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**NEW ZEALAND
TRADE & ENTERPRISE**
Te Taurapa Tūhono

PEA PROTEIN

An analysis of the New Zealand and export markets for potential investors in pea/legume protein isolate facilities

*A REPORT TO NEW ZEALAND TRADE & ENTERPRISE
February 2023; v1.00b*

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PEA PROTEIN

An analysis of the New Zealand and export markets for potential investors in pea/legume protein isolate facilities

A REPORT TO NEW ZEALAND TRADE & ENTERPRISE

February 2023

v1.00b

EXECUTIVE SUMMARY

New Zealand has strong comparative advantage in animal-based proteins, including dairy, beef and sheep meat. New Zealand is the largest global exporter of dairy products and the global leader in dairy-based powder exports. The country is also the world's largest sheep meat exporter and a major beef exporter. At the same time, New Zealand is a major producer and exporter of numerous crops, including barley, oats and peas. The country is leveraging its strength in protein into plant-based food products, including sports nutrition and plant-based meats. This growth has driven demand for pea protein by firms in the New Zealand domestic market.

The purpose of this research is to develop a clear understanding of the pea protein isolate and concentrate market in New Zealand and for export. The primary target audience for this research is potential investors in a New Zealand pea/legume protein processing facility, likely in Canterbury. However, the research can also be used by other value chain participants and a wider audience of stakeholder, including regional government.

As part of this research, all major buyers and users of plant protein in New Zealand, including importers, wholesalers, manufacturers (including contract manufacturers), brand owners, sales and marketing organisations and retailers were identified and almost all were interviewed.

From this a clear picture of the New Zealand market for pea protein isolates - across all key metrics across all channels and markets - has emerged.

HOW BIG IS THE NEW ZEALAND MARKET?

New Zealand is a 530t market for pea protein. While this

is small relative to the United States (with an estimated 50,000-60,000t in pea protein imports), it is similar in size to South Korea (500-1,000t) or Singapore (600-1,000t). This is because New Zealand processors - led by their consumers - have more quickly made the shift away from soy to pea.

A SOLID AND ATTRACTIVE MARKET

The 530t of pea protein the New Zealand market currently demands currently flows primarily into two uses: sports nutrition products (451t or 85%) and alternative meats (74t or 14%). Other food and beverage uses are currently very small (5t or 1%) as these sectors are currently dominated by soy.

A STRONGLY GROWING MARKET

New Zealand has experienced strong demand growth for imported pea protein, with the market growing at 53% CAGR (2010-2021) over the past decade. This growth in demand has been driven almost exclusively by the two key sectors: sports nutrition and alternative meats.

Total ingredient pea protein imports (530t) are dominated by pea protein isolate which accounts for 90% of total pea protein usage. Pea protein concentrate (20t), pea crisp (10t) and pea-based textured vegetable protein (TVP)(20t) together account for only 10% of total demand.

Usage of these different pea protein products varies by sector, with 97% of sports nutrition (powders and bars) usage being isolates, while alternative meats using all forms of pea protein.

FURTHER GROWTH POTENTIAL EXISTS IN EXISTING AND NEW SECTORS

New Zealand is not a small country. New Zealand is similar in size to the United Kingdom, Italy or Japan, but with a population similar to Singapore. As a result, the New Zealand food and beverage industry produces a huge net surplus and is highly focused on export markets. Therefore, while New Zealand does not currently produce pea protein and rather imports all its needs, it still processes and re-exports a large part of production. About a third (34%) of pea protein in sports nutrition is re-exported and about 20% of pea protein in alternative meats is re-exported.

Industry interviews and modelling suggest that New Zealand market demand for pea protein has the potential to grow by 10x over the next decade from 530t to 5,500t. At these volumes, the market would be similar in size to Japan or Australia currently. All segments of the New Zealand market demand for pea protein are projected to experience growth, though with four key sectors expected to drive this growth: sports nutrition for export (+1,300t), plant-based infant formula/toddler milk (+1,600t), premium pet food (+900t), plant-based milks (+500t) and plant-based meats (+270t).

DIFFERENT USERS PAY DIFFERENT PRICES AS THEY WANT DIFFERENT LEVELS OF QUALITY

Pea protein is not an undifferentiated, one-size-fits-all commodity ingredient like citric acid or sodium nitrate. Different global producers produce different grades of product targeting different market segments at different prices.

Moreover, buyers of pea protein do not all want to buy the same product. Different pea protein products with different characteristics (e.g. solubility, mouth feel) allow buyers to differentiate their own products to the final consumer.

As a result, New Zealand users of pea protein vary in the amount they pay for pea protein, with an estimated average price of NZ\$7.23 (US\$4.62), but with huge variance between buyers. While some small part of this variance will be a result of scale in buying, higher protein levels demand a higher price. The vast majority of these price differences can be explained by differences in perceived quality and other soft characteristics (e.g. European supply). The implication of this is that a New Zealand pea/legume protein plant will need to offer a range of formulations rather than addressing the total New Zealand market with a single product.

SPORTS NUTRITION

New Zealand is leveraging strength and capabilities in whey to grow a strong sports nutrition sector using pea protein.

LEVERAGING STRENGTH AND CAPABILITIES IN WHEY

As the world's largest dairy exporter, New Zealand has large (320,000t) and growing (a 20y CAGR of 4%) exports of whey and other related dairy proteins. It is this strength in whey, combined with a fast moving and highly innovative food processing sector, that has enabled the emergence of a strong sports nutrition industry. Over the past decade, New Zealand firms have leveraged strengths and capabilities developed in whey protein-based sports

nutrition into plant based protein, particularly pea-based products. For example, market leader Vitaco has extended their Healtheries Slim whey-based range into pea-protein based products.

A HUGE RANGE OF PEA-BASED PRODUCTS IN THE MARKET

Over the past decade, the New Zealand market has seen an explosion of both line extensions and new product launches into pea protein-based sports nutrition. As a result, New Zealand firms now make a huge range of pea-based sports nutrition protein powders across a wide range of brands. At the same time, New Zealand sports nutrition firms also make a innovative range of pea protein-based sports nutrition bars, cookies and similar. These products use isolate powders and pea crisp products to achieve the functional results.

A ROBUST DOMESTIC MARKET

New Zealand has a robust domestic market for sports nutrition accounting for 66% of demand. Domestic sales of pea protein-based sports nutrition products occur through a wide range of channels, with no single channel dominating. Major channels include supermarkets (20-30%), pharmacy (15-25%), sports nutrition retailers (10-20%), health supplements retailers (5-15%), online (5-15%) and manufacturer/marketer direct (15-25%). Within all these channels, New Zealand has a large number of retailers with more than 2,000 points-of sale.

A LARGE AND WELL DEVELOPED INDUSTRY

New Zealand firms adding value to pea protein in sports nutrition products are spread across the country.

PLANT-BASED MEATS

New Zealand is leveraging strength and capabilities in meat to support an emerging plant-based meat sector.

LEVERAGING STRENGTH AND CAPABILITIES IN MEATS

New Zealand has large and growing meat industry focused on exports.

New Zealand is leveraging strengths and capabilities developed in meat into plant-based meats.

A HUGE RANGE OF PEA-BASED PRODUCTS IN THE MARKET

New Zealand makes a range of alternative meat products, many of which use pea protein.

A ROBUST DOMESTIC MARKET

Domestic (New Zealand) sales of pea protein-based alternative meat products occur predominantly in supermarkets (85-90%).

A LARGE AND WELL DEVELOPED INDUSTRY

New Zealand firms making plant based meats and meals using pea protein are located in Auckland, other parts of the North Island and Canterbury.

Beyond sports nutrition and plant-based meat, New Zealand makes some other foods using pea protein; however, currently most plant-based food products contain soy.

POTENTIAL INCREMENTAL DEMAND FROM OTHER EXPORT SECTORS

An additional 3,000t+ of incremental demand could be available primarily in pea-based alternatives to traditional large New Zealand exports across three large new export-focused opportunities, as well as some smaller domestic opportunities.

1. PEA-BASED UHT MILK

New Zealand's position as a large and growing exporter of UHT milk creates an opportunity for a share of this to transition to both pea-based milks and the addition of pea fortification to other alternative milks.

2. PEA-BASED INFANT FORMULA/TODDLER MILK

New Zealand's position as a large exporter of infant and toddler formulas creates an opportunity for a share of this to transition to pea-based products.

3. PEA-BASED PREMIUM PET FOOD

New Zealand's growing position as exporter of super-premium pet foods creates an opportunity for a share of this to transition to pea-based products.

OTHER SMALLER DOMESTIC PEA-BASED CATEGORIES

A range of other, smaller product categories would be enabled by domestic supply of pea protein isolate.

THE WORLD MARKET

Pea protein is a 200kt global market where approximately 150kt crosses borders. Within this large world market, we highlight a more narrow range of export markets with high potential for New Zealand produced bulk pea protein isolate.

Overall the United States – in particular - stood out as the major market and importer (50-60kt). The United States emerged from a cross-country benchmarking which highlighted it as the largest and most attractive potential market for New Zealand produced pea protein. The United States is a huge market seeing growth in sports nutrition and plant-based meats; as a result, it is a major market for pea protein isolate.

OTHER HIGH POTENTIAL MARKETS

JAPAN

Japan is a large market (2-5kt) seeing growth in sports nutrition and plant-based meats; however, it is currently a small market for pea protein isolate.

SOUTH KOREA

South Korea is a reasonable sized market (0.5-1kt) seeing growth in sports nutrition and plant-based meats; however, it is a small market for pea protein isolate.

SINGAPORE

Singapore is a reasonable market (0.6-1kt) for sports nutrition and plant-based meats; however, it is currently a small market for pea protein isolate.

AUSTRALIA

Australia is a large market (3-4kt) seeing growth in sports nutrition and plant-based meats; it is a solid market for pea protein isolate.

CANADA

Canada is a solid market (5-6kt) seeing growth in sports nutrition and plant-based meats; as a major producer of pea protein isolate, it needs few imports and is experiencing falling demand for pea protein imports (as domestic production 'takes up the slack').

Beyond these six high potential markets, the rest of the work, particularly Europe, import approximately 75kt of pea protein.

Assuming New Zealand export volumes are small relative to global production (ca. 5-10kt), the world market can absorb these quantities at the quality adjusted world price.

EXPORT PRICING

Pea protein isolate prices on the world market range "between US\$2,000 (dry fractionation) and US\$5,600 (wet fractionation) per metric tonne, although prices fluctuate."* New Zealand products typically achieve a +10% premium over world prices across most foods and related products. Assuming that New Zealand can achieve the required quality standards, this suggests that New Zealand pea protein isolate can achieve prices at the top end of this range into world markets.

1. New Zealand is a 530t market for pea protein with potential to grow to 5,500t over the next decade; growth is coming from multiple segments

A RELATIVELY LARGE MARKET

- The New Zealand market currently demands 530t of pea protein and is currently dominated by demand for use in sports nutrition producers

A STRONGLY GROWING MARKET

- New Zealand has experienced strong demand growth for pea protein, with the market growing at a 53% CAGR (2010-2021)

CURRENTLY TWO MAJOR SECTORS BUYING PRIMARILY PEA PROTEIN ISOLATE

- Ingredient pea protein predominantly (85%) goes into (1) sports nutrition and (2) alternative meats (14%)
- Pea protein isolate accounts for 90% of total pea protein usage and 97% of usage in sports nutrition (powders and bars)

FURTHER GROWTH POTENTIAL AVAILABLE IN EXISTING AND NEW SECTORS

- New Zealand market demand for pea protein has the potential to grow by 10x over the next decade from 530t to 5,500t
- All segments of the New Zealand market demand for pea protein are projected to experience growth

DIFFERENT USERS PAY DIFFERENT PRICES AS THEY WANT DIFFERENT LEVELS OF QUALITY

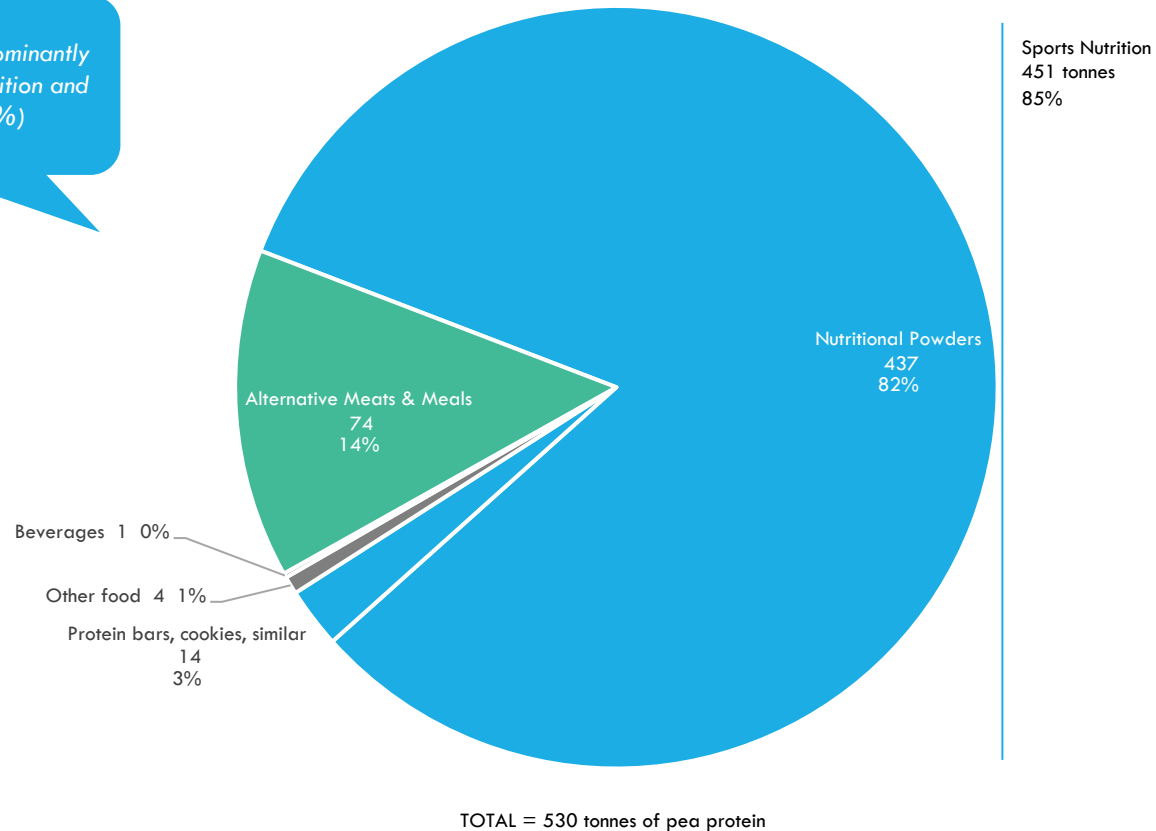
- New Zealand users of pea protein vary in the amount they pay for pea protein, with an estimated average price of NZ\$7.23 (US\$4.62)

The New Zealand market currently demands 530t of pea protein and is currently dominated by demand for use in sports nutrition

ESTIMATED NZ PEA PROTEIN USAGE IN MANUFACTURING (t)

SIGNIFICANT ESTIMATES
TREAT AS DIRECTIONAL

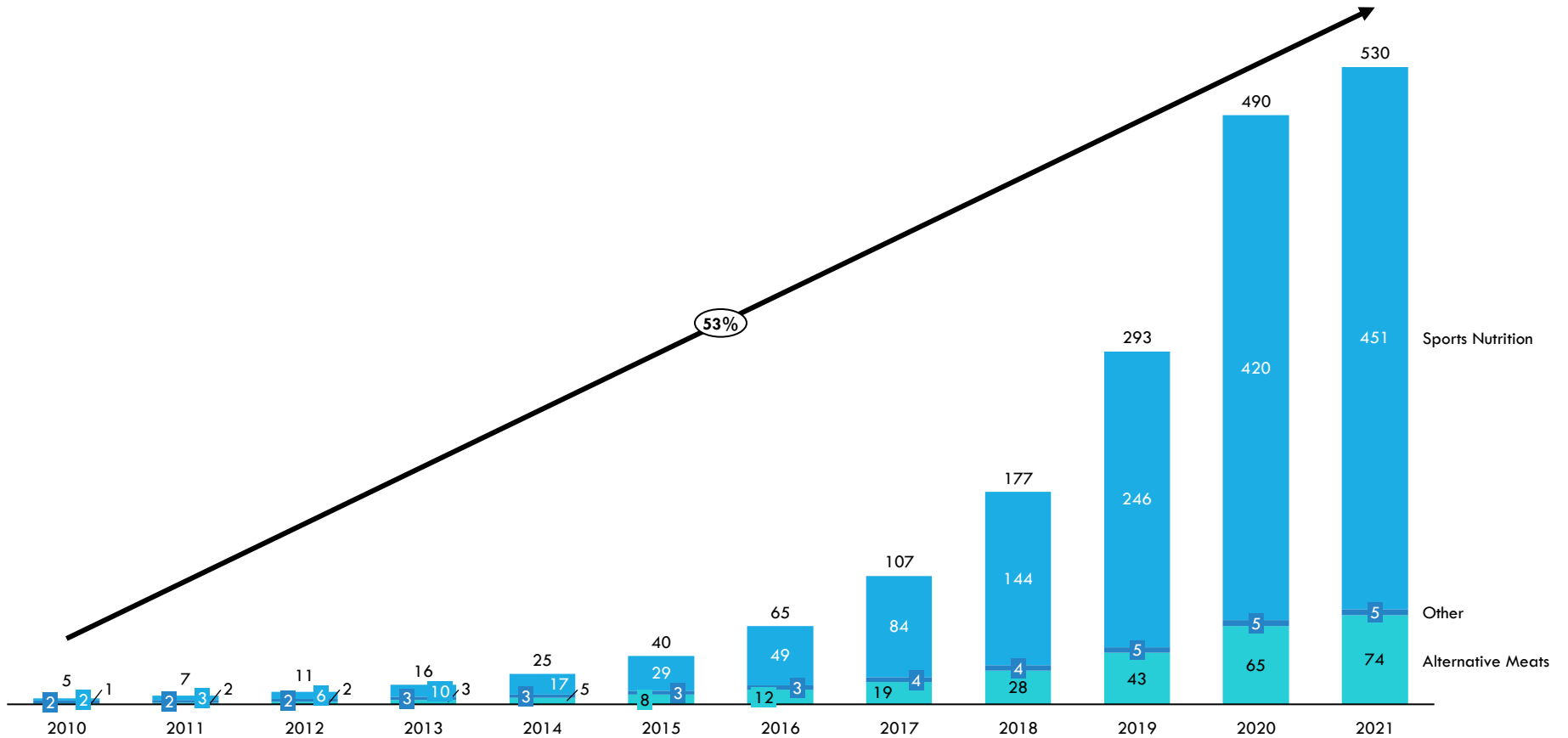
Ingredient pea protein predominantly (85%) goes into sports nutrition and alternative meats (14%)



New Zealand has experienced strong demand growth for imported pea protein, with the market growing at a 53% CAGR (2010-2021)

ESTIMATED NZ MANUFACTURED PEA PROTEIN DISPOSITION BY MARKET (t)

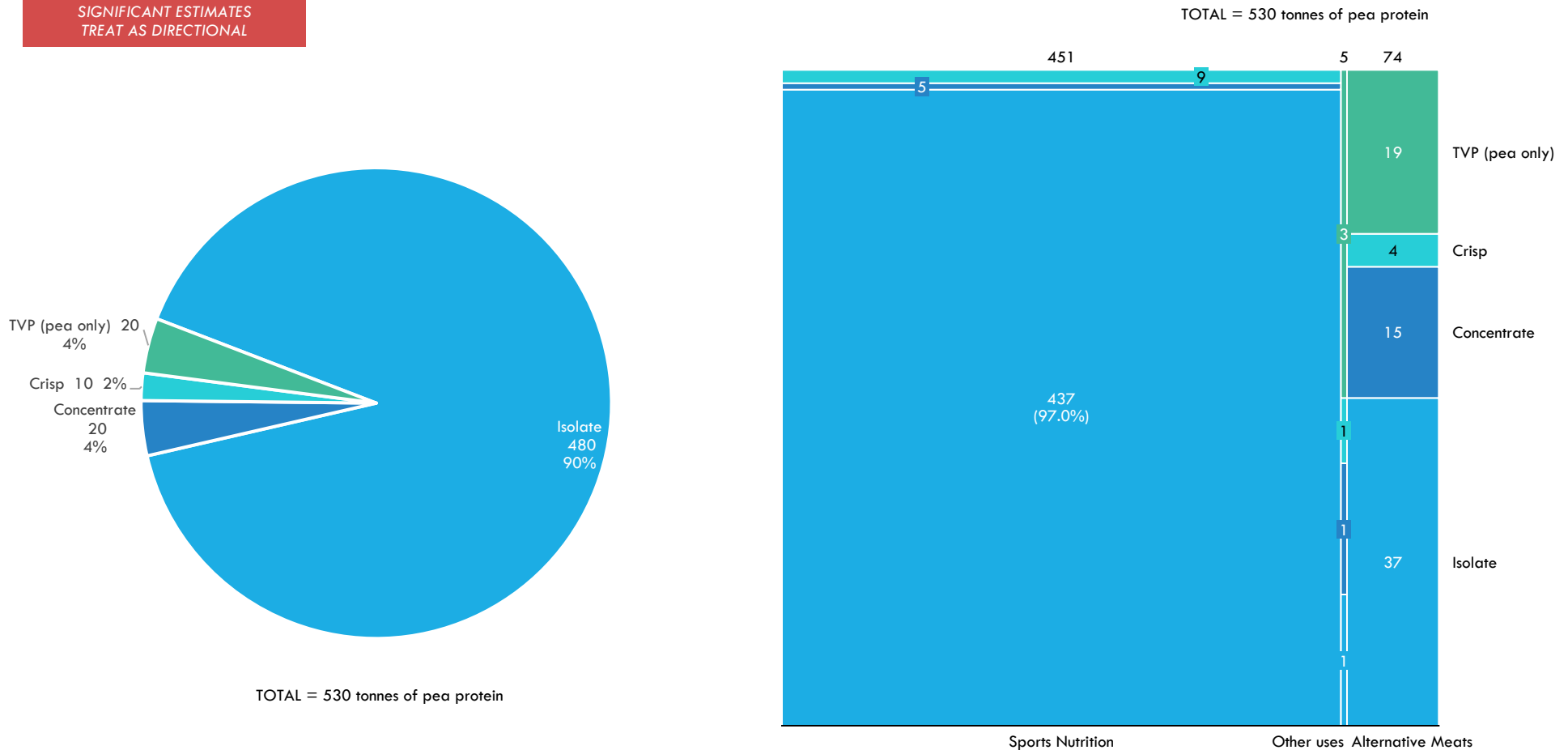
SIGNIFICANT ESTIMATES
TREAT AS DIRECTIONAL



Pea protein isolate accounts for 90% of total pea protein usage and 97% of usage in sports nutrition (powders and bars)

ESTIMATED NZ PEA PROTEIN USAGE IN MANUFACTURING BY TYPE (t)

SIGNIFICANT ESTIMATES
TREAT AS DIRECTIONAL

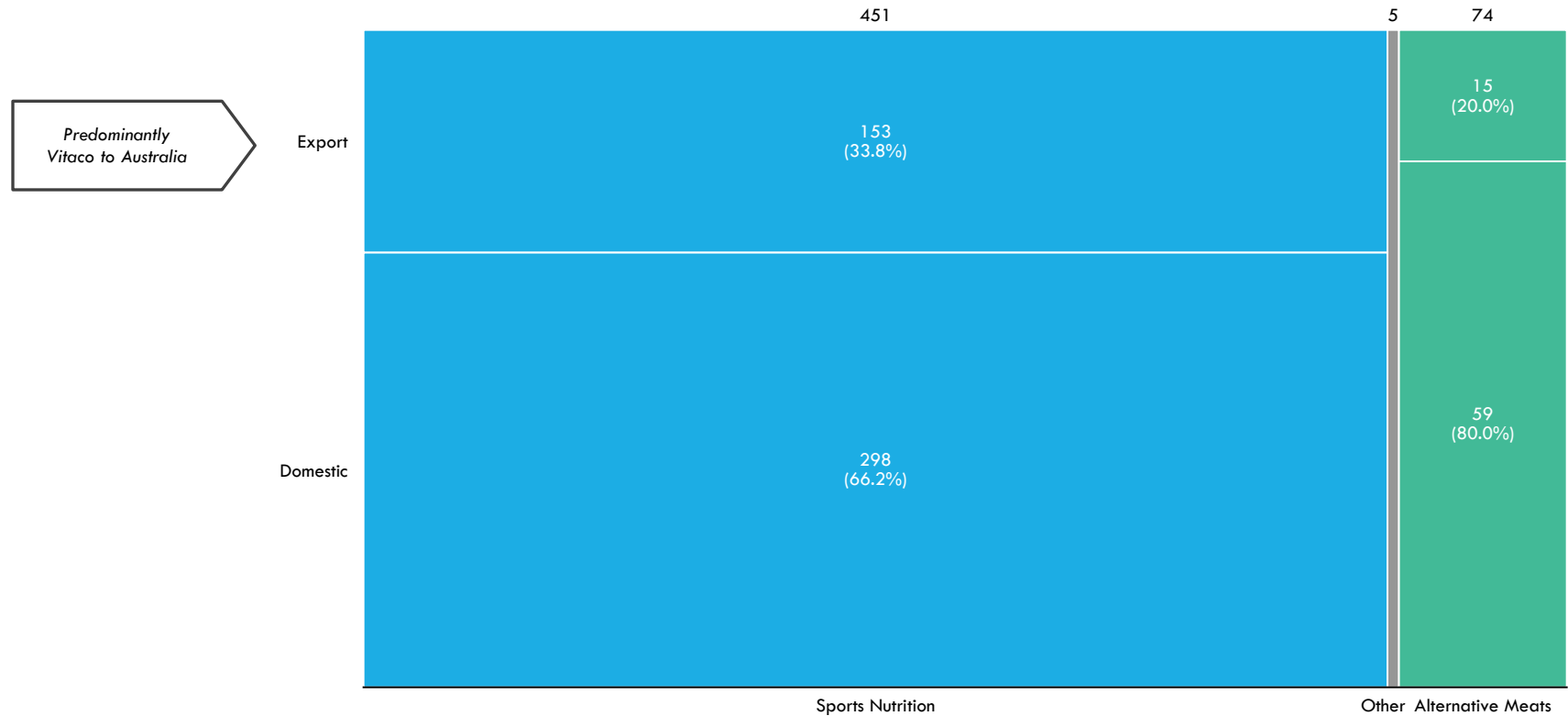


About a third (34%) of pea protein in sports nutrition is re-exported and about 20% of pea protein in alternative meats is re-exported

ESTIMATED NZ MANUFACTURED PEA PROTEIN DISPOSITION BY MARKET (t)

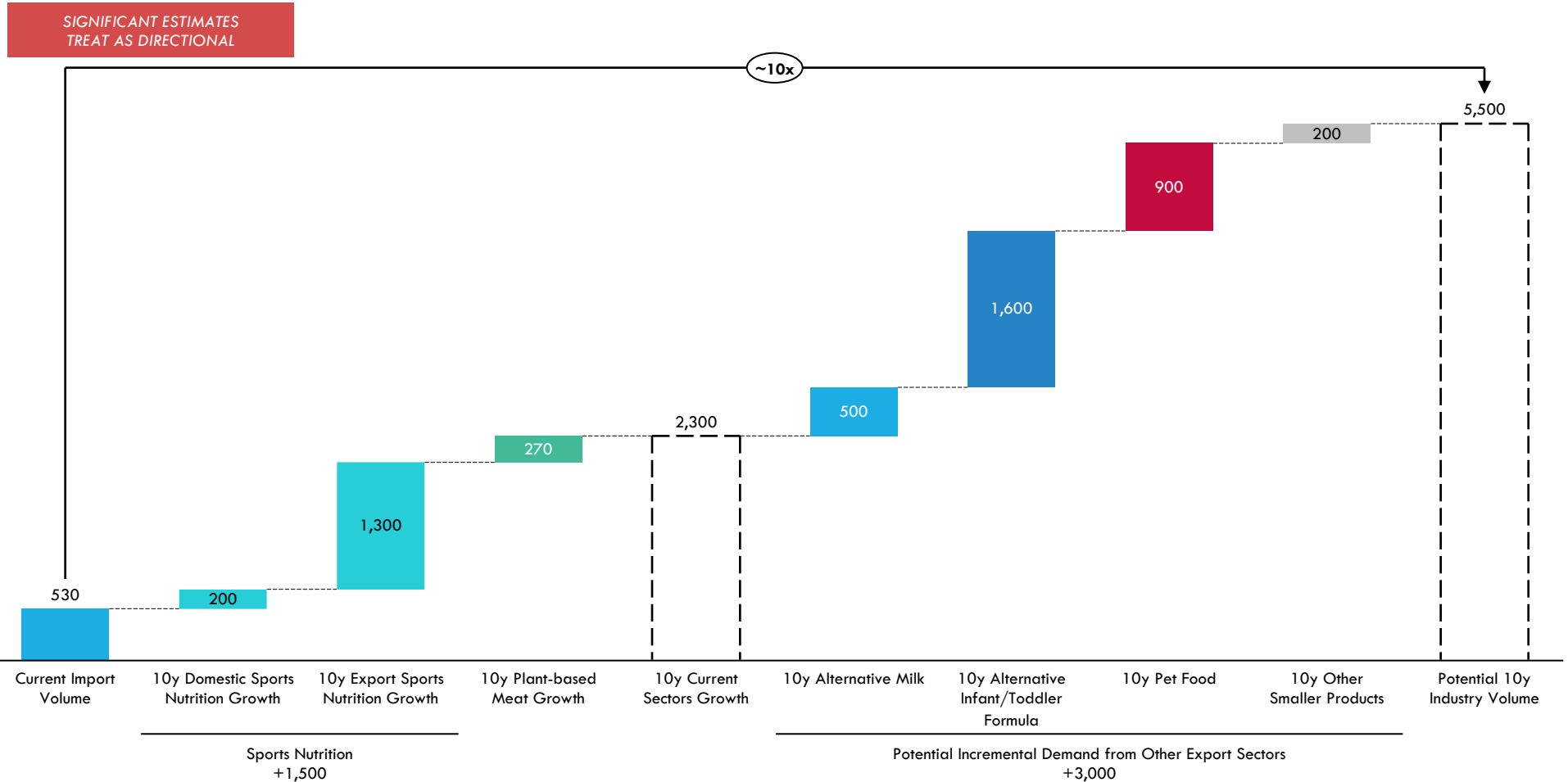
SIGNIFICANT ESTIMATES
TREAT AS DIRECTIONAL

TOTAL = 530 tonnes of pea protein



New Zealand market demand for pea protein has the potential to grow by 10x over the next decade from 530t to 5,500t

WATERFALL: POTENTIAL FUTURE NEW ZEALAND MARKET FOR PEA PROTEIN ISOLATE (t)(10y)



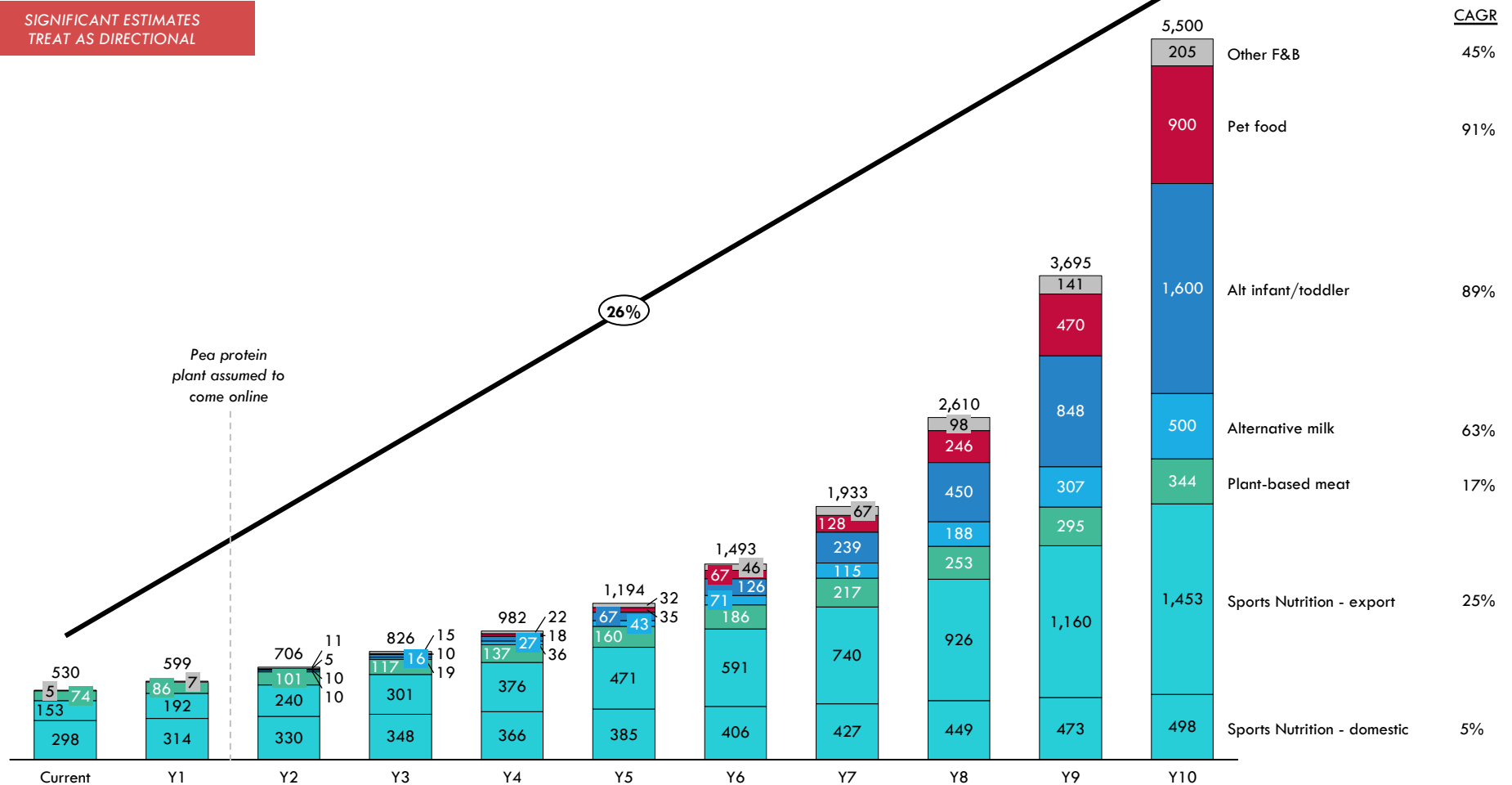
These different growth sectors have different drivers of growth

SPORTS NUTRITION	PLANT-BASED MEATS	OTHER SMALLER PRODUCTS
<p>New Zealand is leveraging strength and capabilities in whey to grow a strong sports nutrition sector using pea protein. Domestic demand for pea protein in sports nutrition is projected to grow at a 5% CAGR over the next decade while export demand is projected to grow at a 25% CAGR.</p>	<p>New Zealand is leveraging strength and capabilities in meat to support an emerging plant-based meat sector. Demand for pea protein in plant-based meats is projected to grow at a 17% CAGR over the next decade.</p>	<p>New Zealand has a large and diverse food and beverage industry that produces a wide range of products that could benefit from supplementation or fortification with pea protein. Demand for pea protein in other food and beverage products is projected to grow at a 45% CAGR over the next decade (off a low base).</p>
ALTERNATIVE MILKS	ALTERNATIVE INFANT FORMULA	PET FOODS
<p>New Zealand's comparative advantage in dairy and position as a large exporter of UHT milk creates an opportunity for a share of this to transition to pea-isolate containing products. Demand for pea protein in export-focused alternative milks - both in pea-based products and as a blended product for fortification - is projected to grow at a 63% CAGR over the next decade.</p>	<p>New Zealand's comparative advantage in dairy and position as a large exporter of infant and toddler formulas creates an opportunity for a share of this to transition to pea-based products. Demand for pea protein in export-focused plant-based infant formulas and toddler milks is projected to grow at a 89% CAGR over the next decade.</p>	<p>New Zealand's growing position as exporter of super-premium pet foods creates an opportunity for a share of this to transition to pea-based products. Demand for pea protein for used in export-focused premium pet food is projected to grow at a 91% CAGR over the next decade.</p>

All segments of the New Zealand market demand for pea protein are projected to experience growth

POTENTIAL FUTURE GROWTH OF NEW ZEALAND MARKET FOR PEA PROTEIN ISOLATE (t)(10y)

SIGNIFICANT ESTIMATES
TREAT AS DIRECTIONAL

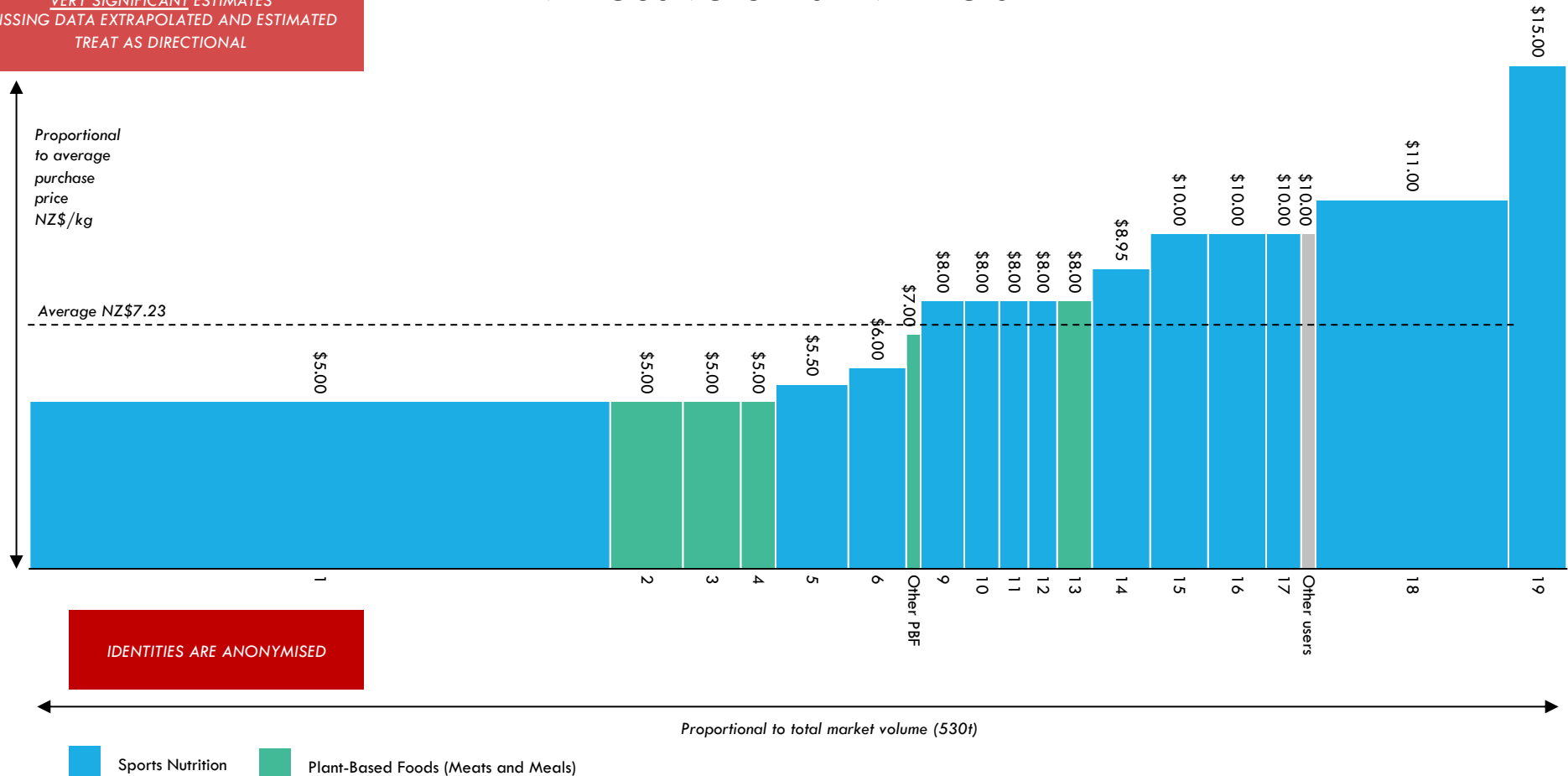


Source: Coriolis interviews, modelling, estimates and analysis

New Zealand users of pea protein vary in the amount they pay for pea protein, with an estimated average price of NZ\$7.23 (US\$4.62)

DEMAND CURVE SHOWING NEW ZEALAND DEMAND FOR PEA PROTEIN AT VARIOUS VOLUMES AND PRICES

VERY SIGNIFICANT ESTIMATES
MISSING DATA EXTRAPOLATED AND ESTIMATED
TREAT AS DIRECTIONAL



Source: Coriolis interviews, modelling, estimates and analysis

II. New Zealand is leveraging strength and capabilities in whey to grow a strong sports nutrition sector using pea protein

LEVERAGING STRENGTH AND CAPABILITIES IN WHEY

- New Zealand has large and growing exports of whey and other dairy proteins
- New Zealand is leveraging strengths and capabilities developed in whey protein into plant based protein

A HUGE RANGE OF PEA-BASED PRODUCTS IN THE MARKET

- New Zealand firms now make a huge range of pea-based protein powders
- New Zealand sports nutrition firms also make a innovative range of pea protein-based sports nutrition bars, cookies and similar

A ROBUST DOMESTIC MARKET

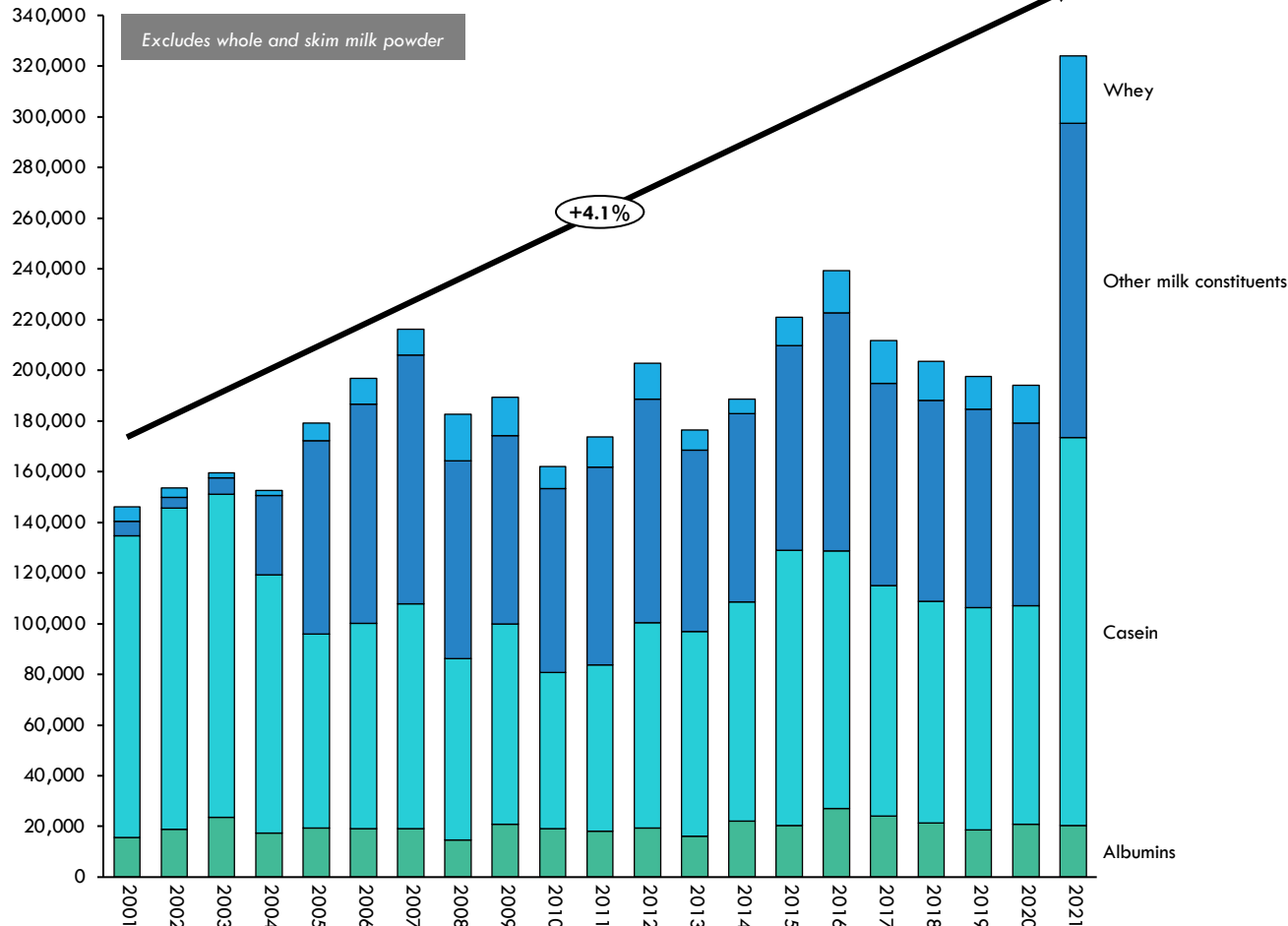
- Domestic (New Zealand) sales of pea protein-based sports nutrition products occur through a wide range of channels
- New Zealand has a robust and competitive sports nutrition market with a large number of retailers

A LARGE AND WELL DEVELOPED INDUSTRY

- New Zealand firms adding value to pea protein in sports nutrition products are spread across the country

New Zealand has large and growing exports of whey and other related dairy proteins

NEW ZEALAND WHEY/CASEIN & OTHER MILK CONSTITUENTS EXPORT VOLUME (t)



OBSERVATIONS

New Zealand is the world's largest dairy exporter by value

- Most of New Zealand's milk has traditionally gone into whole and skim milk powders; however the production mix is shifting based on changing global demand patterns
- Whey is a by-product of cheese production and New Zealand cheese production is growing (by taking volume from milk powders) based on growing Asian demand particularly for pizza cheese and other foodservice cheese products
- New Zealand has historically further fractionated raw whey into whey proteins (i.e. α -lactalbumin, β -lactoglobulin, serum albumin, immunoglobulins, and proteose peptones); the whey show here is unfractionated
- The world bought over 320,000 tonnes of whey, other milk proteins and other milk constituents from New Zealand last year

TAKEAWAY

- New Zealand is a major global player in both key ingredients in the wider sports nutrition sector: whey and casein

New Zealand is leveraging strengths and capabilities developed in whey protein into plant based protein



New Zealand firms now make a huge range of pea-based protein powders

— EXAMPLES OF NEW ZEALAND PRODUCED PEA PROTEIN ISOLATE-BASED SPORTS NUTRITION POWDERS —



Others...

New Zealand sports nutrition firms also make a innovative range of pea protein-based sports nutrition bars, cookies and similar

— EXAMPLES OF KEY NEW ZEALAND PRODUCED PEA PROTEIN ISOLATE-BASED SPORTS NUTRITION BARS —

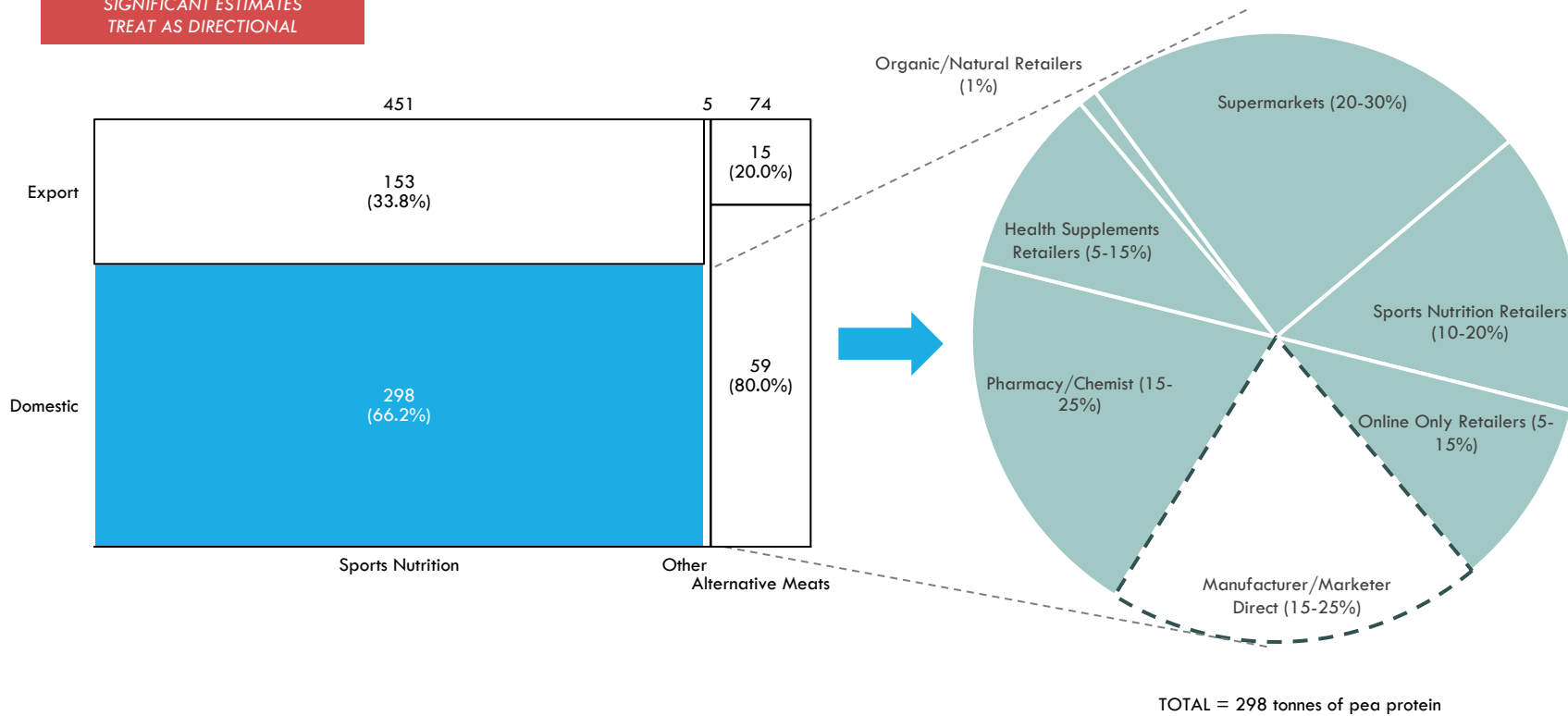


Domestic (New Zealand) sales of pea protein-based sports nutrition products occur through a wide range of channels

ESTIMATED DOMESTIC CHANNEL MIX FOR PEA PROTEIN SPORTS NUTRITION MADE IN NZ (t)





















DOMESTIC NZ MANUFACTURING
MODEL v07

SIGNIFICANT ESTIMATES
TREAT AS DIRECTIONAL



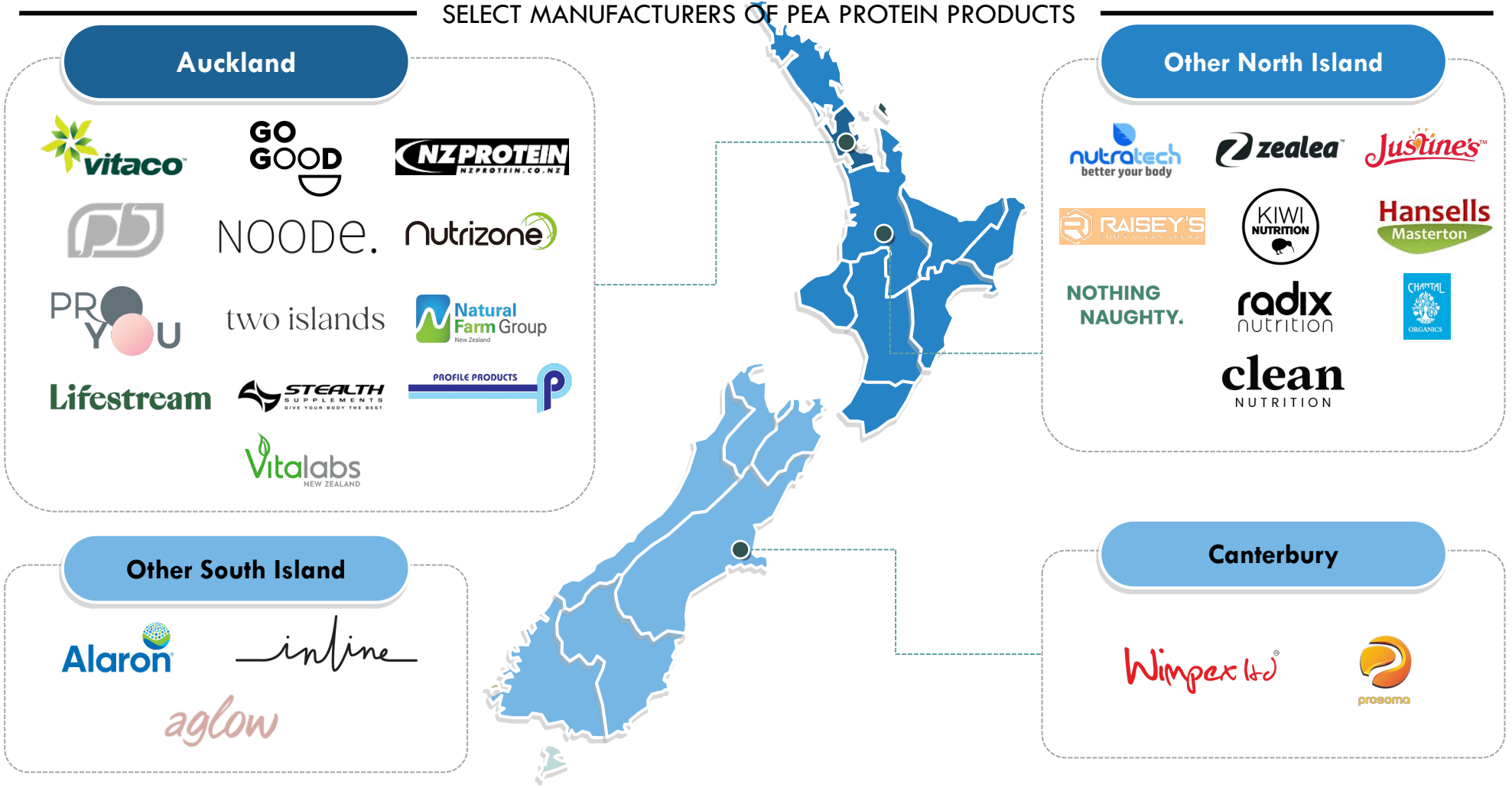
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KEY RETAILERS SELLING PEA PROTEIN PRODUCTS IN NEW ZEALAND BY CHANNEL

1 Pharmacy/Chemist		2 Sports Nutrition Retailers		3 Health/Supplements Retailers		4 Organic/Natural Retailers		5 Supermarkets		6 Online-Only Retailers	
 Unichem Your local health professional	287	 XPLOSIV	18	 Health 2000 where good things come naturally	49	 commonsense	6	 NEW WORLD	147	 HealthPost	1
 life Pharmacy	58	 XTREME NUTRITION.CO.NZ	7	 Hardy's Health Stores	18	 farro FRESH FOOD	6	 PAK'nSAVE	58	 PHARMACY DIRECT	1
 CHEMIST WAREHOUSE	37	 sportsfuel	5			 huckleberry	4	 4 FOUR SQUARE	226		
		 PS PRYLES SUPPLEMENTS	5					 countdown	187		
		 SC SUPPLEMENTS.CO.NZ	4					 superValue freshchoice	77		
Independents	500+	Independents	40-80	Independents	50-80	Independents	30-40	Asian Supermarkets & Independents	80-100	Others	45-50
TOTAL	900+	TOTAL	80-120	TOTAL	120-150	TOTAL	45-55	TOTAL	780-800	TOTAL	45-50
Retail and online	15-25%	Retail and online	10-20%	Retail and online	5-15%	Retail and online	1%	Retail and online	20-30%	Online-only	5-15%
										Group/Chain /Operator	Outlet #'s

New Zealand firms adding value to pea protein in sports nutrition products are spread across the country

SELECT MANUFACTURERS OF PEA PROTEIN PRODUCTS



NOTE: Select firms only

III. New Zealand is leveraging strength and capabilities in meat to support an emerging plant-based meat sector

LEVERAGING STRENGTH AND CAPABILITIES IN MEATS

- New Zealand has large and growing meat industry focused on exports
- New Zealand is leveraging strengths and capabilities developed in meat into plant-based meats

A RANGE OF PEA-BASED PRODUCTS IN THE MARKET

- New Zealand makes a range of alternative meat products, many of which use pea protein

A ROBUST DOMESTIC MARKET

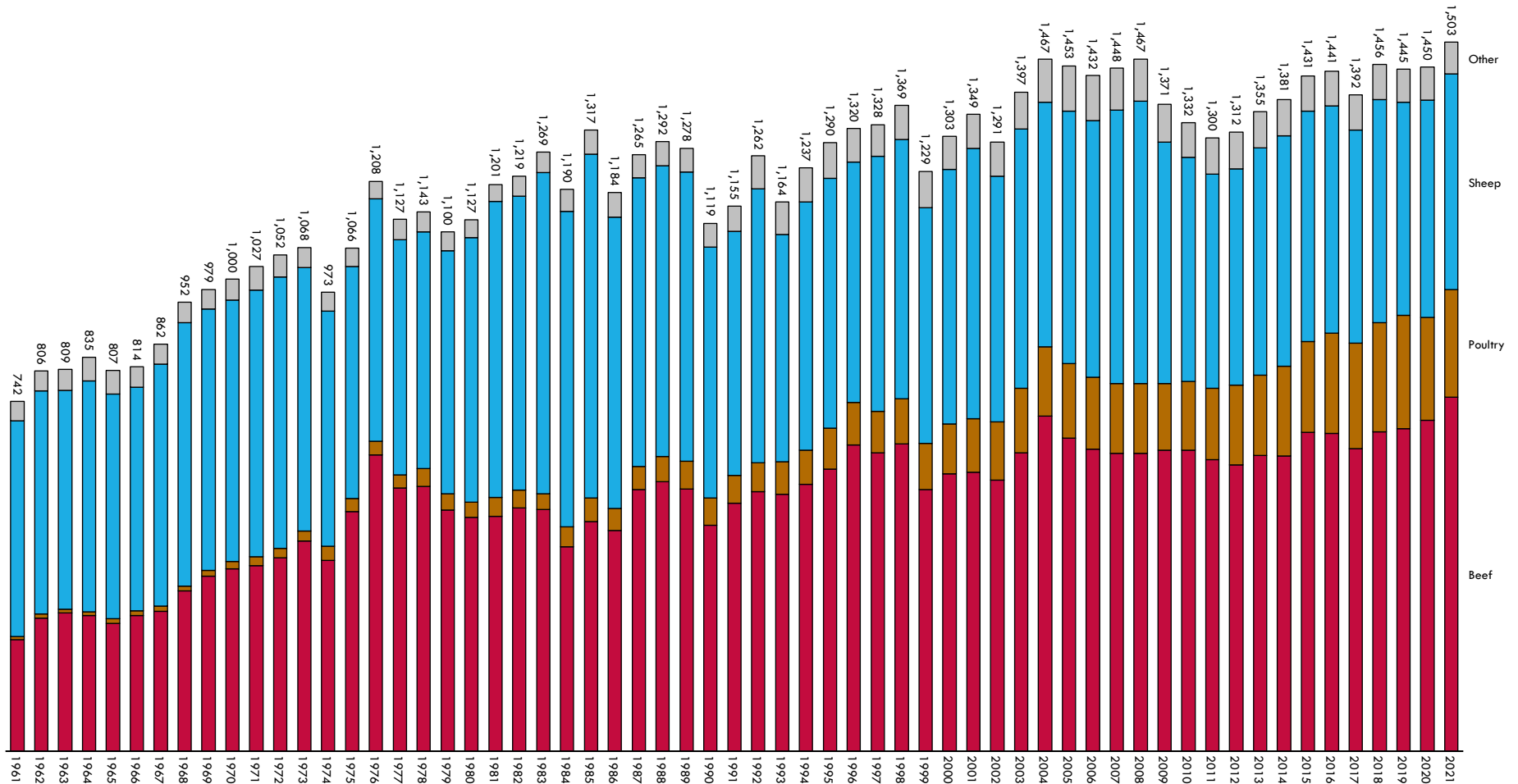
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- Beyond sports nutrition and plant-based meat, New Zealand makes some other foods using pea protein; however, currently most plant-based food products contain soy

New Zealand has large and growing meat industry focused on exports

NEW ZEALAND MEAT PRODUCTION VOLUME (kt)



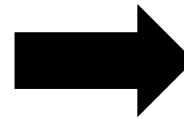
Source: UN FAO; Coriolis analysis

New Zealand is leveraging strengths and capabilities developed in meat into plant-based meats

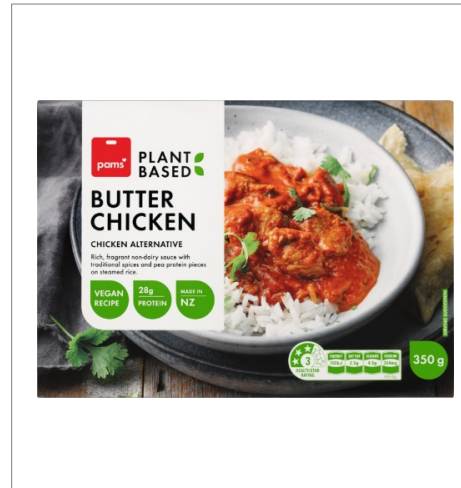
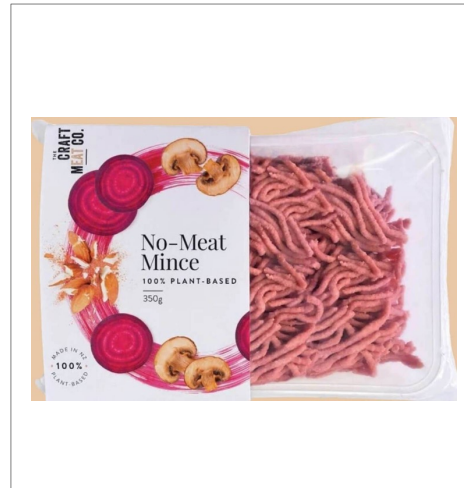
EXAMPLE MEATS



EXAMPLE PLANT-BASED MEATS



New Zealand makes a range of alternative meat products, many of which use pea protein

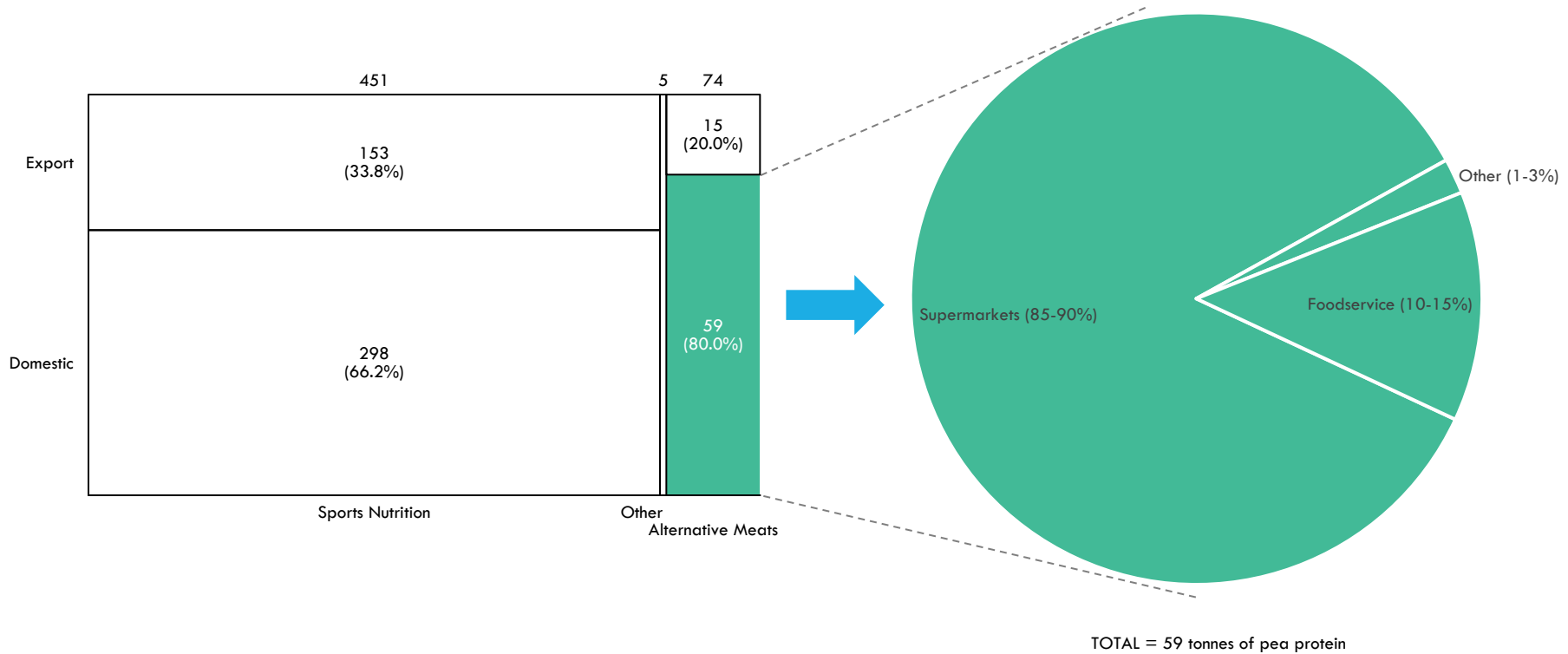


Domestic (New Zealand) sales of pea protein-based alternative meat products occur predominantly in supermarkets (85-90%)

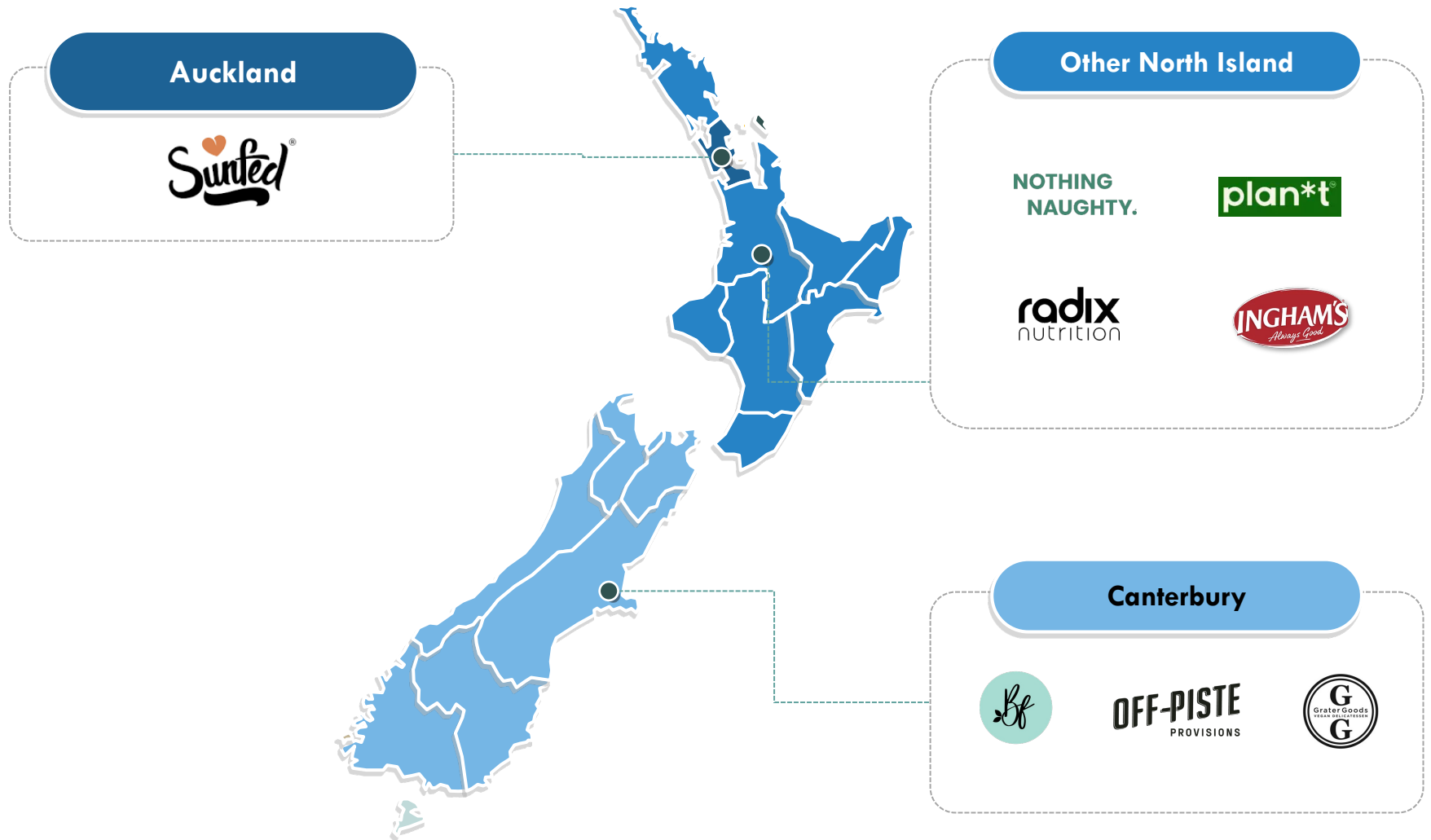
ESTIMATED DOMESTIC CHANNEL MIX FOR PEA PROTEIN ALTERNATIVE MEATS MADE IN NZ (t)

SIGNIFICANT ESTIMATES
TREAT AS DIRECTIONAL

DOMESTIC PRODUCTION ONLY
EXCLUDES IMPORTS
(e.g. Impossible Foods, Beyond Meat)



New Zealand firms making plant based meats and meals using pea protein are located in Auckland, other parts of the North Island and Canterbury



NOTE: Select firms only

New Zealand also makes some other foods using pea protein; however, currently most plant-based food products contain soy

SELECT EXAMPLES OF OTHER PLANT-BASED FOOD PRODUCTS MADE IN NEW ZEALAND

NZ MADE PEA BASED



NZ MADE SOY-BASED



IV. An additional 3,000t+ of incremental demand could be available primarily in pea/legume-based alternatives to traditional large New Zealand exports

An additional 3,000t+ of incremental demand could be available primarily in pea-based alternatives to traditional large New Zealand exports across three large new export-focused opportunities, as well as some smaller domestic opportunities.

1. PEA-BASED UHT MILK

- New Zealand's position as a large and growing exporter of UHT milk creates an opportunity for a share of this to transition to both pea-based milks and the addition of pea fortification to other alternative milks.

2. PEA-BASED INFANT FORMULA/TODDLER MILK

- New Zealand's position as a large exporter of infant and toddler formulas creates an opportunity for a share of this to transition to pea-based products

3. PEA-BASED PREMIUM PET FOOD

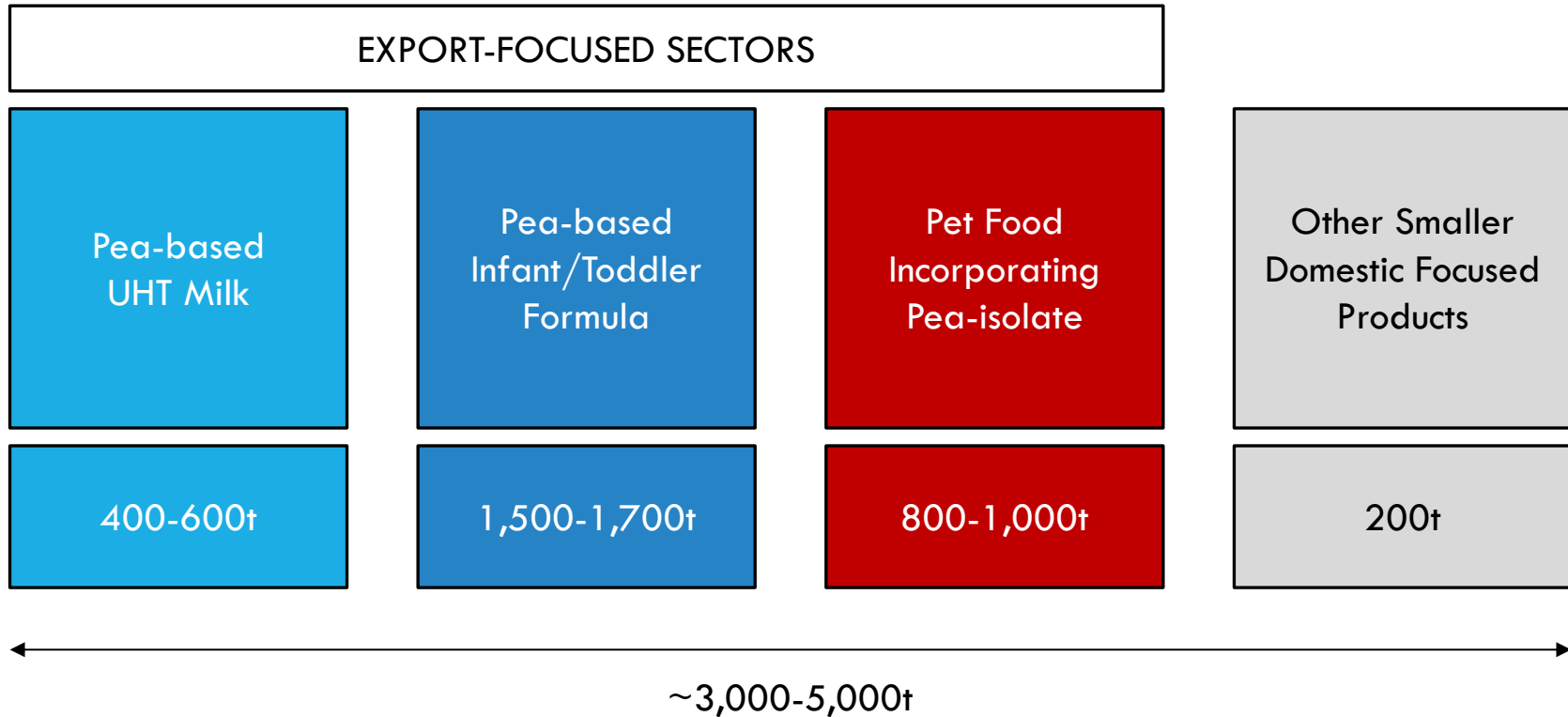
- New Zealand's growing position as exporter of super-premium pet foods creates an opportunity for a share of this to transition to pea-based products

OTHER SMALLER DOMESTIC PEA-BASED CATEGORIES

- A range of other, smaller product categories would be enabled by domestic supply of pea protein isolate

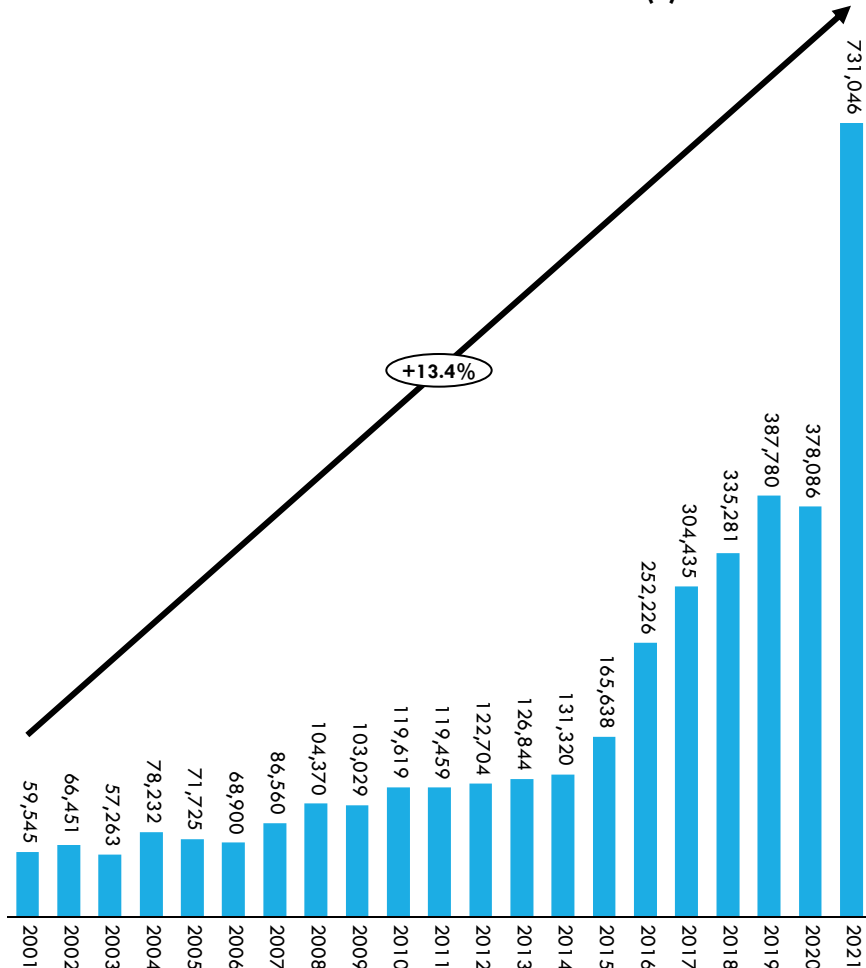
Local pea/legume protein isolate supply could enable 3,000t+ across three large export-focused opportunities, plus smaller domestic opportunities

POTENTIAL INCREMENTAL VOLUME ACCESSIBLE TO LOCALLY PRODUCED PEA PROTEIN ISOLATE



New Zealand's position as a large exporter of UHT milk creates an opportunity for a share of this to transition to pea-isolate containing products

NZ UHT MILK EXPORTS (t)



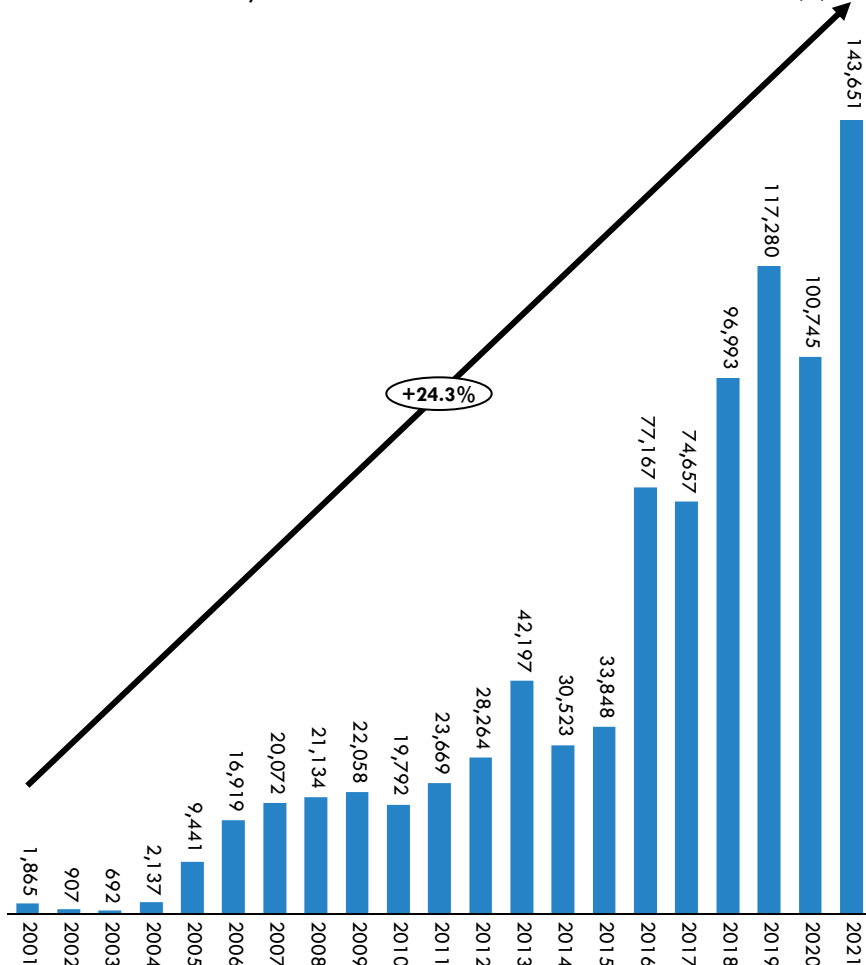
MODEL OF POTENTIAL DEMAND FOR PEA PROTEIN ISOLATE

MEASURE	METRIC
Fluid (UHT) milk export volume	731,046t (2021)
Average % solids	3%
% accessible to pea protein isolate	2%*
Potential demand for pea protein isolate for export plant-based milks	300-500t
Potential demand for pea protein isolate for domestic plant-based milks	100t
Total potential demand for pea protein isolate for New Zealand produced plant-based milks	400-600t

* Coriolis minimum estimate based on past analysis of key New Zealand markets for UHT milk (e.g. Philippines); Note: UHT milk includes UHT creams (and similar); Source: UN Comtrade database (HS041010-041050); Coriolis classification, analysis, modelling and estimates

New Zealand's position as a large exporter of infant and toddler formulas creates an opportunity for a share of this to transition to pea-based products

NZ INFANT/TODDLER FORMULA EXPORTS (t)



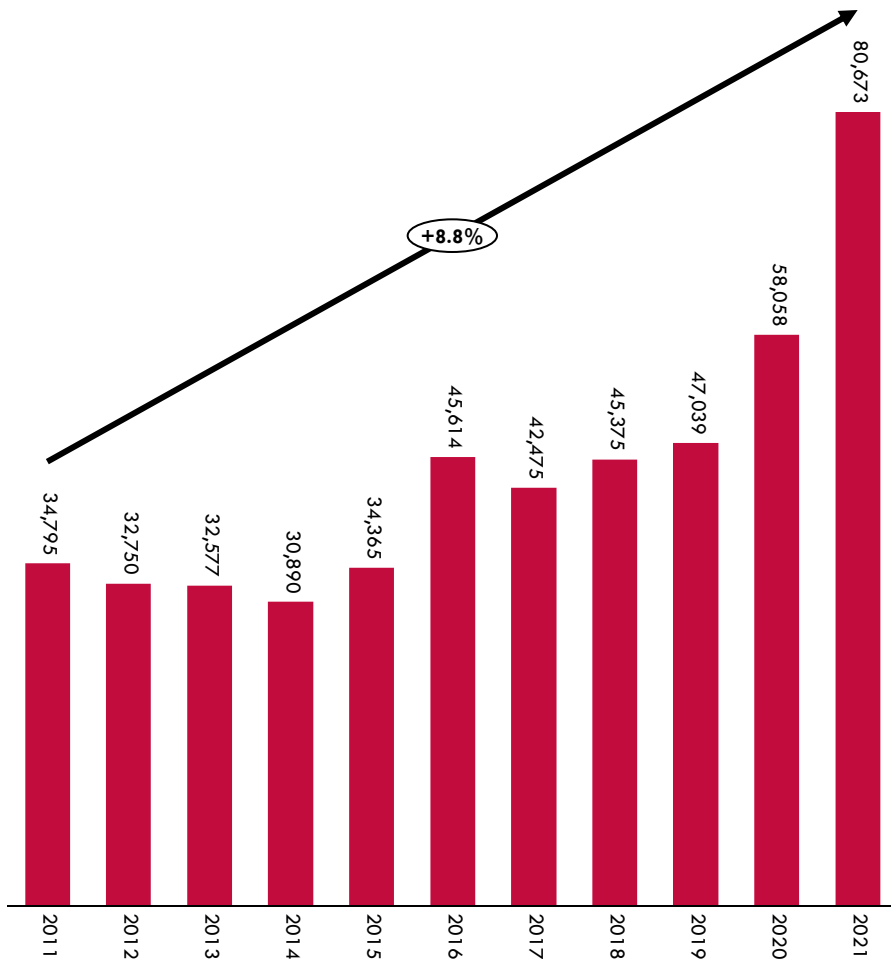
MODEL OF POTENTIAL DEMAND FOR PEA PROTEIN ISOLATE

MEASURE	METRIC
Dairy-based IF powder export volume	143,651t (2021)
% accessible to pea protein isolate based products	2%*
% of volume replaced with pea protein isolate (rather than other plant-based ingredients)	50%*
Potential demand for pea protein isolate for export infant/toddler formula products	1,300-1,500t
Potential demand for pea protein isolate for domestic infant/toddler formula products (including Daigao)	200t
Total potential demand for pea protein isolate for New Zealand produced infant/toddler formula products	1,500-1,700t

* Coriolis minimum estimate based on past analysis of key New Zealand markets for infant formula (e.g. China); Source: UN Comtrade database; Coriolis classification, analysis, modelling and estimates

New Zealand's growing position as exporter of super-premium pet foods creates an opportunity for a share of this to transition to pea-based products

NZ RETAIL PET FOOD EXPORTS (t)



MODEL OF POTENTIAL DEMAND FOR PEA PROTEIN ISOLATE

MEASURE	METRIC
Meat-based pet food export volume	80,673t (2021)
% accessible to pea protein isolate	1%*
Potential demand for pea protein isolate for export super-premium pet food products	700-900t
Potential demand for pea protein isolate for domestic super-premium pet food products	100t
Total potential demand for pea protein isolate for New Zealand produced super-premium pet food products	800-1,000t

* Coriolis minimum estimate based on past analysis of key New Zealand markets for pet food (e.g. USA); Source: UN Comtrade database; Coriolis classification, analysis, modelling and estimates

A range of other, smaller product categories would be enabled by domestic supply of pea protein isolate

IDENTIFIED SMALLER DOMESTIC-FOCUSED PRODUCTS ENABLED BY DOMESTIC SUPPLY



Yoghurt & other dairy
100+



Extruded snacks
50+



Other foods
50+

V. A range of high potential export markets exist for New Zealand produced bulk pea protein isolate

OVERALL

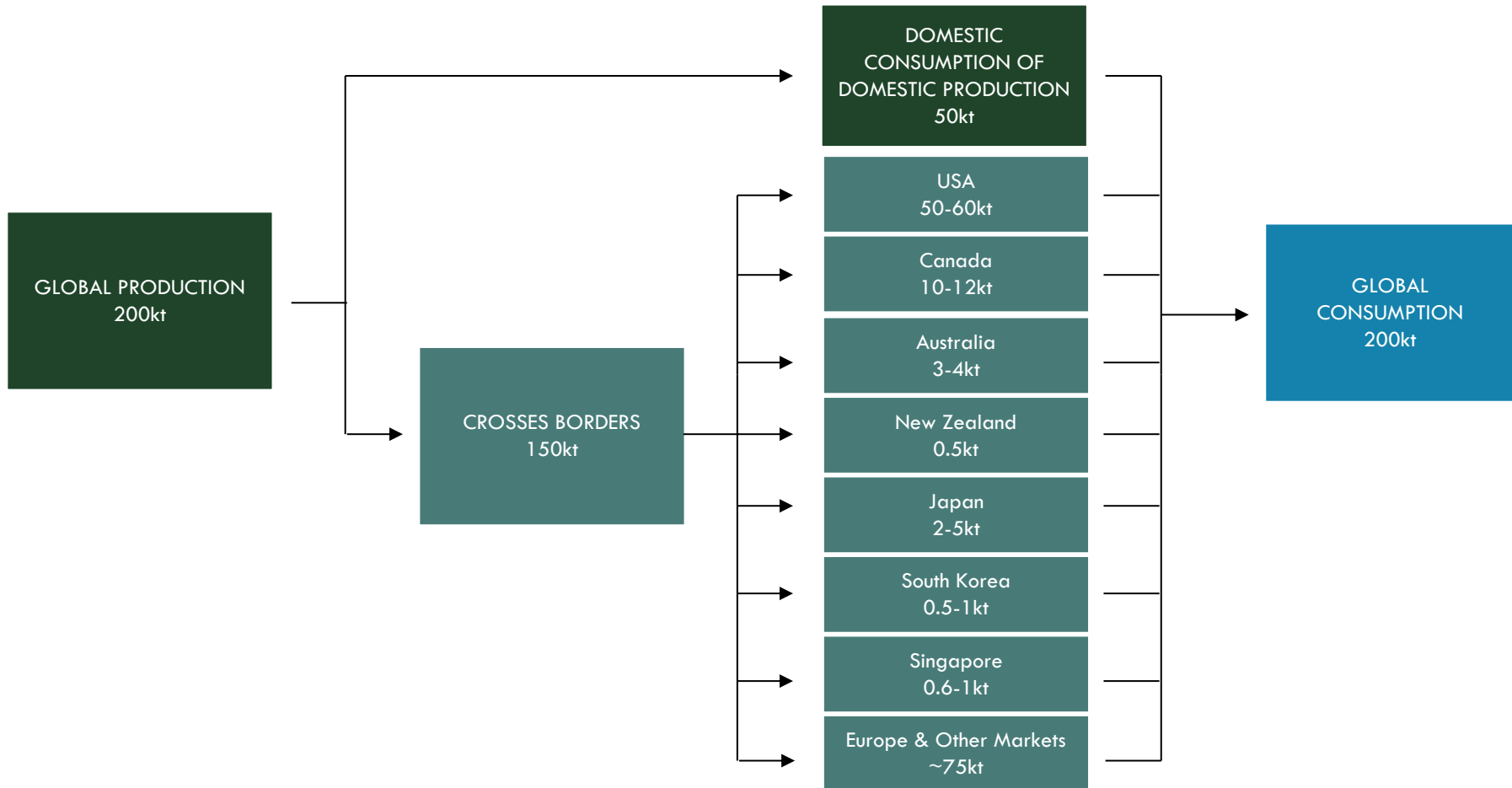
- Pea/legume protein is a 200kt global market with North America in particular standing out as a major importer
- Cross-country benchmarking highlights the United States as the largest and most attractive potential market for New Zealand produced pea protein

SPECIFIC MARKETS

- Japan is a large market seeing growth in sports nutrition and plant-based meats; however, it is currently a small market for pea protein isolate
- South Korea is a reasonable sized market seeing growth in sports nutrition and plant-based meats; however, it is a small market for pea protein isolate
- Singapore is a reasonable market for sports nutrition and plant-based meats; however, it is currently a small market for pea protein isolate
- Australia is a large market seeing growth in sports nutrition and plant-based meats; it is a solid market for pea protein isolate
- The US is a huge market seeing growth in sports nutrition and plant-based meats; it is a major market for pea protein isolate
- Canada is a solid market seeing growth in sports nutrition and plant-based meats; as a major producer of pea protein isolate, it needs few imports

Pea protein is a 200kt global market with North America in particular standing out as a major importer

GLOBAL MARKET FOR PEA/LEGUME PROTEIN ISOLATES



Cross-country benchmarking highlights the United States as the largest and most attractive potential market for New Zealand produced pea protein

BENCHMARKING: GROWTH METRICS IN SELECT HIGH POTENTIAL MARKETS

	JAPAN	S KOREA	SINGAPORE	AUSTRALIA	UNITED STATES	CANADA
Total import volume of all types of bulk non-whey protein (HS350400)	44,056t (2021)	19,760t (2021)	6,621t (2021)	7,377t (2021)	128,312t (2021)	32,624t (2021)
Growth rate of imports under HS350400	6% CAGR (2016-2021)	11.2% CAGR (2016-2021)	28.7% CAGR (2016-2021)	1.1% CAGR (2016-2021)	23.9% CAGR (2016-2021)	-13.6% CAGR (2016-2021)
Import volume of retail non-whey protein (HS210610)	8,553t (2021)	28,489t (2021)	4,400t (2021)	10,633t (2021)	59,241t (2021)	26,310t (2021)
Growth rate of imports under HS210610	-1% CAGR (2016-2021)	8% CAGR (2016-2021)	-17.9% CAGR (2016-2021)	9.5% CAGR (2016-2021)	32.7% CAGR (2016-2021)	11.6% CAGR (2016-2021)
Estimated imports of bulk pea protein isolate included in above	2,000-5,000t (2021) (~5-11% of HS 350400)	500-1,000t (2021) (~2.5-5% of HS350400)	600-1,000t (2021) (~10-15% of HS350400)	3,000-4,000t (2021) (~40-55% of HS350400)	50,000-60,000t (2021) (~40-45% of HS350400)	5,000-6,000t (2021) (~15-18% of HS350400)
Estimated growth rate of pea protein isolate	2-3% CAGR (2020-2021)	10-15% CAGR (2020-2021)	15-20% CAGR (2020-2021)	15-20% CAGR (2020-2021)	10% CAGR (2020-2021)	-15% CAGR (2020-2021)
Size of sports nutrition market (at retail)	US\$1,740m (2022)	US\$79m (2022)	US\$86m (2022)	US\$745m (2022)	US\$14,145m (2022)	US\$477m (2022)
Growth rate	14.6% (2015-2022)	16.6% (2015-2022)	4.4% (2015-2022)	10.2% (2015-2022)	10.0% (2015-2022)	3.0% (2015-2022)
Size of plant-based meat market (at retail)	US\$270m	US\$134m (2022)	N/A	US\$185m	US\$1.92m	C\$227m
Growth rate of plant-based meat market	N/A	23.5% CAGR (2017-2022)	Strong	22% CAGR (Forecast to 2030)	Shrinking currently	9.5% (2015-2022)

Source: CIA World Fact Book; UN Comtrade database; Euromonitor; various published articles; Coriolis estimates, analysis and modelling

Japan is a large market seeing growth in sports nutrition and plant-based meats; however, it is currently a small market for pea protein isolate

JAPANESE MARKET FOR PEA PROTEIN ISOLATE

Total import volume of all types of bulk non-whey protein (HS350400)	44,056t (2021)
Growth rate of imports under HS350400	6% CAGR (2016-2021)
Import volume of retail non-whey protein (HS210610)	8,553t (2021)
Growth rate of imports under HS210610	-1% CAGR (2016-2021)
Estimated imports of bulk pea protein isolate included in above	2,000-5,000t (2021) (~5-11% of HS 350400)
Estimated growth rate of pea protein isolate	2-3% CAGR (2020-2021)
Size of sports nutrition market (at retail)	US\$1,740m (2022)
Growth rate sports nutrition market	14.6% CAGR (2015-2022)
Size of plant-based meat market (at retail)	US\$270m
Growth rate of plant-based meat market	22.5% CAGR (2015-2022)

OBSERVATIONS

Japan is a large market seeing growth in sports nutrition; however, it is currently a small market for pea protein isolate.

- The Japanese sports nutrition market has been growing since 2015 when the country won its bid for the Olympic Games held in 2021.
- The Japanese sports nutrition market is growing and plant-based powders account for ~20% of the market (almost exclusively soy).
- Japanese consumer expenditure on sports nutrition has been growing on a per capita basis and overall since 2015. Meiji is the dominant player in the Japanese sport nutrition sector.

Soy based products dominate the plant-based meats/meals sector in Japan

- The Japanese market for plant-based meats and meals is growing strongly (22.5% CAGR) though off a relatively small base (US\$270m)
- The market is almost exclusively soy-based currently. The Japanese plant-based meat industry is dominated by the two largest meat companies (Itoham and NipponHam), a soy firm and a pharma-giant

South Korea is a reasonable sized market seeing growth in sports nutrition and plant-based meats; however, it is a small market for pea protein isolate

SOUTH KOREAN MARKET FOR PEA PROTEIN ISOLATE

Total import volume of all types of bulk non-whey protein (HS350400)	19,760t (2021)
Growth rate of imports under HS350400	11.2% CAGR (2016-2021)
Import volume of retail non-whey protein (HS210610)	28,489t (2021)
Growth rate of imports under HS210610	8% CAGR (2016-2021)
Estimated imports of bulk pea protein isolate included in above	500-1,000t (2021) (~2.5-5% of HS350400)
Estimated growth rate of pea protein isolate	10-15% CAGR (2020-2021)
Size of sports nutrition market (at retail)	US\$79m (2022)
Growth rate sports nutrition market	16.6% CAGR (2015-2022)
Size of plant-based meat market (at retail)	US\$134m (2022)
Growth rate of plant-based meat market	23.5% CAGR (2017-2022)

OBSERVATIONS

Canada has a strong sports nutrition industry

- The South Korean sports nutrition market is small but growing, and the majority buy online
- South Korean consumer expenditure on sports nutrition is very low (US\$1.50/person), but growth has been occurring
- South Korea have a number of dairy and beauty firms that manufacture sports nutrition and other similar nutritional products in both powder and liquid forms

Soy dominates the plant-based meat market in South Korea

- The South Korean market for plant-based meats and meals is growing strongly (23.5% CAGR) though off a relatively small base (US\$134m), driven by a rise and interest in veganism and flexitarianism
- South Korea has a wide range of primarily soy-based alt-meat products in the market and a diverse range of domestic firms participating

Singapore is a reasonable market for sports nutrition and plant-based meats; however, it is currently a small market for pea protein isolate

SINGAPORE MARKET FOR PEA PROTEIN ISOLATE

Total import volume of all types of bulk non-whey protein (HS350400)	6,621t (2021)
Growth rate of imports under HS350400	28.7% CAGR (2016-2021)
Import volume of retail non-whey protein (HS210610)	4,400t (2021)
Growth rate of imports under HS210610	-17.9% CAGR (2016-2021)
Estimated imports of bulk pea protein isolate included in above	600-1,000t (2021) (~10-15% of HS350400)
Estimated growth rate of pea protein isolate	15-20% CAGR (2020-2021)
Size of sports nutrition market (at retail)	US\$86m (2022)
Growth rate sports nutrition market	4.4% CAGR (2015-2022)
Size of plant-based meat market (at retail)	N/A
Growth rate of plant-based meat market	Strong

OBSERVATIONS

Singapore has reasonable market for sports nutrition

- Sports nutrition market growth is anticipated throughout Asia, in particular Singapore
- Singaporean consumer expenditure on sports nutrition has been showing consistent growth leading to total market growth
- Singapore has strong, well recognised plant-based and dairy nutrition brands

Singapore is an early adopter of plant-based meat production

- Significant investment has gone into plant-based meats in Singapore
- Singapore has a wide range of primarily soy-based alt-meat products in the market
- Singapore is an early adopter of plant-based foods; almost two thirds of Singaporean consumers have consumed plant-based food alternatives

Australia is a large market seeing growth in sports nutrition and plant-based meats; it is a solid market for pea protein isolate

AUSTRALIAN MARKET FOR PEA PROTEIN ISOLATE

Total import volume of all types of bulk non-whey protein (HS350400)	7,377t (2021)
Growth rate of imports under HS350400	1.1% CAGR (2016-2021)
Import volume of retail non-whey protein (HS210610)	10,633t (2021)
Growth rate of imports under HS210610	9.5% CAGR (2016-2021)
Estimated imports of bulk pea protein isolate included in above	3,000-4,000t (2021) (~40-55% of HS350400)
Estimated growth rate of pea protein isolate	15-20% CAGR (2020-2021)
Size of sports nutrition market (at retail)	US\$745m (2022)
Growth rate sports nutrition market	10.2% CAGR (2015-2022)
Size of plant-based meat market (at retail)	US\$185m
Growth rate of plant-based meat market	22% CAGR (Forecast through 2030)

OBSERVATIONS

Australia has a strong and growing sports nutrition industry

- Australian sports nutrition market forecasts strong growth
- Australian consumer expenditure on sports nutrition is large and growing strongly
- Australia has a number of specialist sports nutrition companies and a sophisticated sector with strong brands

The Australian plant-based meat market is showing growth

- The Australian market for plant-based meats is reasonable (A\$184m in 2020) and forecast to grow strongly
- Significant investment and consumer spending has gone into plant-based meats in Australia; significant growth is forecast
- Australian has a robust group of plant based meat companies (e.g. v2, CD, Meet)
- Australia has a broad Australian-made product range – primarily using soy and wheat

The US is a huge market seeing growth in sports nutrition and plant-based meats; it is a major market for pea protein isolate

US MARKET FOR PEA PROTEIN ISOLATE

Total import volume of all types of bulk non-whey protein (HS350400)	128,312t (2021)
Growth rate of imports under HS350400	23.9% CAGR (2016-2021)
Import volume of retail non-whey protein (HS210610)	59,241t (2021)
Growth rate of imports under HS210610	32.7% CAGR (2016-2021)
Estimated imports of bulk pea protein isolate included in above	50,000-60,000t (2021) (~40-45% of HS350400)
Estimated growth rate of pea protein isolate	10% CAGR (2020-2021)
Size of sports nutrition market (at retail)	US\$14,145m (2022)
Growth rate sports nutrition market	10.7% CAGR (2015-2022)
Size of plant-based meat market (at retail)	US\$1.92b
Growth rate of plant-based meat market	Shrinking currently

OBSERVATIONS

The US is a huge market seeing growth in sports nutrition

- The US is the largest sports nutrition market (US\$14b) showing strong growth (10.7% CAGR)
- The USA has many large sports nutrition firms producing and selling in the US
- The USA is a sophisticated plant-based market, primarily using pea as the base for sports supplements and nutrition

The US is the largest plant-based meats market

- The plant-based meat sector is showing growth in the USA market
- Significant investment has gone into plant-based meats over the years
- Investment is now occurring by "Big Food". Many/most of the largest US food processors now have a plant-based meat or dairy range resulting in many brands
- The American market for plant-based meat, meals and dairy products was worth US\$6.6b in 2020; meats and meals were US\$1.92b of this

Canada is a solid market seeing growth in sports nutrition and plant-based meats; as a major producer of pea protein isolate, it needs few imports

CANADIAN MARKET FOR PEA PROTEIN ISOLATE

Total import volume of all types of bulk non-whey protein (HS350400)	32,624t (2021)
Growth rate of imports under HS350400	-13.6% CAGR (2016-2021)
Import volume of retail non-whey protein (HS210610)	26,310t (2021)
Growth rate of imports under HS210610	11.6% CAGR (2016-2021)
Estimated imports of bulk pea protein isolate included in above	5,000-6,000t (2021) (~15-18% of HS350400)
Estimated growth rate of pea protein isolate	-15% CAGR (2020-2021)
Size of sports nutrition market (at retail)	US\$477m (2022)
Growth rate sports nutrition market	3.0% CAGR (2015-2022)
Size of plant-based meat market (at retail)	C\$227m
Growth rate of plant-based meat market	9.5% (2015-2022)

OBSERVATIONS

Canada has a strong sports nutrition industry

- Canada has a range of sports nutrition powders; the plant-based options often contain pea protein isolate
- Canadian consumer expenditure on sports nutrition is showing modest, relatively stable growth
- Sports nutrition firms are well established in Canada

Canada has an advanced and innovative plant-based meat sector

- Significant investment has gone into plant-based ingredients in Canada, in particular in the ingredients space
- The Canadian market for plant-based meats and meals is growing (9.5% CAGR) though off a relatively small base (US\$227m)
- Canada has a handful of plant-based brands; ConAgra-owned Gardein is the largest and most successful




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