



Opportunities for New Zealand sheep milk products - a study of 5 export markets

Farming



Sheep milk industry snapshot 2019

- In 2019, there were an estimated 22,000 milking ewes in New Zealand
- Of these, 12,345 produced milk from 18 farms
- Milk production totalled 1.6 million litres
- An average of 130 litres per ewe over the year
- Some flocks average 240 litres per year with expectations this could increase to 400 litres (Uys, 2019).
- The current sheep milk lactation period is approximately 200 days
- Average farm-gate milk price is around \$2.75 per litre of \$15.90
- 17.3% solids content

(Data - Massey University and MPI, 2020),



The models are based on utilization of 55ha and what impacts to the bottom line.

The industry is relatively new and focused on not compromising the ewe, but the question remains -

Where can we be by introducing marginal economics of adding extra feed?

Figure 1: Impact of Milk Yield on Revenue, Expenses and Gross Profit

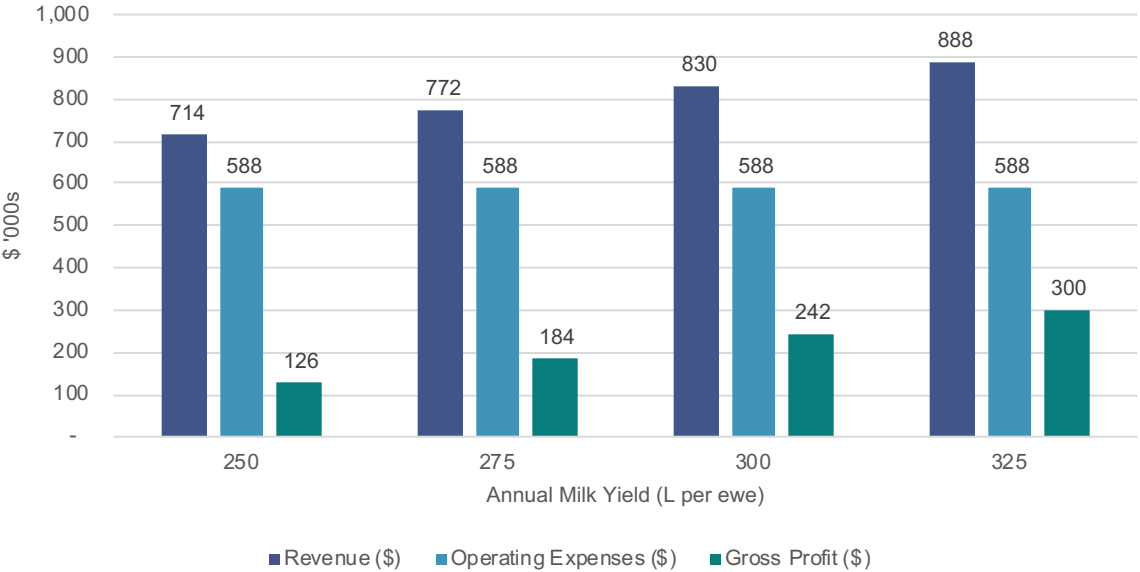


Figure 2: Impact of Milking Ewe Numbers on Gross Profit per Hectare

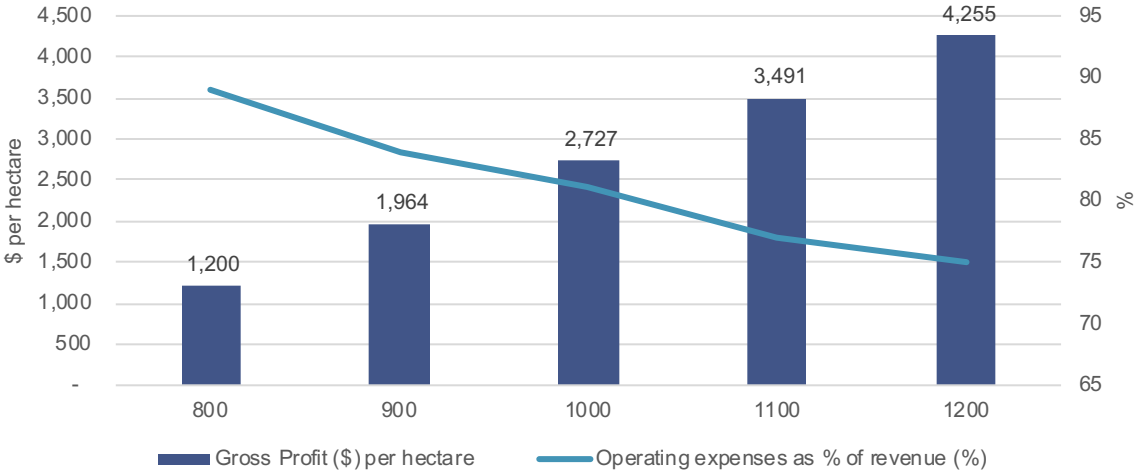
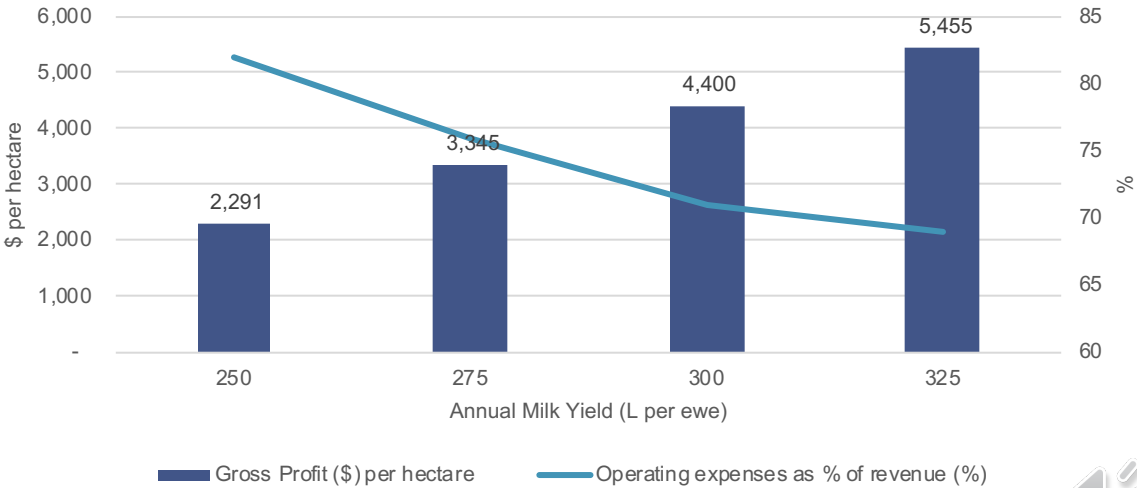


Figure 3: Impact of Milk Yield on Gross Profit per Hectare



Barriers to Entry

- Access to capital with banks reluctant to lend money unless proof milk can be sold (i.e. supply contract with an established processor or brand owner).
- Banks questioned the re-use value on assets, particularly from a small farm (55ha)
- Access to animals with high quality genetics.
- Lack of knowledge e.g. on farm management, economics, environmental implications.
- Access to commercial scale processing infrastructure. – Currently 2 hours from FoodWaikato
- Route to market for additional production volumes.

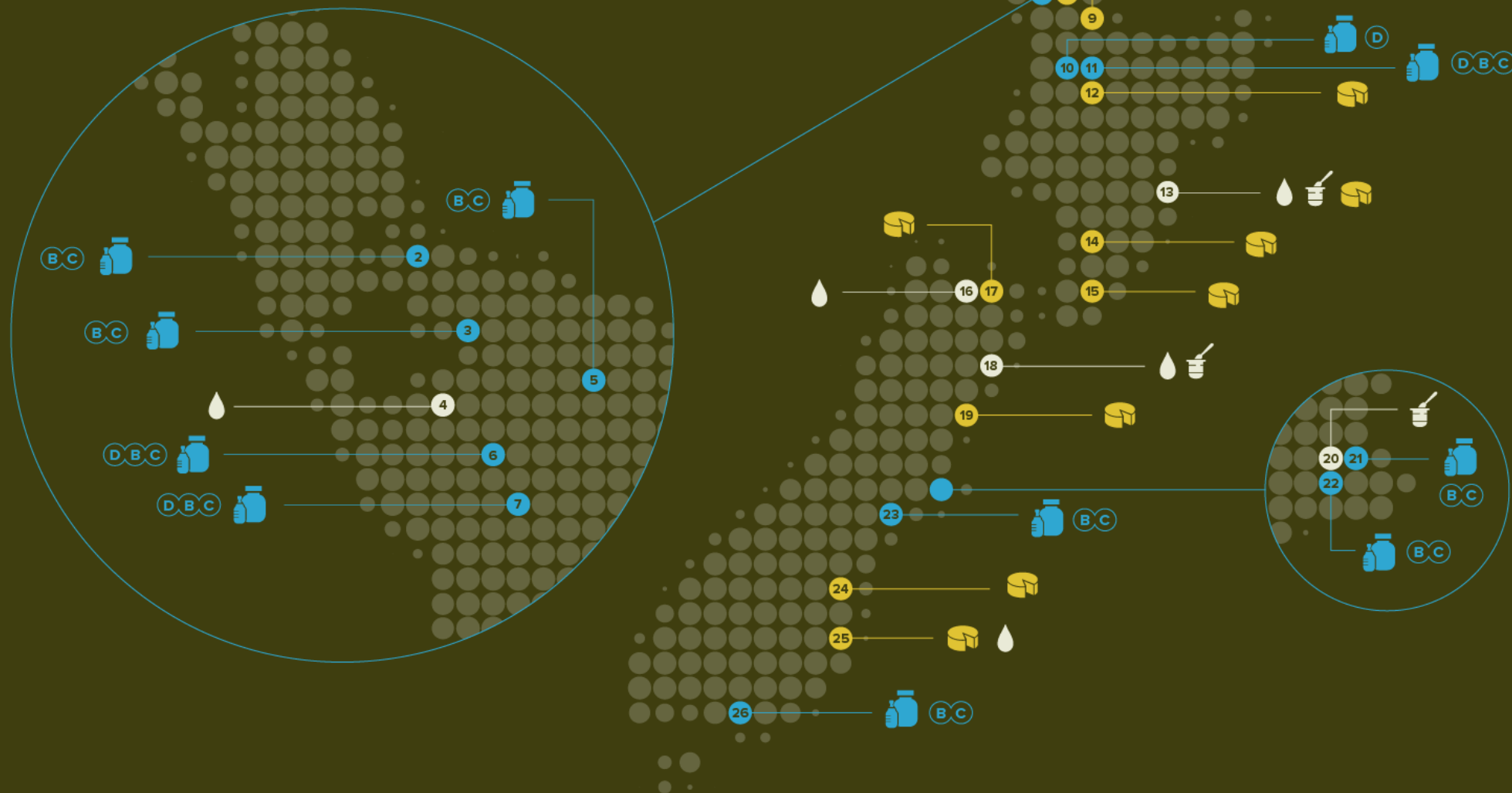


Opportunities

- Farm diversification – land use change, secondary income
- Use block chain technology to support provenance and milk price through traceable and transparent supply chains.
- Improve production system, investigate marginal costs economics of adding extra feed
- Continue genetic improvement to increase milk yield
- Environmental benefit of sheep dairying over bovine dairying yet to be confirmed.
- We should be ready for overseas market regulations mandating the reduction or elimination of anthelmintic drenches and antibiotics



New Zealand Milk Processors



PROCESSORS

- 1 Puhoi Valley
- 2 New Zealand Pure Dairy Products
- 3 Synergy Nutrition
- 4 Wairere Creamery
- 5 New Zealand GMP Pharmaceuticals
- 6 New Image Group (NIG) Nutritionals
- 7 Yashili New Zealand
- 8 Meyer Gouda
- 9 Aroha Organic Goat Cheese
- 10 FoodWalkato/Melody Dairies
- 11 Dairy Goat Co-operative
- 12 Over The Moon Dairy
- 13 Origin Earth
- 14 Cartwheel Creamery
- 15 The Drunken Nanny
- 16 Everbrook Dairy Goats
- 17 Cranky Goat
- 18 Goats Amore
- 19 Kalkoura Cheese
- 20 BioFoods
- 21 Best Health Foods
- 22 Keytone Dairy
- 23 New Zealand Dairy Collaborative
- 24 Whitestone Cheese
- 25 Goat Island Dairy
- 26 Blue River Dairy

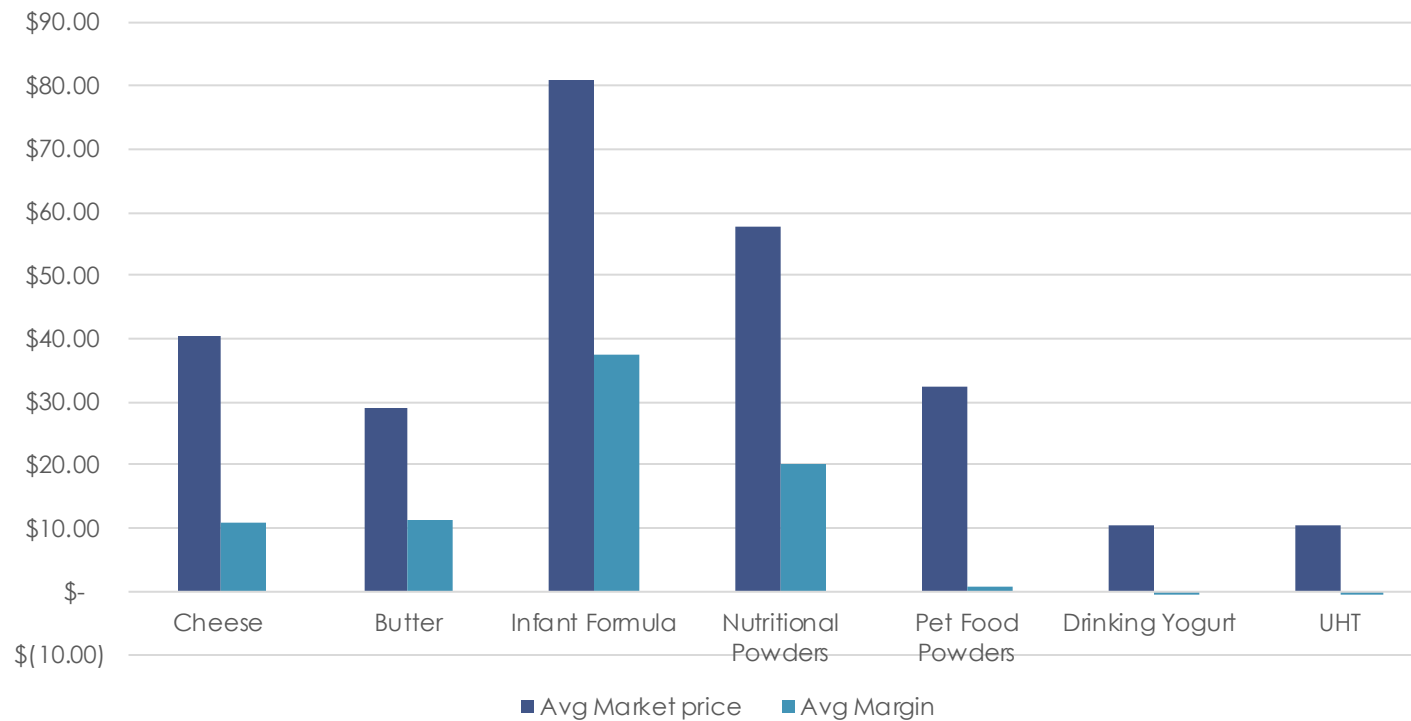
PRODUCTS

- Infant formula and nutritional powders
- Cheese
- Yoghurt
- Pasteurised Milk

CAPABILITIES

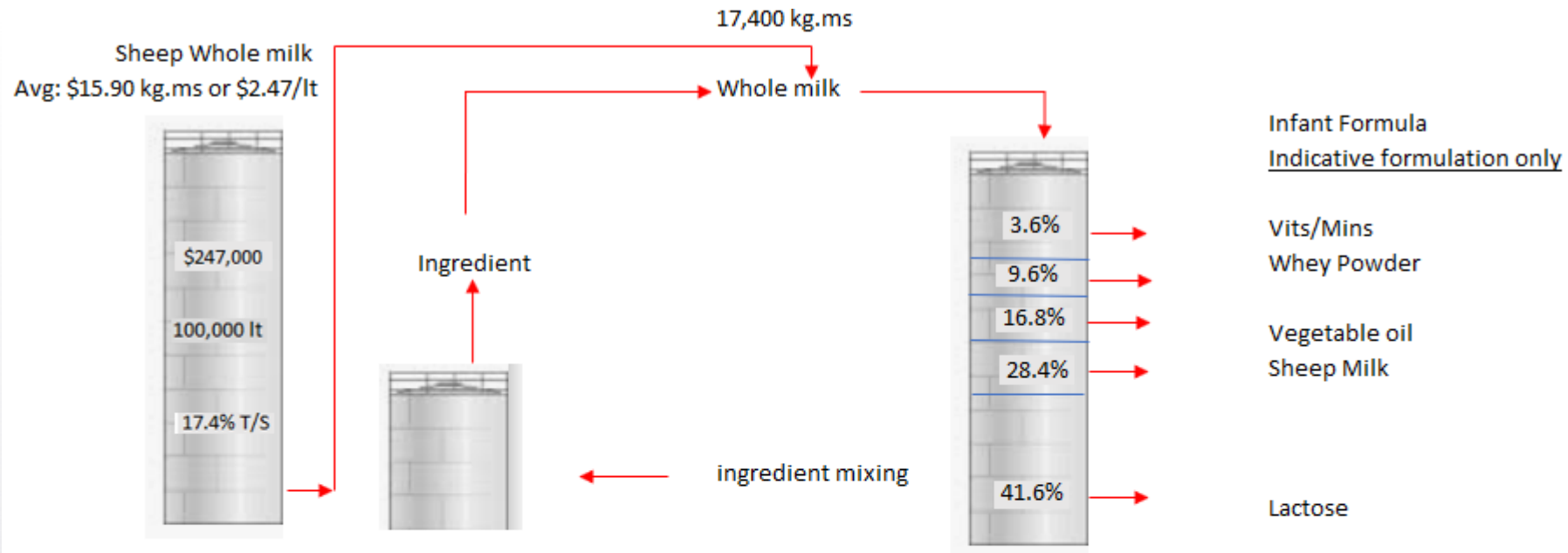
- Drying
- Blending
- Canning

Average Estimated Export Margin on Sheep Products



| | Market | | | | | | | | Farm | | | |
|-------------|------------------------|------------------------|----------|----------|----------|----------|-------------|-------------------|----------------|-----------|--------|--|
| | USD market (Avg) price | Distributor sale price | USD | NZ | Tariff | Tariff % | NZ Ex Works | Approx. NZ Margin | Total NZ costs | NZ EBITDA | EBITDA | |
| China | \$ 89.51 | \$ 53.71 | \$ 45.65 | \$ 70.23 | \$ - | 0.0% | \$ 70.23 | \$ 49.35 | \$ 20.88 | \$49.35 | 55.1% | |
| USA | \$ 75.00 | \$ 45.00 | \$ 38.25 | \$ 58.85 | \$ 10.30 | 17.5% | \$ 48.55 | \$ 27.67 | \$ 20.88 | \$27.67 | 36.9% | |
| South Korea | \$ 76.70 | \$ 46.02 | \$ 39.12 | \$ 60.18 | \$ 11.61 | 19.3% | \$ 48.57 | \$ 27.69 | \$ 20.88 | \$27.69 | 36.1% | |
| Germany | \$ 64.60 | \$ 38.76 | \$ 32.95 | \$ 50.69 | \$ 3.85 | 7.6% | \$ 46.83 | \$ 25.95 | \$ 20.88 | \$25.95 | 40.2% | |
| Taiwan | \$ 99.01 | \$ 59.41 | \$ 50.50 | \$ 77.68 | \$ - | 0.0% | \$ 77.68 | \$ 56.80 | \$ 20.88 | \$56.80 | 57.4% | |





100,000lt will manufacture 71,789kg of infant formula based on this indicative formulation

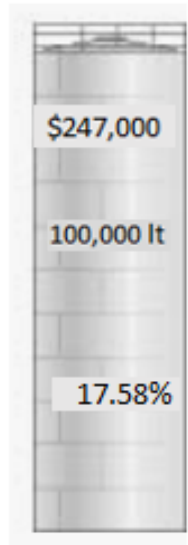
| | |
|---------------------------------------------------------|-----------------------|
| Estimated ingredient, production and canning costs | \$20.88 /kg/NZD |
| Avg retail sale cost USA, China, Taiwan, Korea, Germany | \$80.96 USD |
| Average NZ market margin | \$42.65 /kg NZD |
| Total Profit | <u>\$3,061,800.85</u> |

Sheep Infant Formula production



Sheep Milk Whey Processing

Sheep Whole milk
Avg: \$15.90 kg.ms or \$2.47/lit

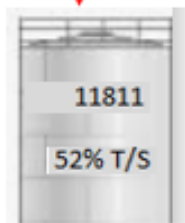


Cream /

Skim milk

88,518 lt

Cream



5926 kg of butter

Products from Skim Milk

| | Manufactured | kg | Market price | sale value |
|--------------------|--------------|-------|--------------|----------------------|
| → Lactoferrin | | 15 | \$ 2,000.00 | \$ 30,000.00 |
| → WPC80 | | 1,085 | \$ 22.72 | \$ 24,651.20 |
| → Caseinate | | 4,260 | \$ 9.50 | \$ 40,470.00 |
| → Permeate/Lactose | | 3,895 | \$ 1.33 | \$ 5,180.07 |
| → Butter | | 5,926 | \$ 15.07 | \$ 89,304.82 |
| | | | | <u>\$ 189,606.09</u> |

*Caseinate & Butter sold in retail packs

*WPC80, Permeate & Lactoferrin sold as ingredient

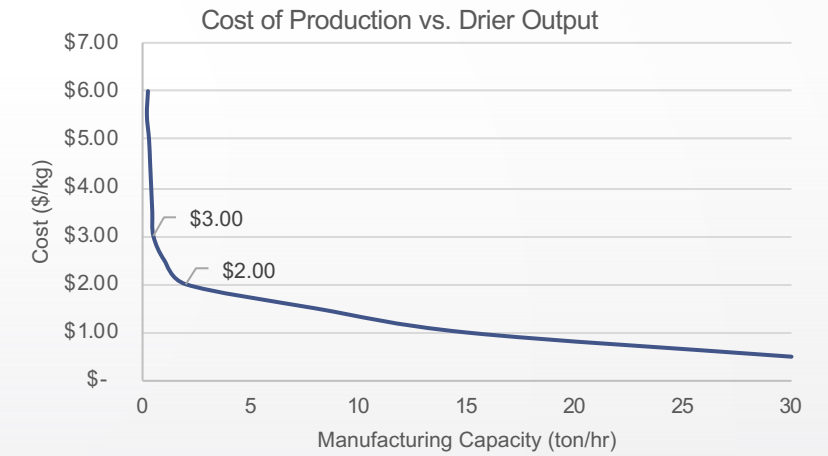
Engineering the Bucket of Milk



sheep milk infant formula growing its share

0.04% (1,000 ton in 2019) to 0.5% or 14,400 ton in 2024

- 1.2 ton per hour drier
- Processing 103,000 lt/day
- 3 x Raw milk production days per week (309,000 lt/week)
- 2 x Infant Formula production days per week
- 1.5 x Clean in place (CIP) days per week
- 0.5 days Product change over
- 184,000 milking ewes



| Assumptions | Yr0 | KPIs | Yr0 | Yr1 | Yr2 | Yr3 | Yr4 | Yr5 | Yr6 | Yr7 | Yr8 | Yr9 | Yr10 | Trend |
|-----------------------------|---------|--------------------------------------|---------|---------|--------------------------|----------|----------|----------|---------|---------|---------|---------|------|-------|
| Investments \$000 | | Production Volumes | | | | | | | | | | | | |
| Capital Investment | 56,950 | Revenue. | | | | | | | | | | | | |
| Equity Contribution | 34,170 | Goat | 78,958 | 80,142 | 81,344 | 82,564 | 83,803 | 85,060 | 86,336 | 87,631 | 88,945 | 90,279 | | |
| Working Capital | 600 | Sheep | 82,112 | 83,343 | 84,594 | 85,862 | 87,150 | 88,458 | 89,785 | 91,131 | 92,498 | 93,886 | | |
| Total Equity Contribution | 34,770 | Cow | | | | | | | | | | | | |
| Equity : Loan Ratio | 60.0% | Total Revenue \$000 | 161,069 | 163,485 | 165,938 | 168,427 | 170,953 | 173,517 | 176,120 | 178,762 | 181,443 | 184,165 | | |
| Bank loan | 40% | Profitability | | | | | | | | | | | | |
| | | EBITDA \$000 | 47,052 | 47,758 | 48,475 | 49,202 | 49,940 | 50,689 | 51,449 | 52,221 | 53,004 | 53,799 | | |
| Bank Loan Fixed Term | 5 | EBITDA% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | 29% | | |
| Bank Loan Fixed 5 yrs | 10,000 | | | | | | | | | | | | | |
| Bank Loan Float | 12,780 | Interest paid \$000 | 922 | 450 | 450 | 450 | 450 | | | | | | | |
| Total Bank Loan | 22,780 | Net Profit Before tax \$000 | 42,662 | 43,835 | 44,596 | 45,599 | 46,332 | 48,026 | 48,781 | 49,529 | 50,320 | 51,143 | | |
| | | Net Profit Before tax % | 26.5% | 26.8% | 26.9% | 27.1% | 27.1% | 27.7% | 27.7% | 27.7% | 27.7% | 27.8% | | |
| Cost of Capital | | | | | | | | | | | | | | |
| IRR Finance Rate | 5.25% | Dividends | 18,430 | 25,080 | 25,578 | 26,121 | 26,582 | 27,419 | 27,989 | 28,421 | 28,870 | 29,340 | | |
| MIRR Reinvestment | 8.50% | | | | | | | | | | | | | |
| Bank Interest Float | 5.25% | Bank Loan Balance \$000 | 22,780 | 18,999 | 10,000 | 10,000 | 10,000 | 10,000 | | | | | | |
| Bank Interest Fixed | 4.50% | Capital Ratios (Equity/Total Assets) | 65% | 66% | 76% | 78% | 79% | 80% | 90% | 90% | 91% | 91% | 92% | |
| Investment Returns | | Steering Panel | | | | | | | | | | | | |
| MIRR Project Return | 37.87% | | | | Goat | Sheep | Cow | | | | | | | |
| Total Cash Flow IRR | 76.11% | Animal Ratio | | | 50% | 50% | | | | | | | | |
| NPV \$k @76.1% | 0.00 | | | | Factory Selling Price/kg | | | | | | | | | |
| NPV \$k @5.3% | 423,274 | | | | IF | \$ 42.06 | \$ 42.65 | \$ 12.00 | | | | | | |
| EBIT Multiple | 6 | | | | WMP | \$ 17.41 | \$ 19.35 | \$ 6.00 | | | | | | |
| Revaluation Yr0 | | | | | Cost price/kg | | | | | | | | | |
| | | Plant Production days | 320 | | IF | \$ 20.33 | \$ 20.88 | \$ 5.68 | | | | | | |
| Dividends Policy | | Days Allocated to IFB | 160 | | | | | | | | | | | |
| To distribute | 80% | Days to Fresh | 160 | | Milk | \$ 1.61 | \$ 2.75 | \$ 0.66 | | | | | | |

Owner operator process plant



Opportunities / Barriers to Entry

- Lack of suitable processing infrastructure outside central North Island (may limit sector growth in the long-term).
- Market growth opportunities indicate 2 new 1.2 ton driers process would be required in the future
- Difficulties raising capital for new processing infrastructure.
- Opportunity to grow the export market for sheep milk products and create demand for infant formula and nutritional powders.
- Economies of scale when designing new driers may lower manufacturing costs
- Research on Protein products may create the opportunity to manufacture NZ made ingredient
- Opportunities exist for Cheese and Butter and should be explored



Thank You

