amp;B Finishing</b> |
|---------------------|--------------|-----------------------|----------------------|--------------------|--------------------------|
| Farm income (\$/ha) | \$10,990     | \$3,900               | \$3,600              | \$3,150            | \$1,700                  |
| Farm costs (\$/ha)  | \$5,870      | \$2,300               | \$2,600              | \$2,350            | \$1,050                  |
| EFS (\$/ha)         | \$5,120      | \$1,600               | \$1,000              | \$800              | \$650                    |
| Return on assets    | 10.89%       | 6.40%                 | 4.00%                | 3.20%              | 2.95%                    |
| 2025 EFS            | \$5,033      | \$1,573               | \$1,000              | \$800              | \$634                    |
| 2030 EFS            | \$4,838      | \$1,512               | \$999                | \$799              | \$599                    |

The modelling data shown in Tables 1 and 2, demonstrate limited economic incentive for conversion of dairy land to oat production, even when GHG emission payments are included. Increased planting of oats is more likely to occur via substitution with existing crop production, including greater use of oats within established rotations. The potential substitution of sheep and beef production is limited by the suitability of pastoral grazing land for conversion to arable production.

## Oat crop volume needs

The proposed Makarewa based oat milk factory (New Zealand Functional Foods) has initial plans to produce 40 million litres of oat milk annually<sup>5</sup>, with the ability to add a further 20 million litres processing capacity when needed. One litre of oat milk requires approximately 230 grams of raw oats<sup>6</sup>, therefore, to meet the production forecast, the milk factory would require approximately 1,200 additional hectares of oats produced (based on grain yield of 7.5 T/ha), or an extra 20% of grain oats grown in Southland. This land-need will not require a large land-use shift from dairy, especially given the comparative returns, outlined in Tables 1 and 2, and is more likely to result in existing cropping farmers replacing some of their other crops with more oat production (if the comparative returns justify this).

Greater adoption of oat production and substitution of intensive dairy production is likely to require either:

1. Stronger economic signals through emissions pricing frameworks. These signals are more likely to evolve over longer time horizons as New Zealand navigates a path towards its more onerous 2050 emission reduction targets.
2. Significant premiums for oat production via the increased use of oats within high value products such as oat milk. This could also incorporate potential value extracted by growers via an extension of their involvement in oat milk beyond the traditional farm gate (example – brand development).

## Project direction shift

In the original project outline, we intended to go into greater detail around environmental modelling and assessment of the other factors in the six-dimension model which would need addressing (particularly regulation, social wellbeing, and knowledge) should there be significant land-use change in Southland to grow more oats.

However, in presenting the modelling results and the literature review to the Farmer Working Group, and after the discussion, it was clear that we needed a greater understanding of how we might add value to the whole value chain, not just have a greater understanding of the production and environmental end of the value chain.

In essence, in today's environment, with the relatively low amount of land needed to supply the existing oat milk value chain, even allowing for some growth, few dairy farmers would undertake major land-use change unless there was

<sup>5</sup> <https://countrytv.co.nz/oat-milk-plant-to-be-built-near-invercargill/>

<sup>6</sup> Justin Riley (CEO NZ functional foods) personal communication

major disruption in the form of regulation or market change, which would need to be greater than the proposed pricing framework of He Waka Eke Noa (as modelled in Table 2).

In addition to that, a concern amongst the Farmer Working Group was that it may be difficult for dairy farmers to “go back” under resource management regulations, if they moved away from dairy. A loss of flexibility was considered to hold considerable risk for farmers. This is not an unreasonable concern, given farm consultants in the AbacusBio business are dealing with farmers (in the Southland area) who are unable to shift land-use to dairy grazing, despite that same land being able to be used for beef grazing. Until restrictions associated with regulations are finalised and better understood, farmers will be reluctant to put existing business structures at risk for the sake of change.

We acknowledge the data presented in Tables 1 & 2 are presented with “today’s view.” Dairy pay-outs are at a record high, and it is easy to forget industry disruption might occur to the industry. A part of the dairy industry which is likely to be at greater risk of disruption is milk ingredient industry, as outlined in a recent Kellogg Leadership report:

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*Ingredients with the functional properties of animal ingredients are being reverse engineered from plants. Individual proteins (whey and casein) are the initial targets for precision fermentation technology. Perfect Day is producing whey commercially, and others are set to launch in the next two years. Protein exports account for 10% of New Zealand’s dairy export revenue - \$2 billion in 2020. These are likely to be the first group of products which experience major disruption from alternatives.*

*Anna Benny, Kellogg Rural Leadership Programme<sup>7</sup>*

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Taking all of this into account the Farmer Working Group and the wider project team, agreed to shift the direction of the remainder of the project to better understand the oat milk value chain and models for adding value to that value chain, acknowledging that some of these findings will be relevant for other potential crops and new food investment in the Southland area.

Therefore, in the remainder of this report, we assess the oat milk value chain to determine the potential value that could be realised by growers, and the commercial/business models that could be utilised to extend their participation beyond the farm gate.

## Oat milk value chain and margin analysis

The structure of the oat milk value chain largely reflects the mix of markets, market channels and customers that are serviced by the brand owner and the value chain requirements imposed by these.

### Manufacturing in the value chain

The standard oat milk value chain and manufacturing process is described in Figure 1.

As with all plant-based milk alternatives, the manufacturing process revolves around the extraction/separation of a liquid base from plant material. Most commonly in oats, this occurs using an enzymatic separation process that breaks down oat starch into smaller components to enable mechanical separation into a liquid oat base (liquified fibre and  $\beta$  glucans) and residual wastes<sup>8</sup>.

The liquid oat base is subsequently formulated into the final product via the blending of oils, vitamins, and secondary ingredients to optimise nutritional composition and product attributes (flavour, consistency etc).

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<sup>7</sup> Milk Without a Moo What’s the Risk to the New Zealand Dairy Industry? Anna Benny, Kellogg Rural Leadership Programme Course 43 2021.

<sup>8</sup> <https://www.oatly.com/stuff-we-make/our-process>



Enzymatic processes and product formulations are typically proprietary and a key source of brand/product differentiation and quality assurance.

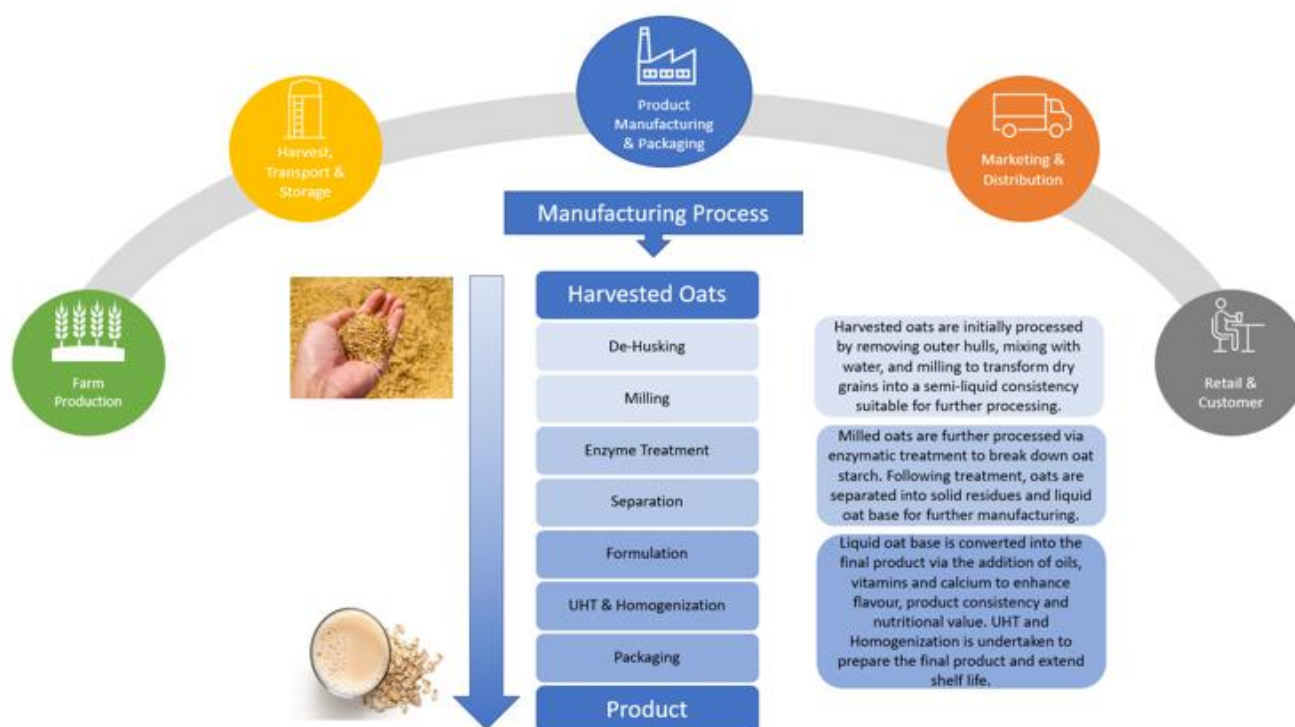


Figure 1. Overview of oat milk value chain and manufacturing process

Manufacturing is a key stage of the product value chain which creates brand-to-brand variation in the structure of the value chain and the product quality. This variation is often linked with the use of third-party manufacturing partnerships.

In the oat milk industry, many brand owners (international and domestic) undertake the manufacturing phase across several sites, requiring separate partnerships for different phases of the process.

This reliance on outsourcing is not unique to the emerging New Zealand brands. The largest global oat milk brand owner, Oatly, only produce 21% of their product within end-to-end Oatly-owned manufacturing facilities<sup>9</sup>. Longer-term, Oatly have stated that they target 50-60% of production occurring within wholly owned/controlled manufacturing sites<sup>9</sup>, indicating significant ongoing reliance on third party manufacturing partnerships.

It is cost prohibitive for a pre-revenue, or early revenue company, to build the entire manufacturing process from oat cleaning through to milk packaging. However, reliance on third party facilities can lead to value chain challenges including timely manufacturing, management of costs, and potential negative association with other value chains, for example, third party infrastructure associated with traditional cows' milk processing and packaging might be an option longer term, however considerations as to consumer needs/value chain ethics regards vegan values (a key market differentiator for many plant milk brands) may lower the value of associated outputs and lessen the likelihood of interest from some brands.

Manufacturing of oat milk in New Zealand is already fragmented with partial oat treatment undertaken at Harraways in Dunedin. The oats are then distributed to oat milk processors across New Zealand and further afield for processing into milk. A potential challenge for existing oat milk brands with this structure, is that oats which might be produced to new specifications, e.g., organically or regeneratively, cannot be milled separately of conventional milling oats at

<sup>9</sup> Oatly (2021), Oatly 3Q21 Financial Presentation, November 2021

present. This challenge has been identified by Harraways management and, in conjunction with oat milk requirements, is an area for capital expenditure to enable such segregation and traceability. However, it does make differentiation of brand on production credentials difficult until this is resolved.

## New Zealand oat milk brands

Consultation with New Zealand-based oat milk brands and value chain participants highlighted critical challenges affecting the development and management of a sustainable oat milk value chain within New Zealand.

These challenges include:

1. New Zealand processing infrastructure offers a limited range of appropriate enzymatic treatment processes. It is important to note that the use and quality of the enzymatic treatment can influence the health value of the final milk product regards presence of  $\beta$ -glucan and other compounds of nutritive value<sup>10,11</sup>.
  - a. Products with intact  $\beta$ -glucan can show a viscous gel-like tendency that is unsuitable for thin beverage applications, however the loss of the  $\beta$ -glucan network makes thin beverage-like products with less stability and fewer health benefits<sup>12</sup> – there is quite a science/art to getting the manufacturing process right (with there being multiple factors that are important in beverage organoleptic properties, retaining beta gluten and having a beverage consistency that is acceptable is possible);
  - b. If companies develop oat milk products with sub-optimal health and organoleptic properties, this can impact the perception of oat milk and the perception of New Zealand being a high-quality producer too – quite simply, a lot of good productive work in producing the oats can be undone;
  - c. Optimal health and quality as a key driver have prompted some brand owners to develop their own IP and to undertake offshore manufacturing to access facilities that can process and package in accordance with their desired product specifications.
2. The small scale of the processing industry creates ownership concentration at key segments of the value chain, for example, the reliance on single milling and the de-husking facilities at Harraways.
3. The ability to maintain value chain segregation, particularly from dairy and gluten products (mostly within packaging facilities, but also processing and general optics for consumers), can be challenging. This segregation is desirable for some brands to support their brand provenance claims and needs to be considered as part of any partnership discussions with dairy companies.
4. The limited scale and range of suitable processing facilities creates strategic challenges for growing brands, requiring careful alignment of their manufacturing requirements with the available capacity offered by a limited pool of partners. This is also a key factor for consideration regards business models (discussed in more detail in next section).
5. New Zealand is a small-volume oat grower, the guarantee of suitable oats (or other plant products) for processing and brands with enough scale to take products to market, present a challenge for any company considering setting up manufacturing facilities who want to incorporate contract manufacturing as part of the revenue stream.

These challenges could help support the business case for development of manufacturing infrastructure to support the growth of an emerging oat milk value chain. However, the business case for investment in manufacturing infrastructure needs to be tested with reference to:

- The prospects for a sustainable oat milk value chain that can support dedicated manufacturing facilities that operate at an economically viable scale;

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<sup>10</sup>Example of a patent filed to protect enzymatic treatment connected with oat milk quality  
<https://patents.google.com/patent/WO2003075683A1>

<sup>11</sup> <https://pubs.rsc.org/en/content/articlehtml/2018/fo/c7fo02006f>

<sup>12</sup> <https://www.sciencedirect.com/science/article/pii/S073352102200011X>

- Identification of the most appropriate and viable business models to support the establishment and ongoing operations of commercially viable processing facilities.

The risks and opportunities associated with different models of farmer participation within the value chain also need to be considered. The potential models are explored below.

## Where is value created and lost in the oat milk value chain?

An indicative gross margin breakdown for a generic oat milk brand is shown in Figure 2<sup>13</sup>.

Costs are predominately derived from Oatly’s financial reports and adapted to reflect a New Zealand value chain and supermarket sales channel. Costs were reviewed and updated with input from local parties within oat milk value chains and market channels.

To assist with interpretation of Figure 2, it is important to note that costs are indicative and reflect expected costs of goods sold (COGS) and other direct costs associated with a local business to business (B2B) supermarket channel.

Direct to consumer (D2C) and food service channels will support higher margins (retail versus wholesale pricing, lower retail margins etc) but generally, offer lower sales volumes (although, this is changing). Export customers will also require higher distribution costs to access overseas markets.

Manufacturing costs are also indicative, depending on brand-specific requirements e.g., enzymatic processes and formulations and packaging. It is highly likely that larger brand-owners, with greater volumes will be able to extract more favourable terms (lower costs) from their manufacturing and retail partners.

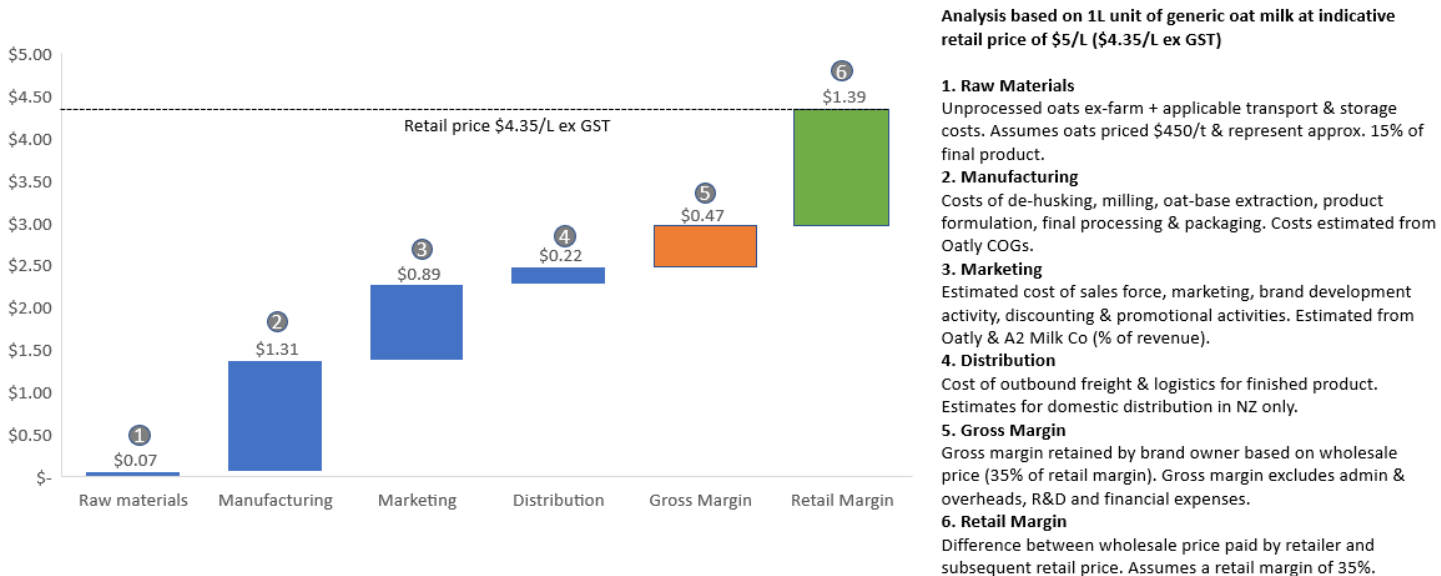


Figure 2 Indicative oat milk gross margin analysis

The range of retail prices for oat milk is between \$4/L and \$5.50/L, with premium brands commanding up to an additional \$1 per litre. There is some reluctance from consumers for prices above the “magic \$5/L,” this may change with inflationary pressures.

The data displayed in Figure 2 show that a generic New Zealand oat milk brand might operate on a gross profit margin of 10%-20%, depending on the optimisation of its manufacturing costs and sale channels<sup>14</sup>. This level of margin highlights risks associated with:

<sup>13</sup> Gross margin reflects the profit margin generated before overheads, finance costs and capital investments.

<sup>14</sup> For comparative purposes, Oatly report a gross margin of 25-30% but this excludes marketing costs (see Q3 2021 earnings presentation).

1. Achieving sufficient scale and sales volumes to generate sufficient gross margin to cover overheads, finance costs and support future investment. Scale and sales growth needs to be achieved without sacrificing margin to secure sales e.g., price discounting, increased marketing expenditure, increased distribution costs.
2. Maintaining price premiums when under competition from new entrants. The entry of new brands, particularly from large, diversified food manufacturers and generic in-store brands will likely lead to price-based competition for brands that lack a clear point of differentiation and strong brand.
3. The loss of the novelty factor of oat milk for consumers and the introduction of new milks, blends and innovations, will reduce price premiums for oat milk.

It is worth noting that supermarkets in New Zealand, and often internationally, make low, to no, margin on dairy milk products. Cows' milk is considered a staple product and is often used as a loss leader, to bring customers in the door. Currently, supermarkets make very good margins (30-40%) on plant milks, so they are an attractive product, especially given the product's stability (no need for refrigeration) and growing consumer demand.

What may happen is that as volumes of oat milk sold increase and more consumers start replacing cows' milk with plant milks, competition among supermarkets and the need to get customers in the door will force the base oat milk price downwards – oat milk may become a loss leader, similar to cows' milk.

These risks highlight the need for a proactive focus on growing or maintaining margins to support business growth/investment and response to competition.

### Strategies for margin enhancement

Margin management requires a concurrent focus on the optimisation of costs and sale price/volume and continual innovation to stay in the premium category. Generic strategies that can be utilised to enhance margins are shown in Figure 3.

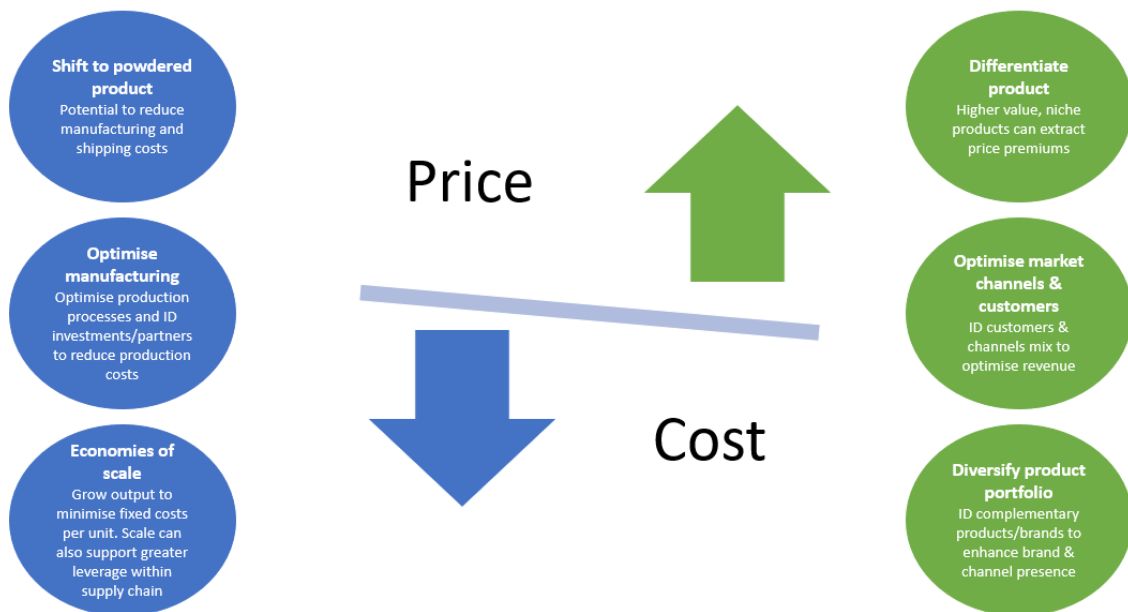


Figure 3. Margin enhancement opportunities

The strategies (Figure 3) have different levels of applicability and impact within a New Zealand context. Key factors that affect the applicability of these strategies include:

- New Zealand's limited processing infrastructure and particularly infrastructure that is segregated from the dairy value chain;

- New Zealand is also an expensive location to build infrastructure; as a result, options to support optimisation of manufacturing processes can be limited;
- The New Zealand arable sector is small and could constrain the ability to scale up production;
- The New Zealand consumer market is small and requires growing brands to pursue export markets to support their future growth, adding additional regulatory, transport and marketing costs;
- Key market channels can lack diversity and competition; New Zealand essentially operates with a supermarket duopoly<sup>15</sup> and one of the major chains is reducing supplier numbers; this creates challenges for small, independent brands to secure favourable commercial terms; supermarkets are also quick to develop and push their own in-store brands within attractive product categories.

An assessment of the applicability of the strategies outlined in Figure 3, within a New Zealand context is shown in Figure 4, simultaneously scoring/ranking the strategies based on their relative value and ease of implementation.

This assessment identifies a brand/product differentiation strategy as the most likely option to deliver both value and ease of implementation for small, independent brand owners. This reflects the New Zealand market factors previously identified that limit the strategic options for local brands, whilst also acknowledging:

- The challenges of executing an effective cost-minimisation strategy as a means of responding to the entry of new brands, particularly brands originating from major food manufacturers (e.g., Sanitarium) and in-store supermarket brands (which will evolve);
- The feasibility and risk for small brands to pursue diversification and rapid growth strategies;
- The opportunity for local brands to leverage New Zealand’s reputation as a safe and sustainable food producer to underpin brand provenance and tap into increased consumer demand for clean, green products;
- The ability to access an increasingly diverse range of niche crop/plant industries that can support innovative new product blends/attributes;
- Most brands utilise a mix of sales channels as each channel offers distinct strengths and weaknesses that evolve in their relative importance as the brand grows; the growth of alternate market channels will create greater diversity of options, especially the option of D2C for small, high-value brands.

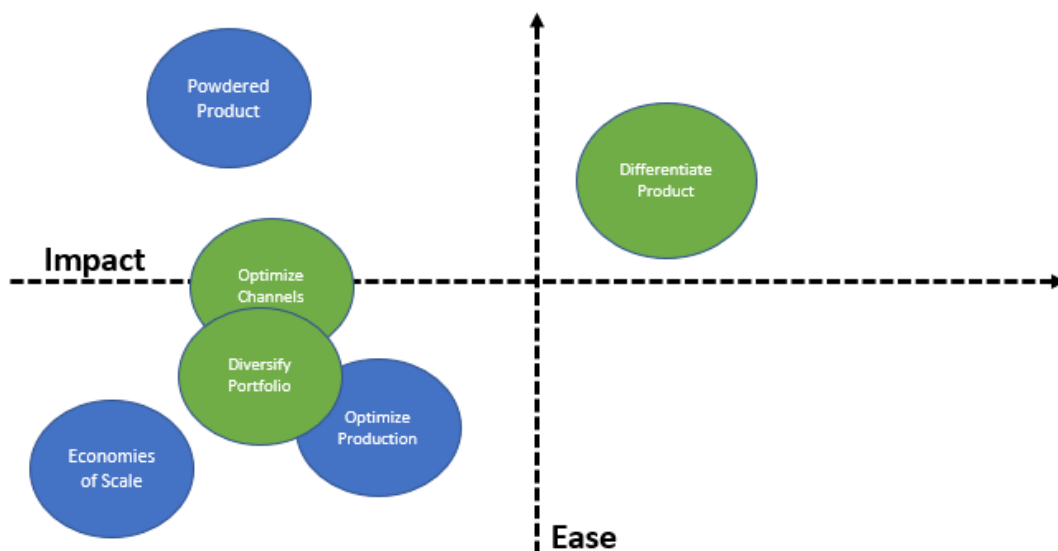


Figure 4. Value-ease analysis of strategic options

<sup>15</sup> [https://comcom.govt.nz/\\_data/assets/pdf\\_file/0024/260376/Market-study-into-the-retail-grocery-sector-Draft-report-Executive-summary-29-July-2021.pdf](https://comcom.govt.nz/_data/assets/pdf_file/0024/260376/Market-study-into-the-retail-grocery-sector-Draft-report-Executive-summary-29-July-2021.pdf)

We have developed an overview of potential differentiation and value-adding opportunities that could support brand owners to extract premium prices (Table 3). Successful execution of this strategy/s requires the identification of brand/product differentiators that offer:

- A strong story (or novel story) that consumers are willing to pay a premium to support;
- The source of differentiation must be defensible and hard to replicate by competitors;
- The differentiation should minimise constraint on scalability and growth.

Table 3. Differentiation strategies for oat milk

| Strategy  | Options   | Advantages  | Disadvantages   |
|---|---|---|---|
| <p><b>Brand Story</b></p> <p>Create a unique brand story based around the product, its attributes and how it is produced.</p>   | <p>Options could include the use of organic oats, oats produced within regenerative systems, or oat high-health products (or a combination).</p>  | <p>Can help embed key suppliers.</p> <p>Good option for Oat Milk – key inputs (oats) are a small part of the cost base. Significant premium to growers does not hurt COGS.</p> <p>Leverages the clean/green image underpinning NZ agri-food.</p>  | <p>Scalability and growth can be challenging if onboarding new suppliers is slow.</p> <p>Shifting consumer expectations can create risk. Longer term monetisation of sustainable products could be risky – won't be novel.</p> <p>Requires clear, transparent standards and certification systems to support the integrity of the brand claims.</p> |
| <p><b>Novel product blends and attributes</b></p> <p>Differentiate the product (and brand) through formulations and blends.</p>   | <p>Options could include new processing systems e.g., enzymatic processes and product blends e.g., oat-pea and oat-hemp milk, that support enhanced attributes, nutritional value, health benefits etc.</p>   | <p>Tangible enhancement of product attributes, nutritional qualities and health benefits can more readily support price premiums than brand story.</p> <p>Innovative processes and blends are potentially defensible from competitors.</p> <p>Can use blends and processes to complement and support brand story.</p> | <p>Requires investment and product development expertise.</p> <p>Can be superseded by competitor innovations, so continual product innovation critical.</p> <p>Processing innovations could be restricted by partner infrastructure/facilities.</p>   |
| <p><b>Develop value-added products</b></p> <p>Use oats or oat milk as a base ingredient in value-added products that can generate higher prices and/or access higher value segments, moving more towards functional beverages, even nutraceuticals.</p> | <p>Options could include using oats or oat milk as a base ingredient in value-added products such as smoothies, shakes and nutraceuticals that could target high-value segments such as sports nutrition.</p> | <p>Products targeted to niche segments can extract significant premiums.</p> <p>Potentially aligns with the volumes and focus of small, independent brands.</p>   | <p>Requires investment and product development expertise.</p> <p>Further processing and value adding adds cost and value chain complexity.</p> <p>Successful entry and growth will attract competitors.</p> <p>May not be easily reversed or refocused if unsuccessful.</p>   |

## Direct to consumer strategy

A key driver of the structure of the value chain is the channel to market, an area undergoing significant change, even disruption, at the moment.

The channel to market is often brand specific and can be based on historical factors. For example, new companies are establishing themselves to access direct-to-consumer (D2C) channels from the outset, whereas more traditional companies are developing these channels as an add-on to their existing channels, which are predominantly wholesale-retail focussed.

Traditionally, sales via retailers (the wholesale model), was the only way to shift large volumes of product, due to the logistical challenges of reaching a fragmented customer base. This is changing quickly, especially in geographies like North America and China, where platforms like Tmall, Amazon and Shopify utilise their own, brand owners' or contract distribution centres to enable greater volumes of product to be shifted and allowing for more brands to partake in the channel.

Covid-19 has escalated this trend with greater numbers of shoppers buying online. Brands such as AllBirds are leading the trend. AllBirds was co-founded by New Zealander, Tim Brown and has operated from the outset as almost entirely D2C. They develop high-value shoes which are light and transportable, so the product does suit the D2C model. One of their main drivers of this trend is the ability to retain full control of their brand and the conversation with consumers<sup>16</sup>, secondary to that is the removal of margins associated with retailers.

The challenge for oat milk with utilising this channel, especially in the New Zealand market, is the costs of freight, relative to the weight of the product and the value of the product, as well as the increasing costs of advertising on dominant platforms such as Facebook.

Optimal food products for this channel are higher value functional food and beverages through to nutraceuticals. Generally, a per unit price of greater than \$12 is needed for D2C, but the relativities of the ratio of **FREIGHT COST : PRODUCT-WEIGHT : PRODUCT-VALUE** will change in more dense population locations and as more contract distributors come into play.

Existing oat milk brands in New Zealand do supply products D2C (in packs of 6 x 1L). An example of a New Zealand high-value functional beverage company, successfully operating a mixed channel approach (D2C and wholesale) is Arepra, who generate ~50% of their blackcurrant nootropic revenue via D2C sales<sup>17</sup>.

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*"I think what we're seeing is the death of wholesale..."*

*If you had to look at the companies that are surviving now and the ones that are dying, anyone in wholesale is dying."*

*Chip Wilson, Founder of Lululemon (clothing brand)*

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## The health story

The strategies described in Table 3 are pursuable by small, independent brands. There are good examples of companies using New Zealand grown products and telling a functional health story, underpinned by ethical production and provenance, for example the Chia Sisters range of functional beverages<sup>18</sup>.

Internationally, the trends towards functional beverages is significant<sup>19</sup> and offers opportunities to add health ingredients to the oat milk base, these may incorporate working with health ingredient companies such as Aquamin<sup>20</sup> who develop marine health ingredients, or a New Zealand high-health ingredients company, such as Anagenix<sup>21</sup>, who works closely with Plant & Food Research and has developed a range of gut, lung and brain health ingredients from New Zealand produce, such as boysenberries, kiwifruit and feijoa.

Oat milk also offers an excellent base for the growing "synbiotic" trend. Synbiotics are a combination of probiotics and prebiotics. The  $\beta$ -glucan prebiotic base of oat milk could be added to with a range of probiotics, commercially available

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<sup>16</sup> Podcasts to understand the advantages of D2C sales for controlling the brand story:

- Lululemon <https://podcasts.apple.com/ca/podcast/chip-wilson-on-the-dangers-of-discounting/>
- AllBirds <https://podcasts.apple.com/ca/podcast/tim-brown-on-benefit-two-ceos-leaving-no-carbon-footprint/>

<sup>17</sup> <https://www.foodticker.co.nz/arepa-clocks-up-australian-accounts/>

<sup>18</sup> <https://www.chiasisters.co.nz/>

<sup>19</sup> <https://www.nutraingredients.com/News/Promotional-Features/Why-plant-based-functional-beverages-are-perfect-for-the-modern-market>

<sup>20</sup> <https://aquamin.com/>

<sup>21</sup> <https://anagenix.com/>

from companies such as DuPont with their Howaru<sup>22</sup> range. Note, adding probiotics to beverages means careful product development and management of the value chain, to retain the efficacy of the probiotics which are live bacteria. Yakult<sup>23</sup> is an example of a successful international company who have developed functional beverages utilising probiotics for health.

Further investigation is required to understand the full range of options available for an oat milk brand, and their relative attractiveness within a New Zealand market and value chain context. This should be a key focus of any further due diligence as the ongoing entry of new oat milk brands will create greater competition and pressure on margins within the oat milk value chain.

## Summary – Oat Milk Value chain & Margin Analysis

Our preliminary assessment of the New Zealand Oat Milk value chain and its margins has highlighted that:

1. A generic brand could be expected to operate on a gross margin of 10-15%, depending on sales channel, manufacturing optimisation and scale.
2. This level of margin could be sufficient to support a profitable brand/product subject to the ability to maintain price and margin within an increasingly competitive market category.
3. The longer-term sustainability of New Zealand oat milk brands is likely to require:
  - a. Access to a local, large-scale, modern processing facility to support more cost-effective on-shore processing and access to the latest processing innovations that can underpin product quality and nutritional/health value;
  - b. A focus on export/international markets to generate sales volume;
  - c. Brand differentiation strategies to reduce exposure to competition from low-cost generic brands, and potentially generate premiums via a brand story and higher value products;
  - d. Innovative approaches to market channels that leverage emerging eCommerce platforms to support greater access to higher-value D2C segments.

There is mixed opportunity for emerging oat milk brands and value chains to funnel significant value or price premiums back to New Zealand farmers:

1. Oats are a small component of the overall product and its cost of production (Figure 2). The prospect for a brand to pay significant premiums to secure supply are offset by oats being a global commodity and the likelihood that significant premiums may create arbitrage opportunities.
2. The domestic market for oat milk is small, brands will increasingly focus on overseas markets and may consider Oatly's approach to a global production capability, limiting their reliance on New Zealand supplies and manufacturing.
3. Premiums of the scale that are likely to encourage land-use change are more likely to be supported by brands that pursue differentiation via a novel brand story e.g., regenerative oats. However, the multi-enterprise focus of New Zealand farms may constrain adoption of organic/regenerative systems if systems must be adopted across the whole farm and the benefits are less tangible across other farm enterprises.

Based on the above, farmers and farmer groups are more likely to derive value from the oat milk value chain via more direct engagement with oat milk brands and key value chain parties. Potential business/commercial models that support a shift beyond the traditional 'product push model' are described below.

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<sup>22</sup> <https://www.howaru.com/>

<sup>23</sup> <https://www.yakultusa.com/>



## Business Model Options

In the farmer working group workshop (held September 15<sup>th</sup>, 2021) there was a clear indication that there was interest in exploring alternate business models to a “price taker” model for oat supply, or as Andy Elliot describes below, the “Product Push” model (Figure 5).

The “product push model” is well understood by farmers, it is low risk and requires little upfront investment, especially for farmers who are already involved in cropping activity. As such, it is the model that is playing out now for oat growers supplying to the oat milk market in New Zealand. It is also the model that is likely to continue to play out unless there is co-ordination, investment and commitment made by growers to differentiate growing systems and/or partner/invest in different parts of the value chain, to operate a different model.

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*“Our traditional model in New Zealand is vertical integration and push product into market. The best examples of successful companies in market are the ones who have mastered the “book ends” of this model in differentiation in genetics and their marketing strategy for the product e.g., Zespri Group Limited.*

*Is our focus on China making this even more difficult for us and potentially making us less responsive to other markets? There are probably easier markets in Asia than China. The trouble with the Chinese market is it perpetuates the model of sell in New Zealand first, then export.*

*A perfect example of this is Daigou shoppers<sup>24</sup>. Daigou products are recommended by word of mouth and apps such as WeChat; they gradually build up “trust chains” to buy for more and more people. These shoppers are primarily targeting premium products like baby formula, vitamins, or nutritional supplements, but are also moving towards premium food offerings such as cherries and other fruit. This channel is essentially developing as a superior stamp of approval for premium products and produce. This is becoming a valid pathway to China customers. However, it is reinforcing our product push business model. It is not taking us any closer to our customer or gaining consumer insight, as the channel is third party.*

*A new approach is required, which involves moving from targeting and segmenting consumers based on income level, to targeting consumers for their specific needs and income levels. Health and wellness are the key drivers for this opportunity and nutrition is a need. The model that this report proposes for entering new markets or market sectors is that of a Horizontal Service Model where we develop direct partnership with customers already in market.”*

*Andy Elliot, Nuffield Scholar<sup>25</sup>*

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<sup>24</sup> The Daigou model has collapsed with the cessation of tourism from China into Australia and New Zealand with the Covid-19 pandemic. This has left A2 milk and Synlait Milk, as well as many other companies, in a poorer financial position.

<sup>25</sup> <https://www.nuffieldscholar.org/sites/default/files/2021-04/Andy%20Elliot%20-%20Nuffield%20Report.pdf>



Figure 5. Traditional New Zealand product push model (by Andy Elliot<sup>26</sup>)

There are multiple elements which must be considered when establishing any new agricultural value chain. There is also a level of analysis and co-ordination required by all, prior to sowing a single seed. This needs to be followed with a leap of faith because there will still be unknowns.

A significant challenge to the Southland region is that the financial return for oat production compared with returns for dairy farmers in the region (Tables 1 and 2) will not send farmers rushing towards growing oats. Similarly, the level of return likely under the value chain model outlined in this report are not particularly compelling for large scale land-use change, although they will tempt existing cropping and mixed-use landowners to continue to grow oats as part of their mix, and maybe a greater part.

There are some good reports, written by Leftfield Innovation and available on their website<sup>27</sup> which highlight cropping options for landowners, and also highlight that there is no silver bullet:

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*“Farmers are often asked what they “want to grow”. Their response is “you show me the viable business case and I will be keen to look at it”. There are also plenty of stories from distributors saying farmers approach them with production volumes of a specific ‘on-trend or novel’ crop they have grown in the hope they will find a market. Both clearly indicate the disconnect within the value chain between the producer and the customer.*

*...There is often talk of the ‘silver bullet’ that will solve the sustainable land use challenge. Our research indicates that it is very unlikely such an option would emerge. We grow food for consumers, who are all different, different preferences, values etc. - there is no ‘one-size-fits-all’.*

*Leftfield Innovation<sup>28</sup>*

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## Fragmented value chain

The quote from Leftfield Innovation highlights that there is push and pull from both ends of the value chain when developing a new crop or product and either can lead the initial explorations.

It is common sense that before we start to develop value chains, we navigate these critical questions:

1. Is there a market?
2. Can we innovate and differentiate around value chain and product?
3. Can we grow the plant/animal?
4. Is there a good financial return?

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<sup>26</sup> <https://www.nuffieldscholar.org/sites/default/files/2021-04/Andy%20Elliot%20-%20Nuffield%20Report.pdf>

<sup>27</sup> <https://www.leftfieldinnovation.co.nz/reports>

<sup>28</sup> [https://www.leftfieldinnovation.co.nz/files/ugd/63e957\\_edb714271ad04616b3b4c01295692596.pdf](https://www.leftfieldinnovation.co.nz/files/ugd/63e957_edb714271ad04616b3b4c01295692596.pdf)

## 5. Will we damage the environment?

Some believe that a full value chain should be established from farm to fork from the start, but this is both:

1. Unrealistic, given the investment required *and*
2. Undesirable, given the agility needed around taking new products to market, testing with consumers, and testing and resetting business assumptions.

Let's explore this further as it is very important as to when and how the different parts of the value chain are formed. If we think of a new value chain with a start-up mentality, then we need to change the mindset as to how we might develop it successfully – in start-up world, there are no guarantees, so agility is paramount to minimise risk.

According to Steve Blank (innovation and entrepreneurship expert and adjunct Stanford Professor<sup>29</sup>), a start-up is continuously looking for a business model and once it has that, it needs to scale and move from start-up to a fully-fledged revenue earning, profitable company.

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*A start-up is an organisation formed to search for a repeatable and scalable business model.*

*Steve Blank*

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There is a whole process associated with the searching for a business model<sup>30</sup>, incorporating a “design thinking” approach and continuously testing the market, preferably directly with the end consumers of the products.

### Where is New Zealand oat milk on the start-up spectrum?

It is useful to use this start-up framework to assess where New Zealand oat milk is on the start-up spectrum.

If we consider the end-product, then the rise in demand for plant milks, locally<sup>31</sup> and internationally, and the rise of the oat milk proportion within that, supports the position that there is good sustainable demand for the end-product.

Local oat milk companies, Otis, Boring and Sunny South Oat Milk, have already launched on the New Zealand market, with successful consumer feedback and sales. Otis was the first to launch and is also exporting to Australia and parts of Asia – ~50% of its volume.

The New Zealand oat milk companies are still in a relatively early phase, the consumer feedback and sales are encouraging. However, a high-quality end-product needs manufacturing capabilities within New Zealand to achieve sustainable profitability. A quality manufacturer/s will ensure appropriate food safety standards and that the enzyme technology meets the needs for a healthy, high quality oat milk.

Without significant investment into New Zealand manufacturing, it is difficult to see successful scaling of the industry - especially given one of the arguments for plant milks is a low carbon footprint.

If we consider the oat growing part of the value chain – we have a track record of over 100 years of growing oats in Southland. There are management and genetic elements which could be optimised (which will bring oat production

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<sup>29</sup> <https://steveblank.com/>

<sup>30</sup> Outlined in detail by Steve Blank and Bob Dorf in “The Startup Owner’s Manual” <https://www.amazon.com/Startup-Owners-Manual-Step-Step>

<sup>31</sup> Within New Zealand, supermarket chain Countdown, reported a surge in consumer demand for alternative proteins, with sales of dairy-free milk rising by 14% in the past six months, and dairy-free cheese sales by more than 300%. Foodstuffs-owned, Pak 'n' Save, New World and Four Square, have also seen high growth in the plant milk category over the past year – almond milk sales were up by 32%, oat milk up by 26% and soy milk up by 7.8%, [Can New Zealand transition to a plant-based future? \(thebigg.org\)](https://thebigg.org)

more in line with wheat production returns) and that is being worked on via Plant Research New Zealand, led by Adrian Russell and the Oat Industry Group (a group of diversified arable farmers).

We have the know-how to scale oat production for growers, should the returns justify it. The question is - will any growth in production be via existing arable and mixed farmers (likely initially) or as a portion of dairy land over time?

## Putting the value chain pieces together

The need for a start-up to be nimble and agile is vital according to Steve Blank, so if people have an expectation that the full value chain should be co-ordinated and invested in upfront, that is highly risky and unrealistic.

Where we are as a nascent industry, is in quite a sensible position – we know there is a market (proven by Otis and Boring), although there are still some questions around profitability, and we know we can grow product. Within the value chain, we have different business models operating – product push on farm and consumer-led at the market end, but there is a major missing piece for sustainable growth and that is quality manufacturing.

There is also a question mark as to how the parts of the value chain might co-ordinate to achieve scale, increase profitability and avoid the product push scenario for farmers. In other words, how and where can farmers (and other players) co-ordinate and contribute more to the value chain to achieve greater returns?

The business model options are outlined in Table 4. As stated above, not everything has to be developed at the same time but thought as to what the best option/s are need to be developed now, so planning, capital-raising and resource preparation can take place.

Here are a couple of business model scenarios that we believe are worth pursuing. Note both scenarios assume that New Zealand Functional Foods (or equivalent), successfully capital raises and a new processing plant is built in Southland in the next three years.

## Scenario 1. Grower Club

### Oat growers form a growers' club:

- Determine structure and establish entry and exit criteria;
- Determine production values and establish a measurement and recording programme – form the equivalent of the MerinoNZ ZQR<sup>x</sup> programme<sup>32</sup> to suit the group and market's needs, including how progress will be measured and reported;
  - Targets may include minimising inputs, enhancing biodiversity, establishing suitable crop rotations;
- Co-ordinate and co-invest in quality management, drying and storage facilities;
- Liaise with industry groups such as FAR and private enterprises such as Plant Research (NZ) Ltd to develop a management and agronomic improvement programme (note the existing Oat Industry Group may be the vehicle) and leverage investment made by all parties to gain Government funding, e.g., SFFF;
- Work with oat milk brands and manufacturers to manage supply and demand;
- Develop oat pricing and sales structure to maximise return for growers.

## Scenario 2. Book End

- Form an oat growers' club as in Scenario 1;
- Invest in an existing oat-milk brand or develop a new brand;
- Identify likely product mixes and develop market channel strategy (potential to explore AgMARDT/NZTE funding collaboration);
  - Straight milk brand will likely need mix of channels (food service, supermarket and D2C);
  - Functional beverage of nutraceutical should consider D2C channel as first priority, via a platform such as Shopify, to obtain fast feedback from customers and build brand story – also retains maximum agility;

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<sup>32</sup> <https://www.nzmerino.co.nz/zqrx>

- Ownership of brand story and direct connection with customer base is critical;
- Test products in-market in small volumes;
- Scale production, manufacturing, and distribution of winning products.

Table 4. Business model options for oat milk.

| Model  | Description   | Advantages  | Disadvantages   | What's needed  | Examples (some overlap)  |
|--|---|---|---|--|--|
| <b>Product push</b>  | Parts of value chain independently owned & operated.<br><br>Sales & margins independently established.                  | Flexibility, particularly for growers, allowing to move among crops to select best returns.<br><br>Oat buyers pay no more than market rates – competition for land-use with other crops will push supply down and market rates up, although oat importing will be an option if local prices get too high. | No premium for advanced environmental/quality production.<br><br>More market volatility for all players.<br><br>Individual farmer ownership of cropping storage creates barriers for new entrants.  | Existing model   | Current cropping model - wheat, barley, hemp, oats.  |
| <b>Grower club</b>   | Farmers collaborate around shared growing vision, production & sales  | Shared values re quality & environmental credentials<br><br>Can co-invest in, or share, quality control & storage facilities<br><br>Greater selling power   | Identifying and management of shared values & farming practices when dealing with individual companies.<br><br>Accessing expertise and skillsets required harder for small-scale production needs – easier to find good management personnel when there is more scale.<br><br>Ownership structures & management of entries and exits. | Leadership, planning & coordination – potential for accessing SFFF type funds.<br><br>Potential to partner with local iwi. | Headwaters.  |
| <b>Processing club</b>   | Growers invest-in/fully own processing facilities   | Efficiencies from growing – production for managing storage & supply needs<br><br>Skin in the game  | Processing rather than market led.<br><br>Companies with shareholders with different expectations.<br><br>Not farmers' core business.   | High quality leadership and management of shareholder needs.   | Farmers Mill <sup>33</sup> (recently established by South Canterbury farmers).<br><br>Fonterra.<br><br>Silver Fern Farms.<br><br>Alliance Group. |
| <b>Ownership of, or investment in, market brand company by growers</b> | Growers build their own brand or invest in existing brand (as parcel to maximise voting rights/directorship/direction). | Differentiates brand & creates market premium.<br><br>Greater visibility of value chain.<br><br>Greater ability to present authentic story & connect with consumers.<br><br>Farmers with skin in the game.  | Companies with shareholders with different expectations.<br><br>Not farmers' core business.   | High quality leadership and management of shareholder needs.   | Headwaters & Lumina lamb <sup>34</sup> .<br><br>Angus Pure <sup>35</sup> .   |

<sup>33</sup> <https://www.farmersmill.co.nz/>

<sup>34</sup> <https://luminafarms.com/>

<sup>35</sup> <https://www.anguspure.co.nz/>

|                        |   |   |  |  |  |
|------------------------|---|---|--|--|--|
| <p><b>Book end</b></p> | <p>Growers own marketing &amp; distribution company and brand/s</p> | <p>Differentiates brand &amp; creates market premium</p> <p>Market drives production practices e.g., MerinoNZ's ZQ)</p> <p>Greater visibility of value chain</p> <p>Greater ability to present authentic story &amp; connect with consumers</p> |  | <p>High quality leadership and management of shareholder needs.</p> <p>Different need can make things clunky/slow.</p> | <p>Zespri.</p> <p>MerinoNZ.</p> <p>First Light<sup>36</sup>.</p> |
|------------------------|---|---|--|--|--|

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<sup>36</sup> <https://www.firstlight.farm/>

# High Value Case Studies

There are many examples highlighting the development of high value, niche products from generic agricultural commodities both in New Zealand and internationally. We highlight some below in case study format focussing on the business model, positioning and value-add and how the company/organisation was established and connecting this with implications for the oat-milk industry.

## Zespri Case Study 1

The Zespri story is well known in New Zealand, so for this case study, we are focussing on what we see as the critical success factors in building the “Book end” model.

### Background

- The Zespri brand was launched in 1997, when New Zealand kiwifruit growers elected to form a unique brand to maximise sales revenue for growers;
- Prior to the formation of Zespri multiple exporters were competing to sell kiwifruit independently around the world;
- The Zespri business revolves around the sales, marketing, procurement, and logistics of the kiwifruit brand; they manage grower relationships in New Zealand and also procure fruit from other licensed producers, mostly in Italy and France;
- Zespri exports ~100 million 3.5kg boxes of kiwifruit to more than 70 countries;
- Zespri’s largest market and key to their success is China which they entered in 1999;
- Zespri financial summary from 2020/2021<sup>37</sup>:
  - Zespri global operating revenue NZ\$3.89 billion (up from \$3.14 billion in 2018/19);
  - Zespri global fruit sales revenue \$3.58 billion;
  - Total New Zealand-grown fruit and service payments including loyalty premium: \$2.25 billion;
  - Zespri global trays sold: 181.5 million trays;
  - Zespri’s net profit after tax: \$290.5 million;
  - Expected Total Dividends: \$1.33.

### The health “halo” of kiwifruit

- International marketing of Zespri kiwifruit clearly connects eating the fruit with improved health and vitality, this is no accident, and the positioning has been built on extensive New Zealand Government and industry funded research and development and the desire to become a premium brand (Figure 6);

*“Health marketing underpins Zespri’s marketing around the world as a premium brand”*

*Veronique Parmentier, Zespri global marketing manager in 2014*

- Zespri lodged the first self-substantiated health claim in a fruit under the Food Standards Australia-New Zealand’s standard for nutrition, health, and related claims<sup>38</sup>

*“The claim – that Zespri green kiwifruit can contribute to normal bowel function – will not come as a surprise to most people. However, it’s important to us to get this health claim from FSANZ to move towards our longer-term strategy of getting a European health claim for Zespri Kiwifruit.”*

*David Tanner, Zespri general manager of science and innovation in 2014*

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<sup>37</sup> <https://www.zespri.com/en-NZ/newsroomdetail/2020-21-season-results>

<sup>38</sup> <https://www.sunlive.co.nz/news/71425-zespri-health-claim-nz-first.html>



- Early health research focussed on the nutrient profile of kiwifruit;
  - Compared with other commonly consumed fruit, both green and gold kiwifruit are high in vitamins C, E, K, folate, carotenoids, potassium, fibre, and other phytochemicals<sup>39</sup>;
- This was followed up with extensive research into the digestive benefits of kiwifruit;
- Extensive research is now targeting understanding the impact of kiwifruit on improving adaptive immunity via its components, such as vitamin C, vitamin B9-folate, vitamin A, lutein, and zeaxanthin, which have been implicated in supporting immune function<sup>40</sup> and in assessing the role of unique proteins, actinidin and kiwifellin<sup>41</sup>.

Figure 6. Positioning Zespri kiwifruit as a health product in international markets



## Intellectual property

- A long-term government and industry funded breeding programme, run by Plant & Food Research has underpinned a highly successful strategy of utilisation of plant variety rights (PVR) to differentiate New Zealand kiwifruit from kiwifruit grown elsewhere;
  - The relationship between crown (via Plant & Food Research) and industry is critical in leveraging Government funding over many years and in license fee payments from Zespri back to Plant & Food Research, enabling significant income for PFR to support their breeding programme;
- The PSA disease outbreak led to the release of new gold kiwifruit varieties, with the modern “SunGold” varieties having a waiting list for supply licenses and therefore people waiting to plant orchards – largely due to the increase in return;
- The taste and uniqueness of the gold kiwifruit varieties has been a huge success;
- Much of the scientific work into health attributes cited above, was done on the cultivars *Actinidia deliciosa* ‘Hayward’ (green kiwifruit) and *Actinidia chinensis* ‘Hort 16A’, ZESPRI® (gold kiwifruit); this does not mean to say that similar health effects are not seen in other cultivars of kiwifruit (in fact there are few comparisons), but it certainly helps underpin a unique market proposition based on health benefits of modern Zespri cultivars;
- The lifespan of PVR is significant, they can take 1-5 years to acquire and can last for 20—23 years<sup>42</sup>;

<sup>39</sup> <https://cdnsiencepub.com/doi/abs/10.1139/cjpp-2012-0303@cjpp-nhpt.2015.01.issue-01>

<sup>40</sup> <https://www.sciencedirect.com/science/article/abs/pii/B9780123942944000171>

<sup>41</sup> <https://www.cambridge.org/core/journals/proceedings-of-the-nutrition-society/article/gold-kiwifruit-actinidia-chinensis-hort16a-for-immune-support/C18E5ED85E99EED57991C245026FD5B5>

<sup>42</sup> <https://www.iponz.govt.nz/about-ip/pvr/>

- In 2010, SunGold kiwifruit budwood was smuggled to China; the person responsible was ruled guilty in the New Zealand high court<sup>43</sup>, however, the damage was done, and gold kiwifruit is widely grown in parts of China, the area has doubled between 2019 and 2021 to more than 5,200 hectares<sup>44</sup> (more than half of the 9,300ha grown in New Zealand);
- Zespri moved away from legal defence in 2021 and proposed to New Zealand growers to undertake a one-year SunGold trial in China to determine options, this was voted against by growers;
- It is expected that the volume produced out of China will significantly increase and threaten New Zealand supply and margins;
- Chinese breeding programmes are underway, some of which use SunGold as a base, one is named “FairyGold.”

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*“We have also set up our own research and development department with an intention to develop our proprietary range of premium kiwifruit breeds – we have achieved breakthroughs in cultivating our own kiwi breeds under the Xianwo variety”*

*David Zhao, Executive Director, China Shensen Orchard<sup>45</sup>*

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## Potential application – New Zealand oat milk

- The kiwifruit industry has succeeded on the back of many years of research and investment, supported by the Crown – in key areas of health and wellness and plant breeding which has created the successful Book-End model;
- The oat milk industry could develop a similar model working with:
  - Health attributes:
    - Plant & Food Research, or The High Value Nutrition Science Challenge<sup>46</sup>, or the Riddet Institute<sup>47</sup> or individual universities around health properties of oat milk and in developing other plant milk blends and high value oat milk products; this would build on the growing prebiotic gut health and immunity health discoveries around  $\beta$ -glucan and other properties;
  - Oat breeding & management integration:
    - Plant Research (NZ) Ltd has been working with the Oat Industry Group around breeding for yield, quality, disease tolerance, phenotypes suited to southern regions, grain functionality (including traits that offer health benefits) for dry and wet products;
      - Quick to germinate, oats are a great smother crop that outcompetes weeds and provides allelopathic residue that can hinder germination of many weeds—and some crops—for a few weeks.
    - They have a new oat variety (L5) which has been tested for 5 years in Southland, and tested through the mill at Harraways:
      - 13% greater yield (equates to one extra tonne per hectare);
      - Improved  $\beta$ -glucan amount;

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<sup>43</sup> <https://asia.nikkei.com/Spotlight/Caixin/In-depth-New-Zealand-fruit-giant-s-kiwi-battle-in-China#:~:text=Zespri%20was%20founded%20in%201997,of%20the%20global%20kiwifruit%20market.>

<sup>44</sup> <https://www.theguardian.com/world/2021/jun/18/kiwi-wars-the-golden-fruit-fuelling-a-feud-between-new-zealand-and-china>

<sup>45</sup> <https://www.foodnavigator-asia.com/Article/2021/08/16/IP-Protection-in-China-Lessons-to-be-learnt-from-Zespri-s-loss-of-control-over-illegal-planting-of-its-gold-kiwifruit>

<sup>46</sup> <https://www.highvaluenutrition.co.nz/>

<sup>47</sup> <https://www.riddet.ac.nz/>

- Greater percentage protein;
  - On-going oat breeding targeting 10MT/ha (average is 7MT/ha);
    - Plant Research (NZ) Ltd now have genetics at a commercial standard that are consistently yielding 9MT in trials (including field scale trials) and have material in trials that is reaching a 10 MT/ha yield, so a significant lift in average oat yields is expected over the next 5 years – which is needed to maintain competitiveness with other arable species.
  - The Oat Industry Group contributes a levy which assists Plant Research (NZ) Ltd’s work. Harraways also contributes. The group has been running for 10 years (independent); with 50-70 farmers attending annual field day;
  - Evaluate oat lines evaluated offshore as well;
- It is important to note that Plant Research (NZ) Ltd is a private organisation who have co-invested in the local breeding programme for some years with no government funding;
  - The international work conducted by Plant Research (NZ) Ltd’s genetics is fully funded by Plant Research Ltd;
  - This means that for there to be a New Zealand “owned” PVR cultivar and Book End model, Crown investment into the existing Plant Research (NZ) Ltd would support the model to become more like Zespri SunGold;
  - There would be little point in starting again or trying to replicate what is being done well privately, so a complementary health-breeding MBIE-type research programme incorporating private and Crown players would be of value e.g.: co-ordination of:
    - Health attributes (crown), breeding and agronomy (private and growers), manufacturing and market (private);
    - Licence fees and research funds need to support the infrastructure which is already in place to grow the whole value proposition.

## Glanbia Case Study 2

Glanbia<sup>48</sup> originates from the merger and consolidation of several Irish dairy processing co-operatives during the 1980s and 1990s. Today, Glanbia Plc is positioned as a major global nutrition company with a leading portfolio of performance nutrition brands, and strong presence in the manufacturing of nutritional ingredients and dairy products.

The company’s brands and products are sold in over 130 countries, generating annual revenue of €3.8B. The original dairy processing co-operatives retain a significant 31.5% shareholding in Glanbia Plc, the parent entity of the Glanbia group. Glanbia Plc is listed on both the Irish and UK stock exchanges.

The origins of Glanbia as an amalgamation of Irish dairy farmer co-operatives and its subsequent evolution into a major, diversified global nutrition company represents a valuable case study for highlighting the potential value that can be generated by farmer co-operatives and grower groups/clubs via a focus on funding strategies to support growth and international expansion.

## Glanbia Plc – Key Products and Operating Divisions<sup>49</sup>

- Glanbia Plc is structured across three key divisions:
  - Glanbia Performance Nutrition that incorporates a portfolio of leading global sports and lifestyle nutrition brands that include Optimum Nutrition and Slimfast; GPN generated 2020 revenue of €1.14B (EBIT €91M);
  - Glanbia Nutritionals incorporates the production of nutritional and functional proteins, premixes, ingredients, nutrients and supplements for global food, beverage, and supplement partners. GN generated 2020 revenue of €2.7B (EBIT of €118M);

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<sup>48</sup> <https://www.glanbia.com/>

<sup>49</sup> Data reported below was obtained from the 2020 Annual Report from Glanbia Plc.

- Glanbia Joint Ventures incorporates Glanbia’s partnerships within food processing and manufacturing, particularly dairy products. Operations span partnerships across Ireland, the UK, Europe, and the USA, and includes the Glanbia Ireland JV between Glanbia Plc and the Glanbia Co-operative Society. Glanbia’s share of profit after tax from the JV entities was €62M in 2020<sup>50</sup>.
- Key strategic initiatives for Glanbia comprise:
  - Strong focus on sales channel optimisation within GPN – mass retailers (eg supermarkets, major pharmacy chains, retail giants like Kmart, Target and Walmart) and eCommerce now comprise 70% (37% mass retail & 33% eCommerce) of sales, versus 32% in 2015 (68% distributors and specialty retailers in 2015); market focus seeking to leverage the scale and category leadership within the North American market to drive growth in other international markets (currently only 24% of revenue).
  - Glanbia Nutritionals predominately trades through business-to-business channels as a supplier of specialised ingredients to food, beverage and supplement manufacturers;
  - Glanbia Nutritionals is focussed on pivoting its product portfolio toward growth categories such as sports nutrition, infant nutrition, dietary products and clinical nutrition where they are well placed to supply innovative, functional nutritional ingredients and solutions;
  - Product development is a key focus across all divisions (Figures 7, 8, 9 and 10);
    - Glanbia Performance Nutrition has launched Amazing Grass (Figure 8) as its first plant-based brand within the performance and lifestyle nutrition category;
    - Glanbia Ireland has launched a functional oat powder specifically targeted toward plant-based beverage applications.

*Figure 7. Glanbia Performance Nutrition high value nutrition products*




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<sup>50</sup> For comparability this would indicate a broadly equivalent contribution to the Performance Nutrition division to the overall Glanbia group profit (after deducting finance costs and tax from GPN EBIT).

Figure 8. High value Glanbia Performance Nutrition plant based “performance” or functional food products



## Background – Glanbia Plc and Glanbia Co-operative Society

- The Glanbia group originates from the 1997 merger between Waterford Foods Plc and Avonmore Foods Plc, with renaming as Glanbia occurring in 1999;
- Both Waterford Foods and Avonmore Foods (Figure 9) consisted of a combination of member and non-member shareholders that reflected their origins as dairy processing co-operatives that had subsequently undertaken public listings to introduce new shareholder capital;
- The original farmer co-operative shareholdings of the predecessor entities now reside within the Glanbia Co-operative Society, a separate entity to Glanbia Plc;
- The Glanbia co-operative and Glanbia Plc currently operate a joint venture (Glanbia Ireland) that includes all of the Irish dairy processing and commodity trading operations associated with the co-operative’s farmer members<sup>51</sup> - this represents the primary commercial linkage between Glanbia Plc and the co-operative;
- Adoption of the current structure of Glanbia Plc occurred over 2012-2013 via the restructure of the business into its current strategic segments and subsequent re-alignment of the co-operative’s shareholdings in both Glanbia Plc and Glanbia Ireland to provide a more transparent separation of the entities owned by the public shareholders, versus those owned by the co-operative member shareholders;

<sup>51</sup> Glanbia Plc announced in November 2021 that it will sell its 40% shareholding in Glanbia Ireland back to the co-operative.

- The co-operative's 31.5% shareholding in Glanbia Plc is the key source of annual net income to the co-operative members, with dividends from Glanbia Plc contributing 56% (€24.8M) of the co-operative's revenue base; dividends/distributions from Glanbia Ireland contribute the balance of the co-operative's annual revenue;
- In addition to the dividend income, the market value of the co-operative's investment in Glanbia Plc was valued at €967M, in contrast to the market value of its Glanbia Ireland investment (€278M)<sup>52</sup>; this highlights the relative value derived by the co-operative members from the investment in Glanbia Plc versus a focus on the more traditional commercial activities of the co-operative.

Figure 9. Avonmore brand product.



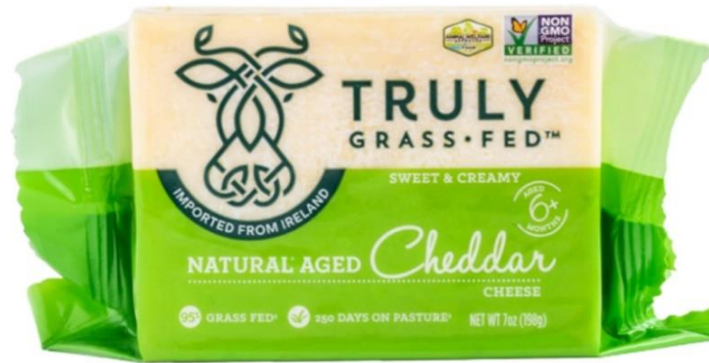
## Establishment of Glanbia Plc – strategic rationale

- Both Waterford Foods and Avonmore Foods operated as dairy farmer co-operatives that had undertaken an IPO to raise capital via public share markets; this was primarily motivated by the need to access additional equity capital to support growth investments and expansion beyond the small Irish market<sup>53</sup>;
- There are significant parallels between the Irish and New Zealand agri-food industries reflecting their relatively large agricultural output, small domestic markets and reliance on international trade and export;
- Growth opportunities in both countries rely on expansion into international markets, often in conjunction with vertical integration to extend reach further along the value chain;
- Strategic initiatives focussing on growth, international expansion and vertical integration often require significant capital to finance strategic acquisitions, capital projects, and product/brand and market development activities; financing these capital-intensive investments can often requires access to additional capital from off the balance sheet;
- Co-operatives and grower groups/clubs can find it challenging to raise sufficient capital from their member-shareholders due to the limited pool of member-shareholders and their finite capital resources; consequently, public listing (and private equity) can provide access to a larger pool of capital via the ability to raise capital from non-members and institutional investors. Listing can also access capital from additional markets/investors via dual listings in separate jurisdictions (as undertaken by Glanbia Plc), whilst private equity models can generally access capital from a global pool of investors.

<sup>52</sup> Both valuations represent market value as reported by Glanbia Co-operative Society as of YE 2020 (2020 Annual Report).

<sup>53</sup> <https://www.glanbia.com/history>

Figure 10. Glanbia cheese product utilising grass-fed story.



## Potential application – New Zealand oat milk

- The New Zealand domestic market is too small and competitive to represent the sole market focus for an oat milk brand; prospective brands will need to consider expansion into international markets, and may eventually need to consider financing production and value chain assets outside New Zealand e.g., Oatly and its global value chain network;
- In addition, this report has highlighted the importance of differentiation via branding (Figure 7,8, 9 and 10), novel product development and value-adding to enable oat milk brands to avoid the growing competition within the generic oat milk category; the report has also highlighted the challenging state of the New Zealand oat milk value chain, in particular the pinch points surrounding the current extent of processing/manufacturing infrastructure;
- These challenges highlight the likelihood that small, independent brand owners will at some point need to consider their ownership structure and financing to ensure they can access capital to meet their growth and developmental priorities;
- Glanbia represents an excellent case study that demonstrates the evolution of a traditional farmer co-operative or grower club (Figure 11) into a major, multinational food and nutritional company; this evolution has been enabled by the prudent use of new equity capital (accessed via public listing) to fund the expansion and development of the company;
- Despite the reduction in the ownership and control of the original farmer members, the growth of Glanbia and its capacity to operate globally, across multiple product categories (beyond the traditional commercial boundaries of the co-operative) and throughout the value chain, has funnelled more value back to the original members than if they retained their investment focus on their traditional commercial activities.

Figure 11. Glanbia co-operative, grass roots production in Ireland.



## AllBirds Case Study 3

AllBirds is a listed United States company, co-founded by New Zealander Tim Brown. We focus on this company to highlight the drivers of their success – their underpinning story, product design and business model.

### Underpinning story

- Tim Brown was an elite athlete, captaining the New Zealand All Whites football team; he teamed up with Joey Zwilling, an engineer and renewables expert to found AllBirds;
- As a footballer he was exposed to a sea of logo-ised, synthetic footwear which drove him to explore sustainable materials, starting with merino wool and later branching into eucalyptus fibres; they also use recycled plastics for their laces and now have an active-wear clothes range;
- His sustainability journey was inspired by Method<sup>54</sup> Co-Founder, Eric Ryan who believed people don't buy sustainability, they buy great products;
- Initial prototypes were developed after a pivotal China fact-finding trip exploring manufacturing; from there they were guided by three principles – design, comfort and sustainability;
- Tim Brown was close to quitting when he met co-founder:

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*"We just imagined this business. And I think really importantly, (we) imagined a business we would tell our grandchildren about. I think I found in Joey, and his vision around the environment and climate change, I found the purpose that had been missing up until that point. I'd been making shoes, making them out of wool and those were really important things but if you're going to go over all the hurdles you need to, all the pain, all the hard work, it needed to be for something bigger."*

*Tim Brown, Co-Founder All Birds<sup>55</sup>*

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- AllBirds listed on the NASDAQ exchange (ticker BIRD) in 2021;
- AllBirds recent financial performance reflects the outcomes of its aggressive growth strategy; this strategy is underpinned by the recent AllBirds IPO which has raised USD \$237M to support further growth and development of the product portfolio, brand and retail channels;
- Key highlights of the company's financial performance over 2019 to 2021 comprise:
  - Revenue growth has achieved a compound annual growth rate (CAGR) of 13%, growing from USD\$194M to USD\$277M;
  - This growth has been achieved whilst increasing the gross profit margin ratio (53% in 2021 from 51% in 2019) – highlighting the ability to maintain margin whilst increasing sales volumes;
  - Net losses (NPAT) have increased from USD\$15M (2019) to USD\$45M (2021). Operating and net losses reflect the ongoing investment in marketing and overhead expenses (development of new stores and channels) to support sales growth (now carrying USD \$107M of inventory versus USD \$44.3M in 2019); overheads also include costs associated with the IPO;
  - Revenue growth lags the investments in marketing and scaling-up – takes time to fully translate into increased revenue.
- AllBirds have provided guidance to investors that the 2022 revenue is expected to be \$355-\$365M (USD), corresponding to gross profit of \$188M-\$195M and operating loss (EBITDA) of \$9M-\$13M;

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<sup>54</sup> <https://www.methodhome.com.au/>

<sup>55</sup> <https://www.newstalkzb.co.nz/podcasts/hp-business-class/hp-business-class-tim-brown-from-allbirds/>



- Post the IPO, Allbirds carries minimal long-term debt and is sitting on cash reserves of US\$289M; they are well placed to continue their growth strategy, particularly as recent investments (13 stores added in 2021, increasing their retail footprint to 37 stores) start to contribute greater revenue.

## Positioning and business model

- AllBirds have positioned their shoe products at the medium-high end of footwear (Figure 12);
- Their sustainability story is measured throughout the value chain from materials through to manufacturing and they aim to have a “near zero” carbon footprint by 2030 (Figure 13);
- They have engaged with MerinoNZ to support their on-farm regenerative programme ZQ (Figure 14) for merino fibre; it is worth noting, this is an individualised farmer programme, where farmers work across a number of sustainability parameters at different paces and levels to optimise progress;
- The AllBirds business model is predominantly D2C, built off the Shopify platform (they are one of Shopify’s flagship companies) with retail stores in premium locations;
- Financial analysis of AllBirds’ D2C model states that there are challenges with continually variable re costs, and that D2C doesn’t fully eliminate middlemen – but it does drive higher revenue sales and profits<sup>56</sup>.

*Figure 12. AllBirds footwear, made from Merino wool and bamboo.*



<sup>56</sup> <https://www.cnbc.com/2021/11/03/allbirds-ipo-bird-to-start-trading-on-the-nasdaq.html>

Figure 13. AllBirds sustainability narrative (taken from website).

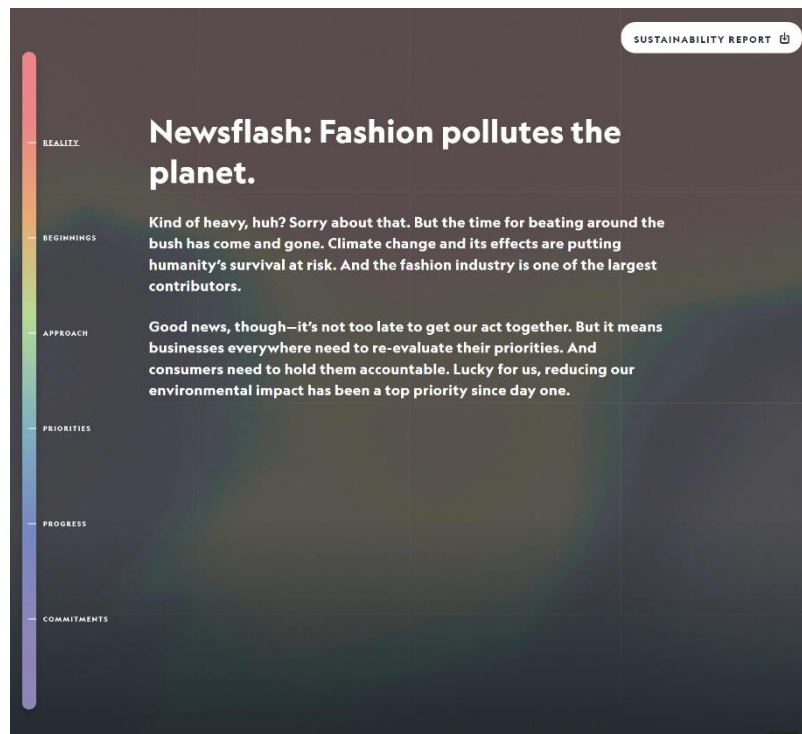
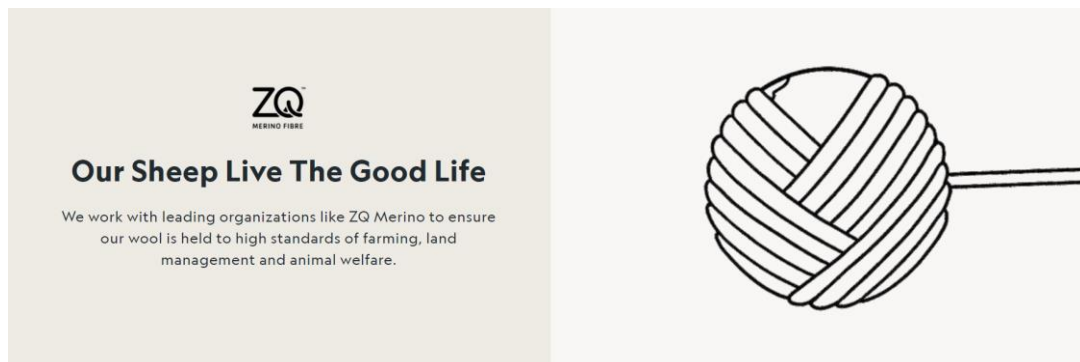


Figure 14. AllBirds tie in with MerinoNZ's ZQ regenerative programme for fibre.



## Potential application – New Zealand oat milk

- New Zealand fibre production is a key part of brand story;
- AllBirds are a purpose driven, world-leading company operating the high value D2C model as their main channel to market;
- The business has compelling ethics, narrative and design which creates a loyal consumer community;
- In a podcast, Tim Brown speaks of the ambition of North Americans (and the drive of his North American co-founder) to build billion-dollar companies and how that challenged his kiwi culture/mindset<sup>57</sup>; this is important to understand for the New Zealand psyche, or willingness to go big.

<sup>57</sup> <https://podcasts.apple.com/ca/podcast/tim-brown-on-benefit-two-ceos-leaving-no-carbon-footprint/>

## Conclusions and future directions

The findings from the economic farm systems modelling showed that based on today's returns and the amount of land required for oat milk production, there is unlikely to be large-scale land-use change for oat milk production in Southland.

This is based on:

- The returns to oat growers, compared with existing returns from other crops and from dairy (especially);
- The land needed to produce a litre of oat milk compared with a litre of cow's milk;
- The concern for dairy farmers about a potential inability to "go back" to dairy use once land-use changes are made due to environmental consent processes.

This is not to say that disruption isn't coming and it's important to look beyond today.

Environmentally, oat production does stack up well against ruminant farming and there is increasing social and community pressure driving land-use change. One of the farmers in our workshops stated that most farmers "have one life cycle," in other words they have one big drive or change in their career – it may be a conversion from sheep to dairy or a significant purchase for the business or investing in farm forestry.

The next generation of farmers will have different perspectives and different social and financial drivers – perhaps it will be here that opportunities like growing plants for milk production will take flight.

Disruption often comes with warning signs. Malcolm Gladwell's "Tipping Point" theory<sup>58</sup> highlights that talking turns into trends which become viral – but the signs are often there earlier than we think.

Southland has the ideal climate and terrain for oat growing, as we discussed in our literature review. As the climate warms and with the region's relatively reliable rain fall, there will be many new cropping and new product opportunities. The question then becomes:

*Does the region fully get in behind one "big idea" such as oat milk and galvanise a world leading industry, or do they back 10 ideas and scale the one with the greatest success early, financially, and socially, first?*

There is no one answer to this question, but under either scenario, it is highly likely that modern, innovative manufacturing will need to be part of the equation.

A key challenge for any new industry is investment in capital-heavy infrastructure. There is a chicken and egg situation, do you invest in manufacturing first and build the brand afterwards or do you build the brand first?

The scenario playing at for Southland now is a contract manufacturing one, that of the potential investment into New Zealand Functional Foods, where if it comes to fruition, will leave the brand owners and the oat growers in a much better position than they are now.

The existing oat milk companies have demonstrated that there is demand for oat milk products, and potentially there is even greater demand and value creation in innovative new plant-blend products such as hemp and oats or peas and oats. The costs and quality of New Zealand oat milk manufacturing facilities is problematic, and a contract solution offers these brands a good opportunity to reduce their costs and to create intellectual property around the production of their end-product. The building of this facility is time-critical if brands are to be built before oat milk becomes commoditised. The facility also needs to be adaptive to new innovation as new products and new blends will need to be developed quickly to avoid "the race to the bottom."

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<sup>58</sup> <https://www.amazon.com/Tipping-Point-Little-Things-Difference>

We very much like the “Book End” concept, proposed by Andy Elliot in his Nuffield studies, in relation to the oat milk scenario. Product innovation and brand building at one end, built on a compelling environmental story at the production end, where the All-Birds/MerinoNZ model is a great exemplar.

Product to market models are also changing quickly, growing subscription models and direct to consumer selling platforms offer interesting alternatives to traditional wholesale supermarket models. How this is managed will need exploration, in terms of product forms and storytelling.

The international trends around functional foods and beverages and personalised food and nutrition add to how both the production stories and product innovation and form play out – the opportunities here are significant and fit with New Zealand’s strengths in agriculture and science, the Glanbia case study highlights how this might be done.

During the course of this project, we were able to meet with a Southland iwi representative and a follow up Kaupapa has been arranged (outside the timeframe of this project). This is an exciting proposition in terms of long-term thinking about land-use and community, as well as commercial opportunities. It will be worthwhile taking into account other iwi-led examples such as Miraka Dairy and Wakatu Incorporation.

There are also significant opportunities for iwi-private-regional collaborations to occur around production and product innovation, to be supported by the Crown via MBIE Endeavour and/or Sustainable Future Food and Fibre programmes.

In conclusion, it’s fair to say that oat milk production will not be a silver bullet for the Southland region in terms of large-scale land-use change and return for farmers without significant investment in the whole value chain, from production, through manufacturing, innovation, and brand.

Additionally, we must not discount the effect of disruptive forces in the food and agricultural industries, and we should be inspired by companies such as AllBirds and Zespri, and by the needs of future generations, to invest and be brave in face of the unknown.

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*“If we are not aware of it and participating in our own disruption, we basically deserve what we get.”*

*Tom Mastrobuoni, Chief Financial Officer, Tyson Ventures<sup>59</sup>*

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<sup>59</sup> <https://www.nuffieldscholar.org/sites/default/files/2021-04/Andy%20Elliot%20-%20Nuffield%20Report.pdf>

# Appendix 1

## Economic farm surplus assumptions for each land class

|                                      | <b>Dairy</b> | <b>Winter grazing</b> | <b>Spring Barley</b> | <b>Spring oats</b> | <b>S&amp;B Finishing</b> |
|--------------------------------------|--------------|-----------------------|----------------------|--------------------|--------------------------|
| Farm area (ha)                       | 190          | 167                   | 300                  | 300                | 258                      |
| No Cows / su                         | 580          | 3,000                 |                      |                    | 2,794                    |
| Milk Production (kgMS)               | 420          |                       |                      |                    |                          |
| Milk price (\$/kgMS)                 | \$8.00       |                       |                      |                    |                          |
| Crop Yield (kg/ha)                   |              |                       | 8,000                | 7,000              |                          |
| Crop price (\$/T)                    |              |                       | \$450                | \$450              |                          |
| R1 grazing rate (\$/hd/wk)           |              | \$8.50                |                      |                    |                          |
| R1 grazing rate (\$/hd/wk)           |              | \$13.00               |                      |                    |                          |
| Cow winter rate (\$/hd/wk)           |              | \$34.00               |                      |                    |                          |
| 2025 HWEN change in EFS %            | -1.70%       | -1.70%                | -0.05%               | -0.05%             | -2.40%                   |
| 2030 HWEN change in EFS %            | -5.50%       | -5.50%                | -0.10%               | -0.10%             | -7.80%                   |
| Asset price/ha (land, stock, shares) | \$47,000     | \$25,000              | \$25,000             | \$25,000           | \$22,000                 |

HWEN – He Waka Eke Noa proposed pricing framework for GHG emissions.

Data generated from B+L NZ benchmarking, Dairy base benchmarking and industry pricing pricing/schedules.