



Dairy trade's economic contribution to New Zealand

NZIER report to DCANZ
February 2017

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Key points

This report shows that dairy continues to make a significant contribution to the New Zealand economy.

Dairy contributes \$7.8 billion to New Zealand's GDP...

- The dairy sector contributes \$7.8 billion (3.5%) to New Zealand's total GDP.
- This comprises dairy farming (\$5.96 billion) and dairy processing (\$1.88 billion).

...and remains New Zealand's largest export sector

- Despite the recent drop in global dairy prices, dairy remains New Zealand's largest goods export sector, at \$13.6 billion in the year to March 2016. Over the past five years, average export revenue has been \$14.4 billion.
- It accounts for more than one in four goods export dollars coming into New Zealand (29% in 2016, down from a high of 35% in 2014).
- Dairy export growth has averaged 7.2% per year over the past 26 years.
- The dairy sector exports twice as much as the meat sector, almost four times as much as the wood and wood products sector and nine times as much as the wine sector. It generates almost four times as much export revenue as export education.

Dairy provides jobs and incomes for over 40,000 workers...

- The dairy sector employs over 40,000 workers, with 27,500 on farm and a further 13,000 in dairy processing.
- Dairy employment has grown more than twice as fast as total employment, at an average of 3.7% per year since 2000.
- It has created jobs at a faster rate than the rest of the economy in all but 5 territorial authorities across New Zealand.
- The sector paid \$2.4 billion in wages to dairy farming and processing workers in 2016.
- The dairy farming sector has the second highest average wage (\$46,640) in the wider farming sector, behind deer farming (\$48,320).
- The average dairy processing wage is \$72,910, well above all other forms of food product manufacturing. The average food manufacturing wage is \$58,200.

...and plays a crucial role in supporting regional economic development

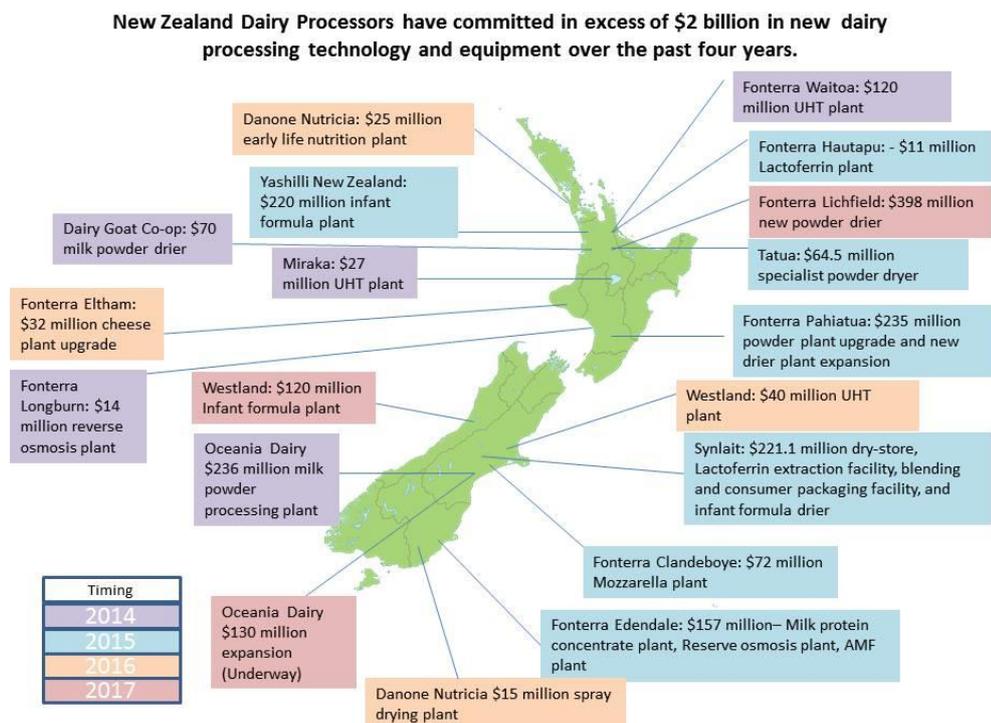
- Dairy provides over 1 in 5 jobs in three territorial authority economies (Waimate, Otorohanga, Southland); and over 1 in 10 in a further eight (Matamata-Piako, South Taranaki, Hauraki, Waipa, South Waikato, Clutha and Kaipara).

- The dairy sector accounts for 14.8% of Southland’s economy, 11.5% of the West Coast economy, 10.9% of the Waikato economy, 8.0% of Taranaki’s economy and 6.0% of Northland’s economy.

Dairy’s impacts flow well beyond the farm gate and processing plant

- Dairy farming supports a range of supplying industries: in 2016 farmers spent \$711 million on fertilisers and agro chemicals, \$393 million on forage crops and bought over \$190 million of agricultural equipment.
- Farmers also spent \$914 million on agricultural services, \$432 million on financial services and \$197 million on accounting and tax services.
- The dairy farming sector provides around \$400 million of intermediates to the meat processing sector.
- As well as taking farmers’ raw milk, the dairy processing sector also spends significant amounts on packaging (\$288 million in 2016), hired equipment (\$199 million) and plastics (\$174 million).
- DairyNZ estimates that farmers have spent over \$1 billion in recent years on environmental management systems such as effluent systems, riparian plating and retiring sensitive land, or about \$90,000 per dairy farm.
- The processing sector has also made substantial capital investments in the past four years, adding over \$2 billion to New Zealand’s capital stock.

Figure 1 Dairy processing investment



Source: DCANZ

Further global or regional trade liberalisation would enhance the sector's ability to support the government's 'Export Double' target

- If all global dairy tariffs were eliminated, and New Zealand's milk production is held constant, the value of New Zealand's dairy exports would increase by \$1.3 billion, generating a \$1.03 billion increase in New Zealand's nominal GDP.

Preventing a retreat to protectionism has considerable value to the New Zealand economy too

- In a separate modelling scenario, if global dairy tariffs increased from their average applied rate to their average bound rate, New Zealand's dairy exports would fall by \$2.3 billion, leading to a \$1.66 billion fall in New Zealand's nominal GDP.
- This provides an indication of the value of historical dairy tariff reductions due to multilateral, plurilateral and bilateral trade negotiations, or the benefits of preventing any backsliding towards trade protectionism.

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1. Objectives and scope

We have been asked to provide an overview of the dairy sector's economic contribution, focusing on:

- GDP and exports contribution
- Jobs and wages generated
- Support for regional development
- Opportunities from further trade reforms and export market development.

2. Dairy's contribution to GDP and jobs

2.1. Dairy's contribution to GDP

Based on NZIER's proprietary database, the dairy sector accounts for \$7.8 billion (3.5%) of New Zealand's total GDP.

This is shared between dairy farming (\$5.96 billion) and dairy processing (\$1.88 billion).

2.2. Dairy's contribution to employment

The government is currently placing a high priority on supporting regional economic development. Regional development cuts across all six themes¹ of its Business Growth Agenda (BGA), and dairy is an important contributor to supporting ongoing regional growth.

The sector currently **employs over 40,000 people**, with 27,500 on farm and a further 13,000 in dairy processing (Figure 2).

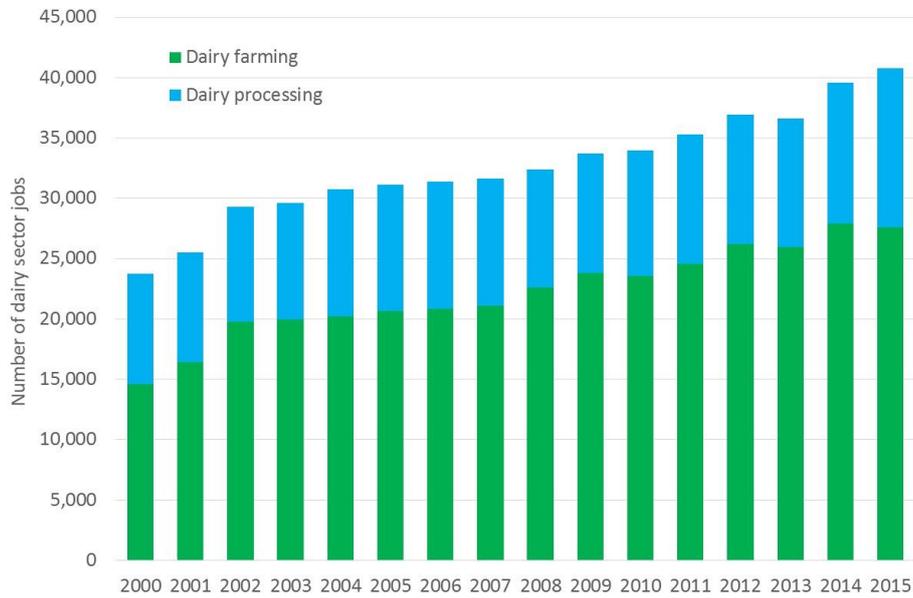
The dairy sector's contribution to national employment has steadily increased over time. Figure 2 shows that over the past 15 years, dairy sector employment has grown by an average of **3.7% per year, over twice as fast as the 1.7% recorded for total employment.**

Dairy sector employment has also been growing faster than other parts of the land-based economy. Total agricultural sector employment has grown at 0.6% per year since 2000. When we include forestry and fishing, average annual jobs growth lifts to 1.0% per year.

¹ Export markets, investment, innovation, skilled and safe workplaces, natural resources, infrastructure.

Figure 2 Dairy sector employs over 40,000 people nationwide

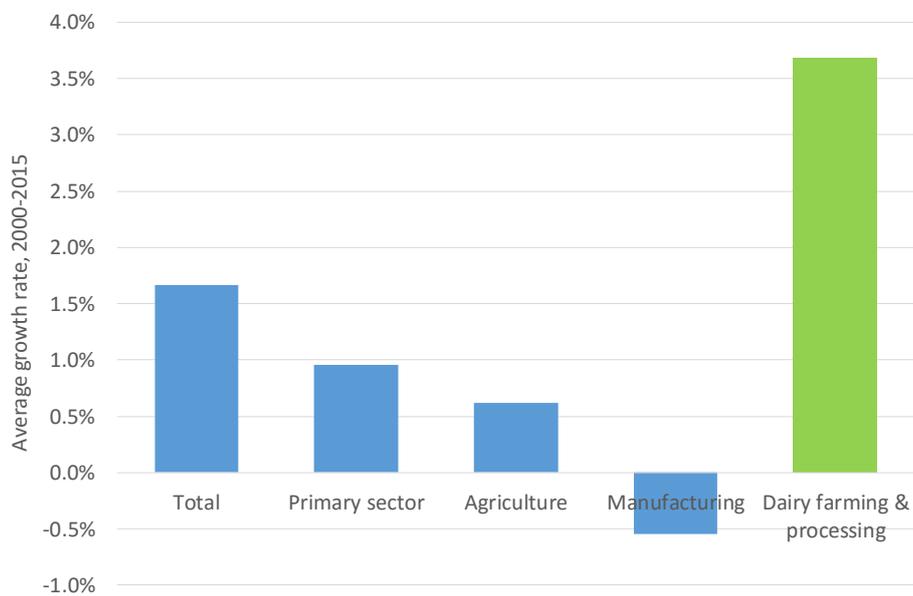
Number of jobs, November years



Source: NZIER, Statistics New Zealand

Figure 3 Dairy employment has grown strongly

CAGR in jobs filled, 2000-2015



Source: NZIER, Statistics New Zealand

2.3. Dairy's support for regional New Zealand

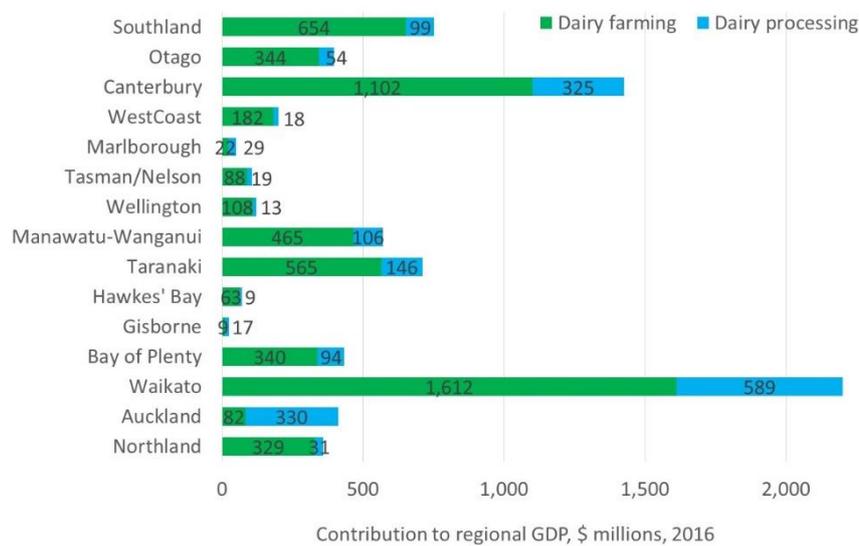
2.3.1. Contribution to regional GDP

On a regional basis, the three largest dairy sectors are in Waikato (\$2.2 billion), Canterbury (\$1.4 billion) and Southland (\$750 million).

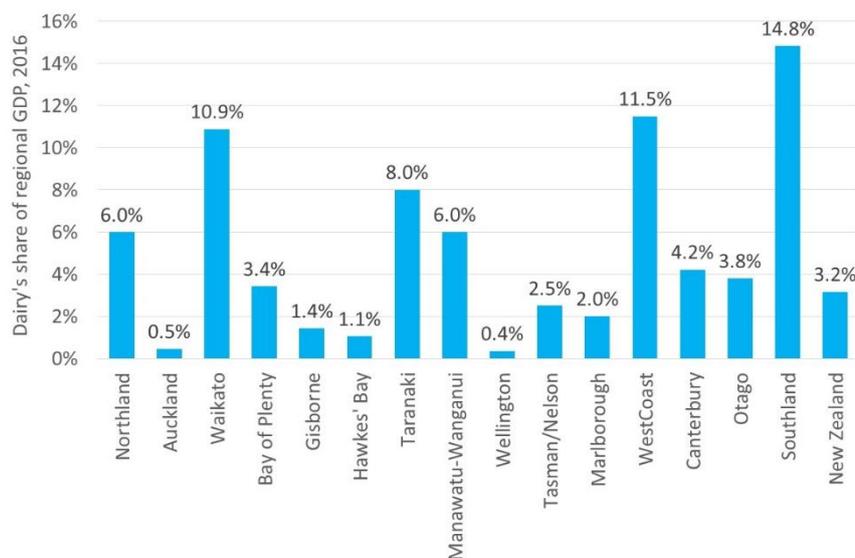
Dairy is particularly important as a share of the regional economy for some of New Zealand's smaller regions, such as Southland, the West Coast, Taranaki, Northland and the Manawatu-Wanganui.

Figure 4 Dairy's contribution to regional GDP

2016, levels, \$ millions



2016, share of regional GDP



Source: NZIER

2.3.2. Contribution to regional job opportunities

At a more detailed level of regional analysis, the dairy sector is vital to many territorial authority-level economies.

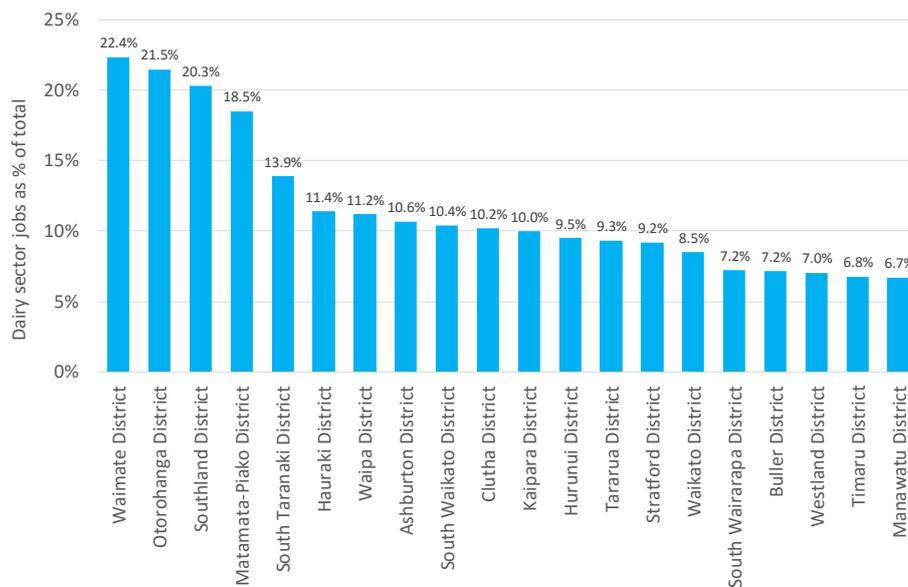
As shown in Figure 5, it provides over 1 in 5 jobs in three territorial authority economies (Waimate, Otorohanga, Southland); and over 1 in 10 in a further eight (Matamata-Piako, South Taranaki, Hauraki, Waipa, South Waikato, Clutha and Kaipara).

Figure 6 shows how dairy sector jobs growth has been very strong in local economies such as Invercargill City (19.2% average annual growth since 2000), Timaru (15.9%), Tauranga City (12.8%), Palmerston North (12.0%) and Southland (11.3%).

Figure 7 shows the top 20 territorial authorities where dairy provides the most jobs.

Figure 5 Dairy is a crucial employer for many regions

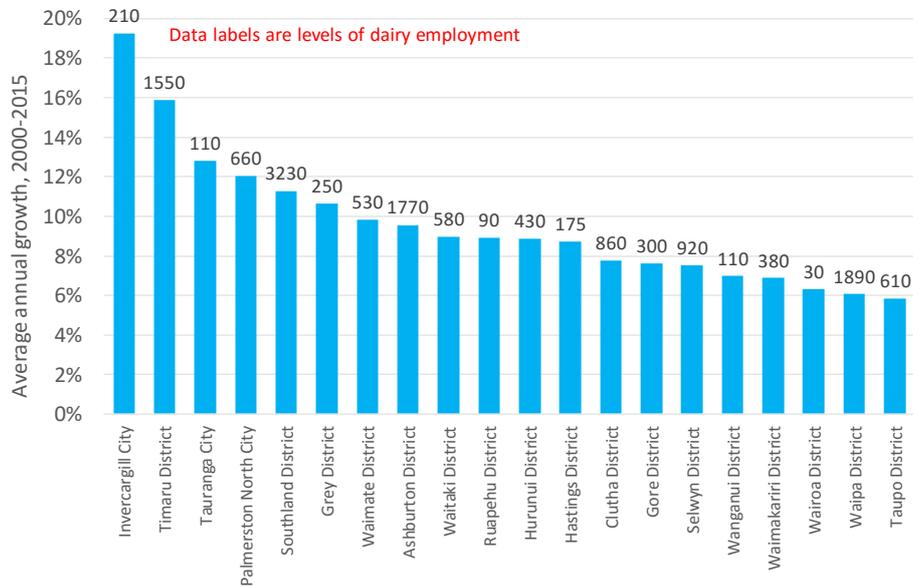
Dairy jobs as a proportion of total jobs; top 20 territorial authorities by proportion



Source: NZIER, Statistics New Zealand

Figure 6 Dairy employment has grown rapidly in many regions

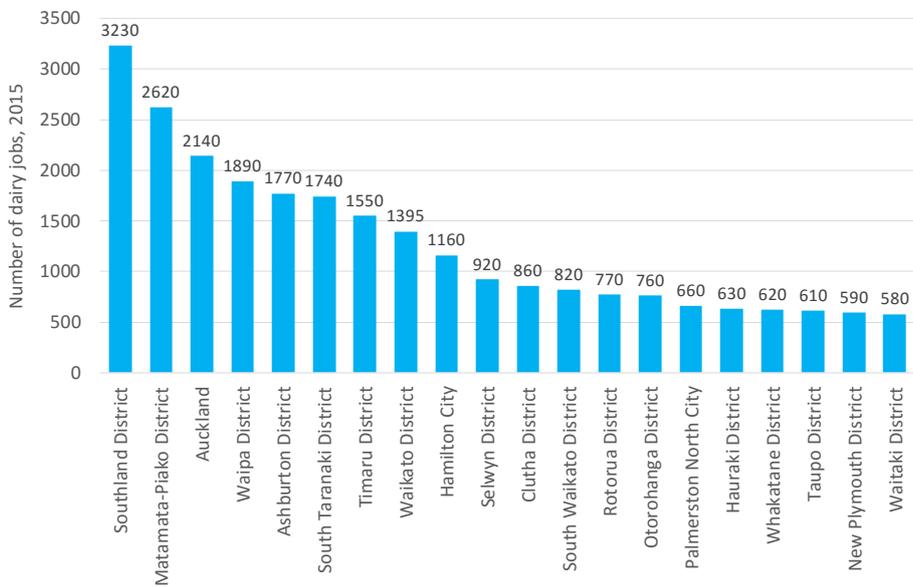
CAGR in jobs in dairy farming and processing, 2000-2015; levels in labels on bars



Source: NZIER, Statistics New Zealand

Figure 7 Largest dairy regions for jobs

Number of dairy jobs; 20 largest dairy territorial authorities

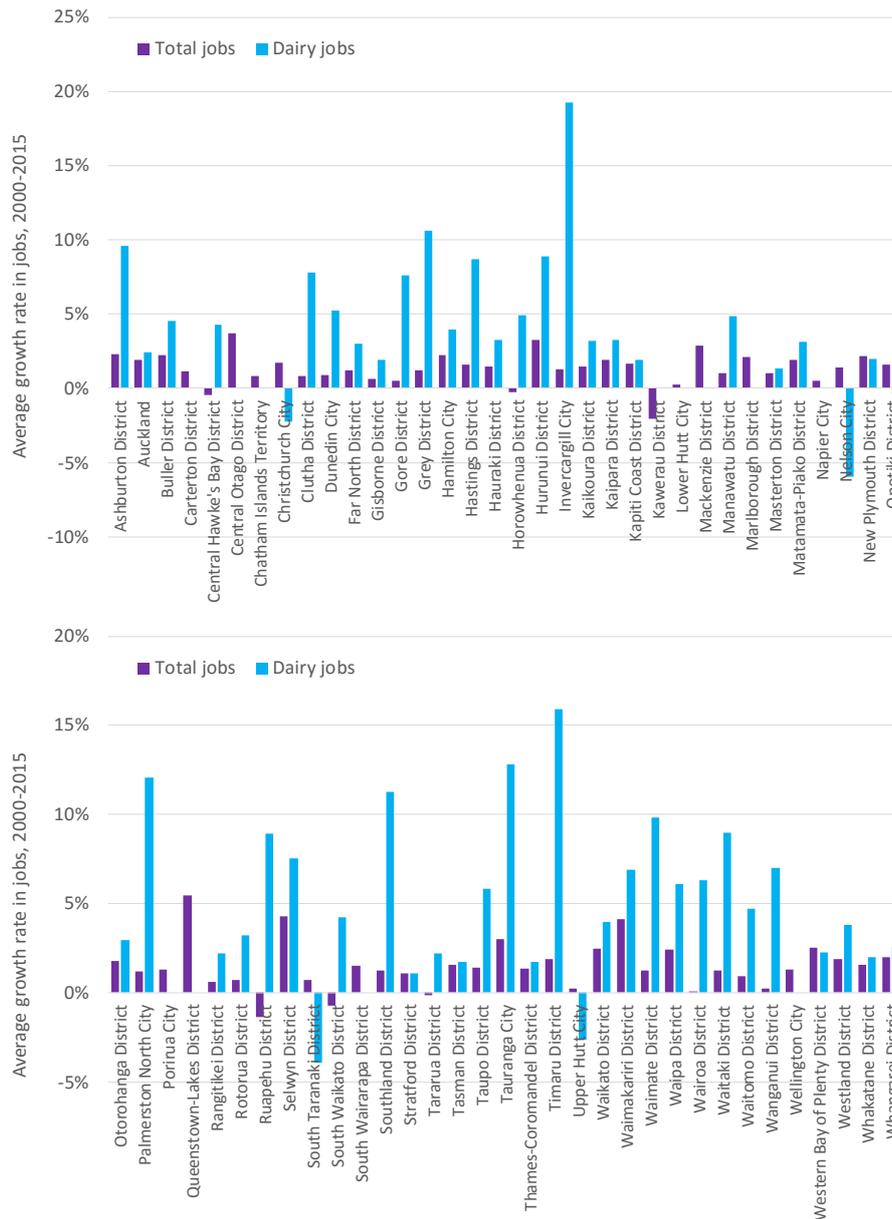


Source: NZIER, Statistics New Zealand

Jobs growth since 2000 has been much stronger in the dairy sector than the economy as a whole in the vast majority of territorial authorities (see Figure 8). Total jobs growth has only been faster than dairy jobs growth in Nelson City, Upper Hutt City, Christchurch City and South Taranaki.²

Figure 8 Dairy jobs growth has outstripped total jobs growth in most regions across New Zealand

CAGR in filled jobs 2000-2015 by territorial authority



Source: NZIER, Statistics New Zealand

² There is no registered dairy sector employment in five territorial authorities (Chatham Islands Territory, Kawerau, District, Lower Hutt City, Napier City, Porirua City) and it was not possible to calculate annual average growth for the other four (Queenstown-Lakes District, Central Otago District, Mackenzie District, Wellington City) due to them each having zero dairy employment in 2000. The latter four local economies now employ 198 dairy workers.

Sustainable Dairying: Workplace Action Plan

The New Zealand dairy sector provides a high number of jobs on-farm across New Zealand and is committed to on-farm workplaces being safe, rewarding and productive for all. The Workplace Action Plan launched in 2015 by DairyNZ and Federated Farmers, builds on a foundation of legal compliance and promotes best practice employment on farms. With the aim of making dairying an attractive and rewarding career option, the Workplace Action Plan:

1. Promotes the five pillars of good people management: balanced and productive work time; fair remuneration; wellness, wellbeing health and safety; effective team culture and rewarding
2. Describes what a quality work environment in the dairy industry looks like and sets out coordinated actions and commitments of the industry to;
3. Provides practical advice and support to employers and employees.

The action plan can be found at:

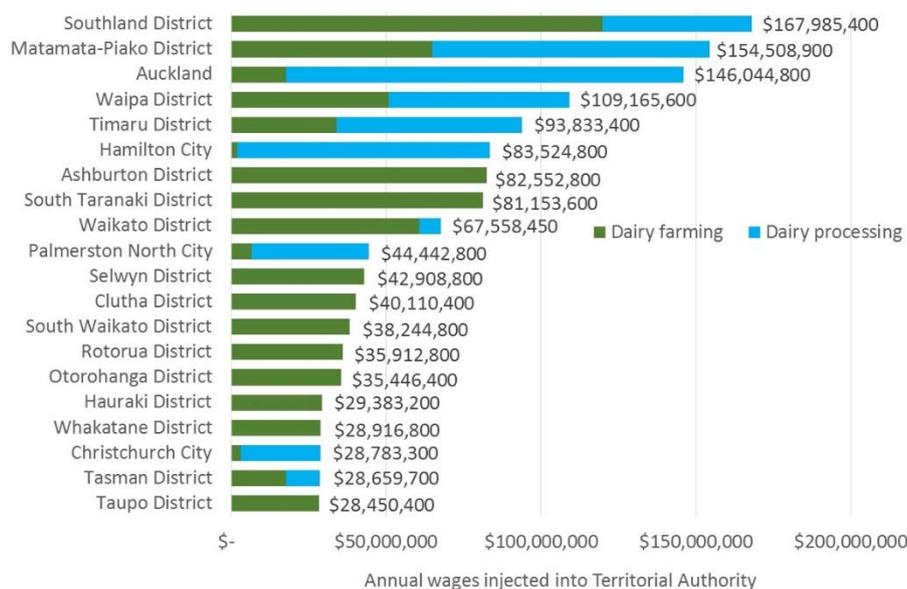
<https://www.dairynz.co.nz/about-us/dairy-industry-strategy/sustainable-dairying-workplace-action-plan/>

2.3.3. Contribution to regional household incomes

The dairy sector delivered \$2.4 billion in wages to dairy farmers and processing workers in 2016. The regions receiving the largest wage injections are shown below in Figure 9.

Figure 9 Dairy injects \$2.4 billion in wages into Kiwi households

Based on LEED average wages; Business Demographics jobs; top 20 regions by wage bill



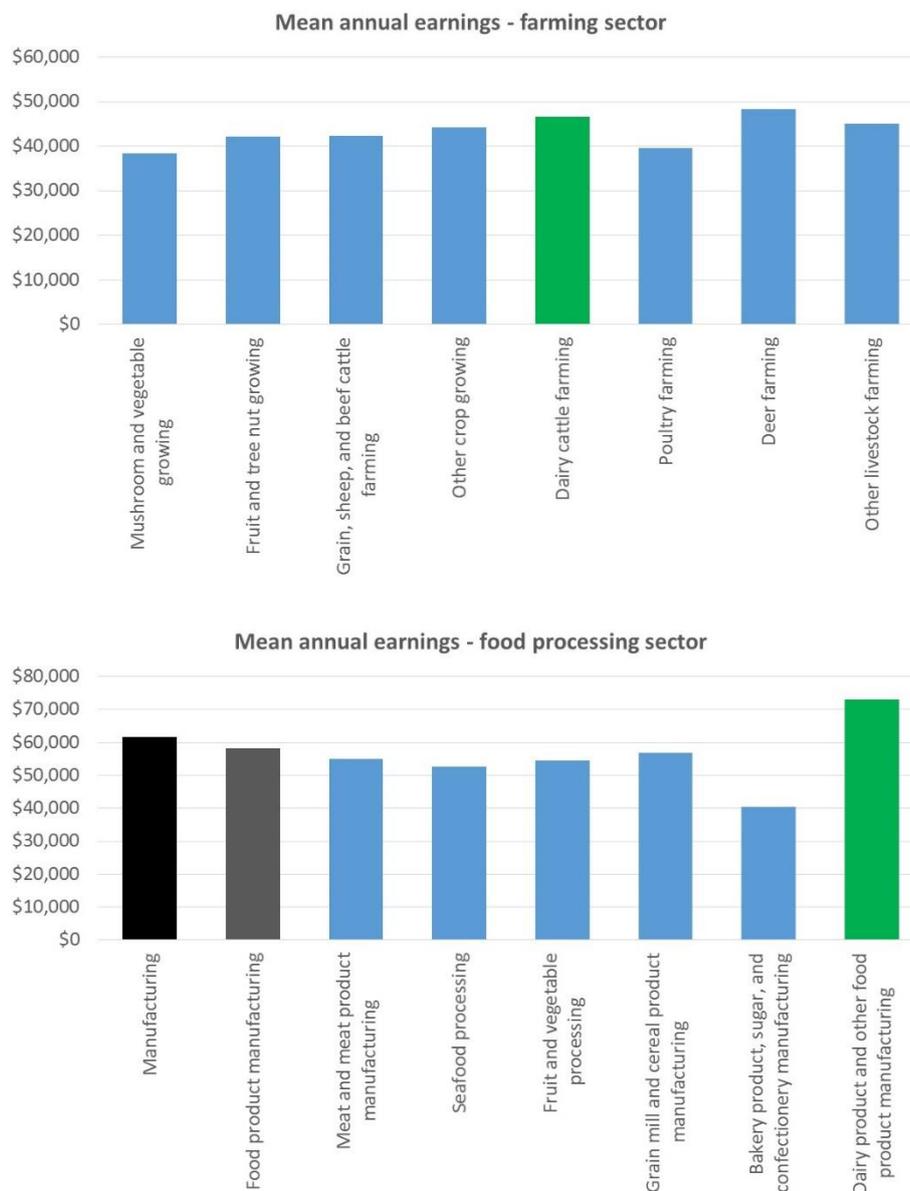
Source: NZIER, Statistics New Zealand

Dairy farming and dairy processing average wages are high compared to other farming and food processing wages (Figure 10):

- The dairy farming sector has the second highest average wage (\$46,640) in the wider farming sector, behind deer farming (\$48,320).³
- The average dairy processing wage is \$72,910, well above all other food product manufacturing. The average food manufacturing wage is \$58,200.

Figure 10 Dairy wages stack up well

Annual average earnings, year to June 2015



Source: Statistics New Zealand, NZIER

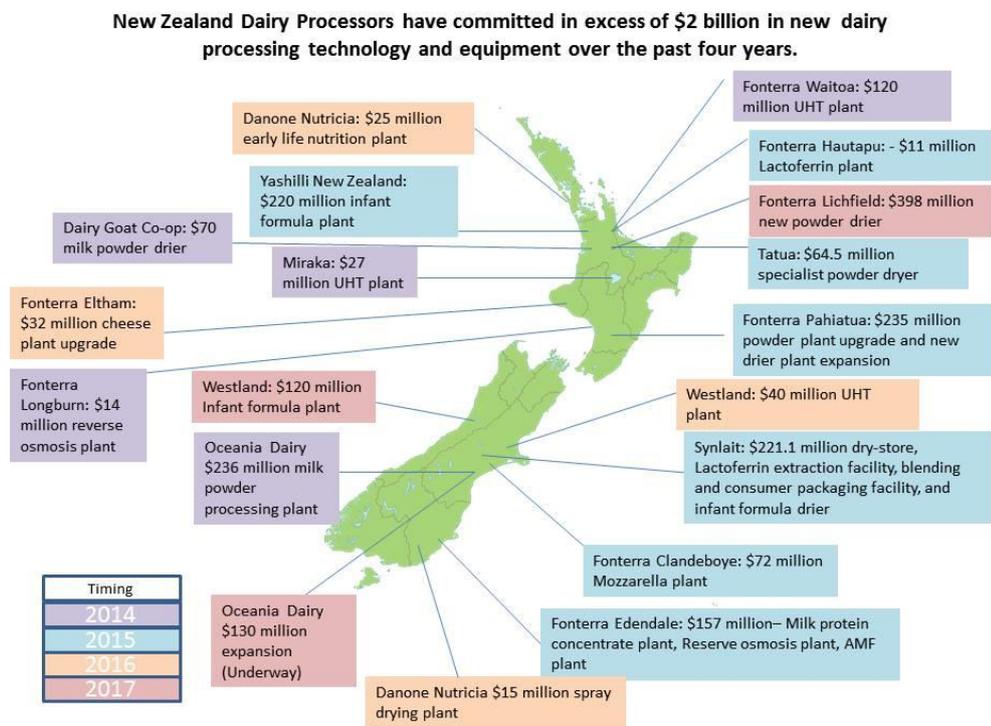
³ Based on Statistics New Zealand's LEED data, the latest of which is for the year to June 2015.

2.3.4. Dairy's contribution to regional investment

The dairy processing sector is continually upgrading its plant to handle greater volumes of milk, produce a wider range of products for domestic use and export and improve efficiency.

As Figure 11 shows, this additional capital investment is substantial – over \$2 billion since 2014, with much of it taking place in regional economies and drawing on local labour and intermediate inputs.

Figure 11 Dairy processing investment: more than \$2 bn since 2014



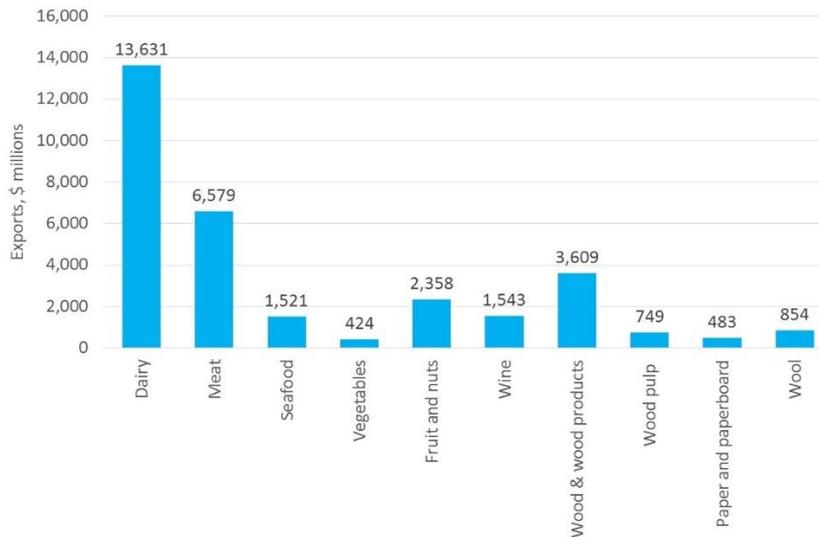
Source: DCANZ members

3. Dairy's contribution to exports

Despite the price downturn in recent years, the dairy sector remains New Zealand's largest goods export sector by some margin.⁴ At \$13.6 billion in the year to March 2016, it generates twice as much as the meat sector, almost four times as much as the wood sector and almost nine times as much as the wine sector (Figure 12).

Figure 12 Dairy is our biggest goods export by far

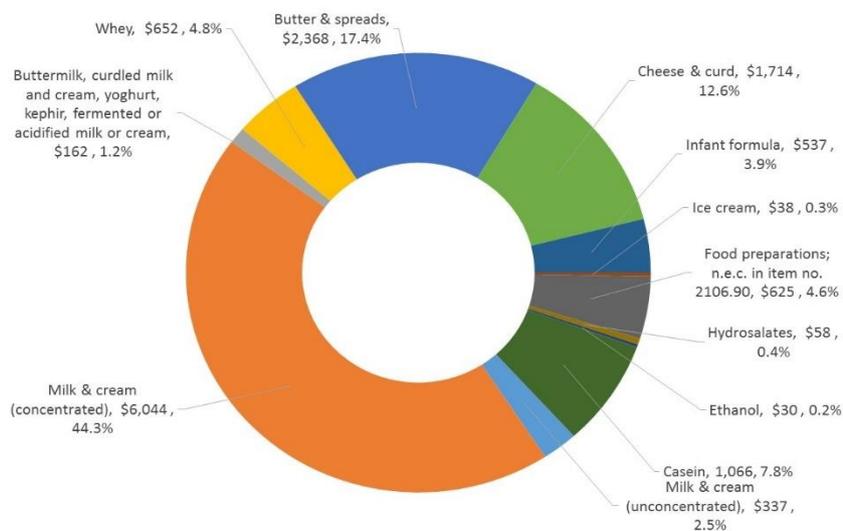
Year to March 2016



Source: NZIER, Statistics New Zealand

Figure 13 Composition of dairy sector exports

\$ millions, year to March 2016; % of total dairy sector exports



Source: NZIER, Statistics New Zealand

⁴ While tourism continues to record very strong growth, international tourists' expenditure in New Zealand has not yet overtaken dairy exports, at \$10.1 billion for the year ended September 2016.

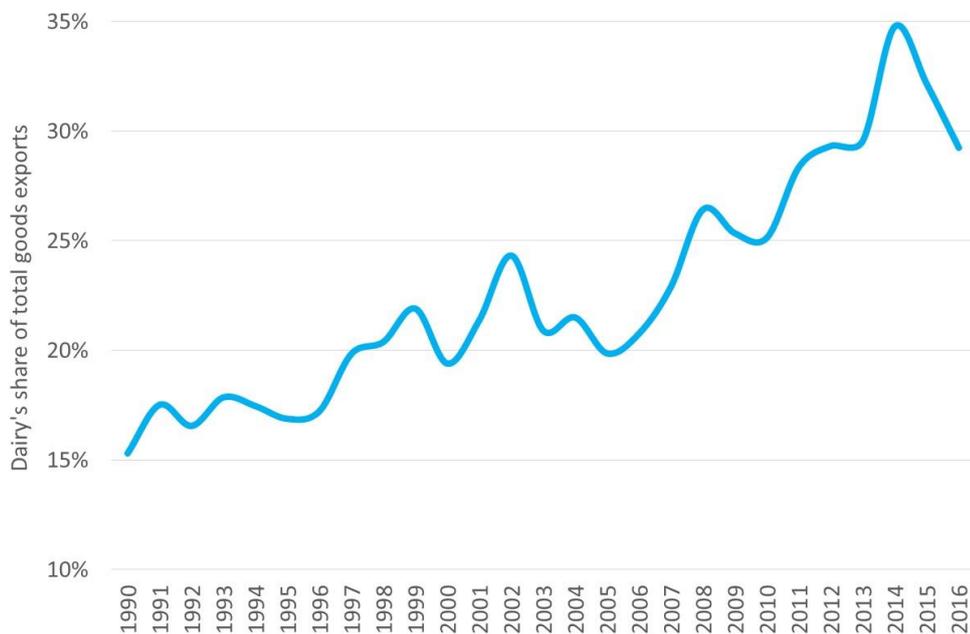
As Figure 13 shows, the key products exported by the dairy sector in the year to March 2016 include concentrated milk and cream (skimmed and whole milk powder) (\$6.0 billion), butter and spreads (\$2.4 billion), cheese and curds (\$1.7 billion), casein (\$1.1 billion), whey (\$625 million) and infant formula (\$537 million).

Niche but rapidly-growing dairy export segments include hydrosolates (\$58 million), ice cream (\$41 million), ethanol (used for alcoholic beverages, \$30 million).

Dairy's share of New Zealand's total goods exports has increased from 15% in 1990 to 29% in 2016, after peaking at 35% in 2014 when commodity prices soared (Figure 14).

Figure 14 Dairy's contribution to goods exports has trended up

Dairy exports as a proportion of total goods exports, March years



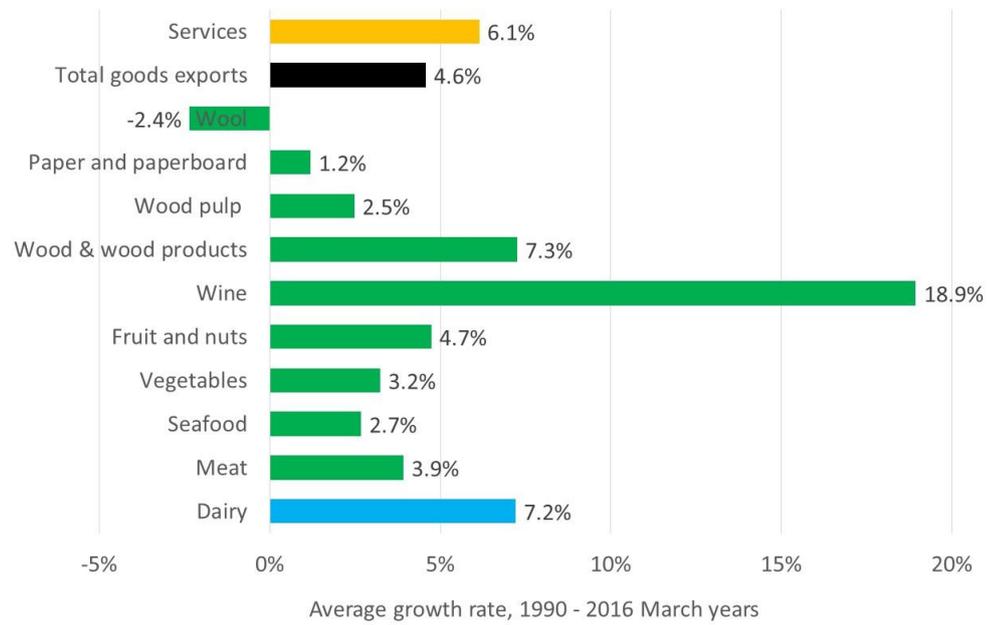
Source: NZIER, Statistics New Zealand

As shown in Figure 12, over the past 26 years, dairy export values have grown by an average of 7.2% per year. Aside from the wine sector (18.9% annual growth, albeit from a low base of \$17 million in 1990), only the wood and wood products sector has shown faster average export growth (7.3%).

This indicates that ongoing dairy export growth will be essential if the government is to meet its 'Export Double' target of lifting real export values to \$64 billion by 2025.

Figure 15 Dairy exports have grown by 7.2% per year since 1990

CAGR, nominal values, 1990-2016



Source: NZIER, Statistics New Zealand

4. Dairy's flow-on impacts

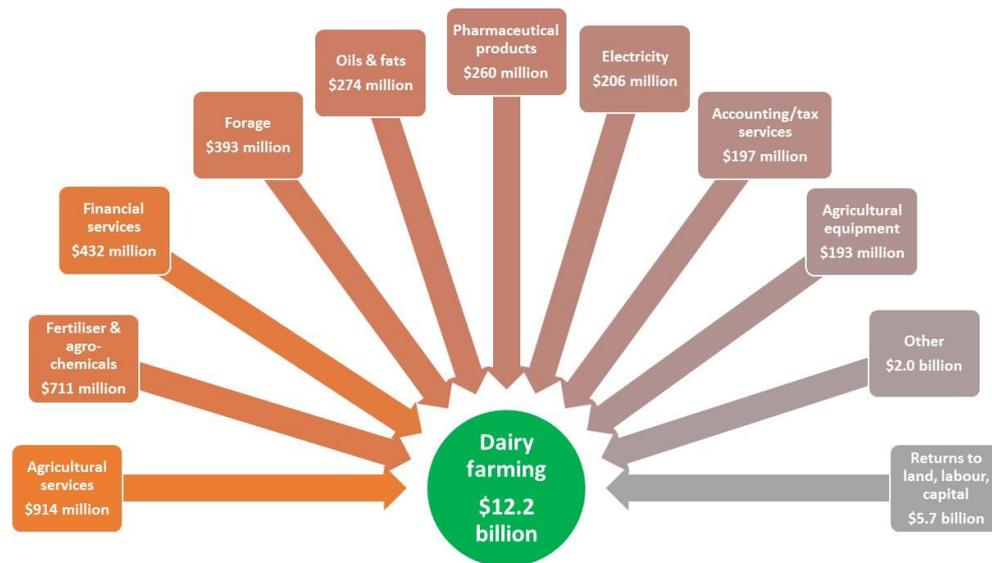
As well as its direct impacts on export growth, employment and income generation, the dairy sector also plays an important role in supporting activity in other parts of the New Zealand economy.

Figure 16 shows the purchases made by dairy farmers to support their production of \$12.2 billion worth of milk in 2016. Farmers spent \$711 million on fertilisers and agro chemicals, \$393 million on forage crops and bought over \$190 million of agricultural equipment.

Farmers also spent a huge amount on services to support their operations: \$914 million on agricultural services, \$432 million on financial services and \$197 million on accounting and tax services.

Figure 16 Dairy farms draw on inputs from a wide range of supporting industries

2016 estimates



Source: NZIER computable general equilibrium model database

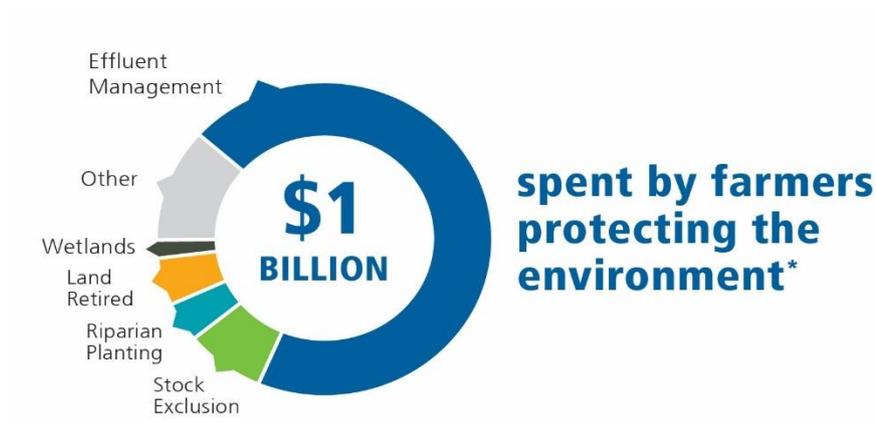
This analysis does not consider the additional spending by farmers out of their \$5.7 billion surpluses (i.e. not on inputs to production) on discretionary items such as entertainment, clothing, holidays, etc.

However, it can be seen that the dairy farming sector injects revenue into a wide range of sectors across rural economies, and also likely directly into cities too, given that most services firms tend to be located in urban centres. As we noted in our 2010 report, **“when dairy farmers are smiling, the whole region smiles”**.⁵

⁵ NZIER. 2010. 'Dairy's role in sustaining New Zealand: the sector's contribution to the economy'. Report to DairyNZ and Fonterra, December 2010.

Dairy farmers have also made considerable investments in environmental systems in recent years. DairyNZ⁶ estimates that farmers spent over \$1 billion between 2010 and 2014 on environmental management systems such as effluent systems, riparian planting and retiring sensitive land, or about \$90,000 per dairy farm. This investment is ongoing as farmers continue implementing the Sustainable Dairying Water Accord commitments.

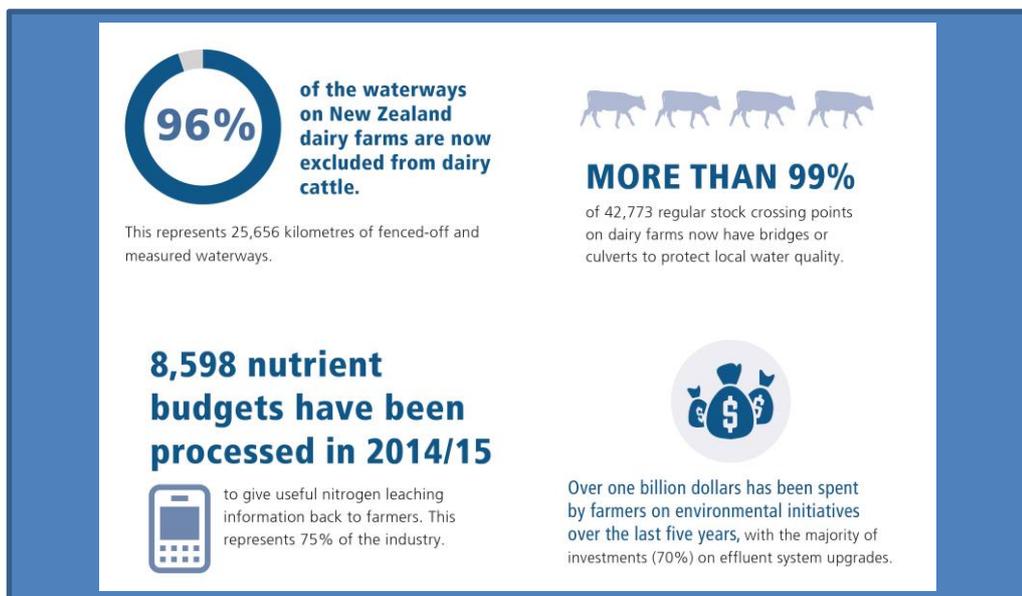
Figure 17 Dairy farmers' environmental systems investments 2010 to 2014



* In January, February and March 2015, Federated Farmers and DairyNZ conducted a nationwide survey of dairy farmers to find out what they had spent on environmental initiatives over five years. Taking that information and using data and statistics from DairyNZ's Economic Survey, the DairyNZ Economics Group has been able to calculate the collective environmental spending of the country's 11,927 dairy farms from 2010 to 2015.

Source: DairyNZ

Figure 18 Sustainable Dairying Water Accord year 2 achievements



Source: Sustainable Dairying Two Year Progress Report⁷

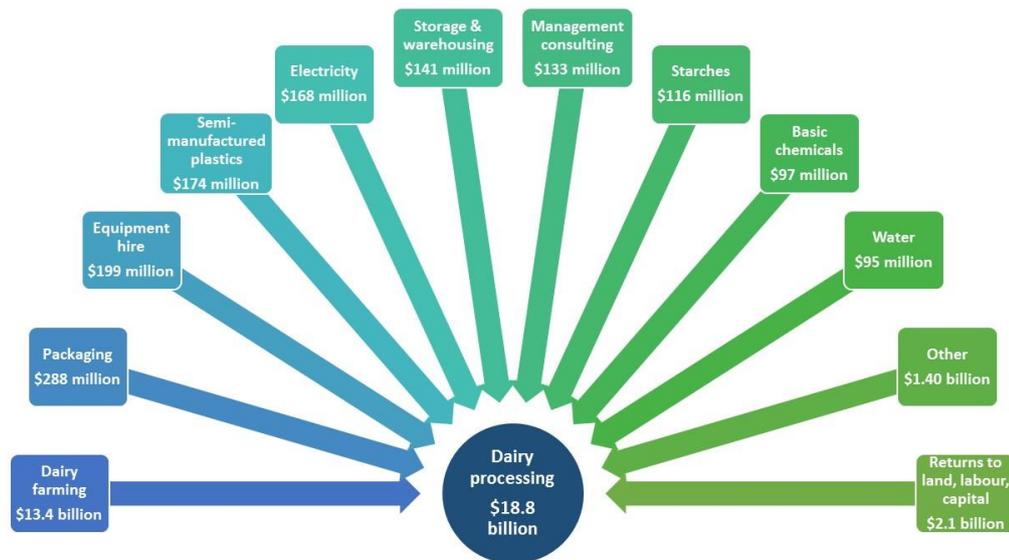
⁶ <https://www.dairynz.co.nz/news/latest-news/dairy-farmers-focused-on-environmental-responsibilities/>

⁷ <https://www.dairynz.co.nz/environment/in-your-region/sustainable-dairying-water-accord/>

Figure 19 shows the inputs used in the dairy processing sector. Clearly milk is the key input, but the processing sector also spends significant amounts on packaging (\$288 million), hired equipment (\$199 million), plastics (\$174 million) and various other products and services.

Figure 19 Dairy processing uses more than just raw milk

2016 estimates



Source: NZIER computable general equilibrium model database

5. Opportunities from elimination of dairy tariffs

5.1. Global dairy demand outlook

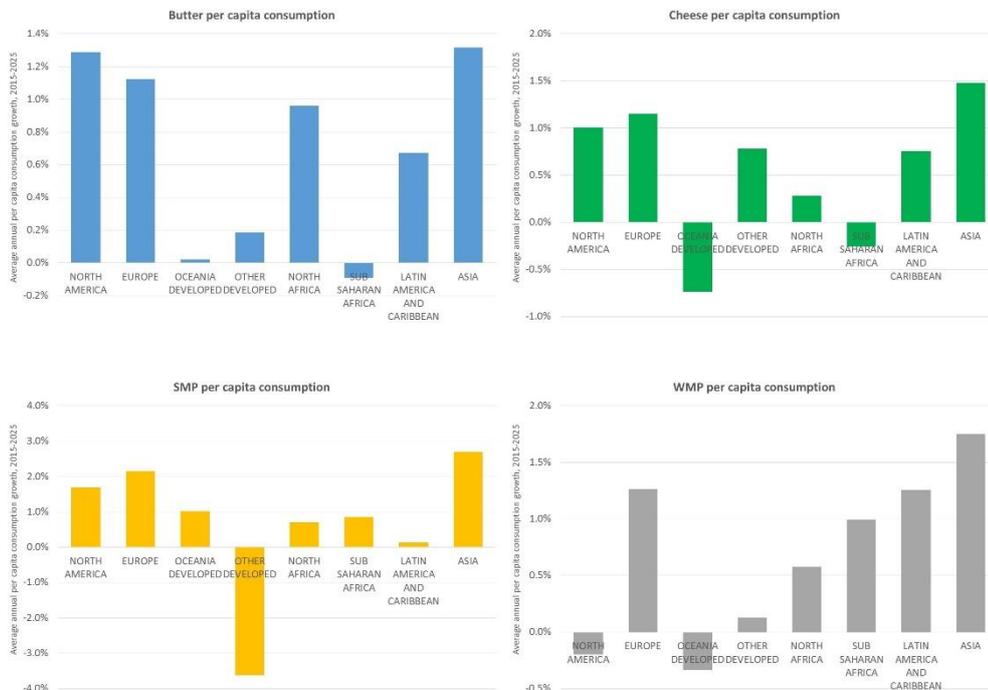
Despite the recent cyclical price downturn, the medium term outlook for global demand for dairy products remains very positive for New Zealand. The OECD/FAO (2016, p. 110)⁸ expects strong growth in demand from developing countries in particular due to “a continued shift in dietary patterns away from staples and towards animal products... Strong [dairy] consumption growth is expected across several markets in the Middle East and Asia, including Saudi Arabia, Egypt, Iran and Indonesia”.

Nominal dairy prices are expected to rise by between 15% and 45% over the next decade for all key dairy products (namely butter, cheese, WMP, SMP). Real prices are expected to increase, albeit at a much lower rate. And New Zealand exports are expected to become more competitive in global dairy markets as the US dollar and Euro currencies appreciate on the back of strengthening economic growth.

As Figure 20 shows, per capita consumption of dairy exports is expected to grow most rapidly in Asia, as dietary requirements in emerging Asian economies such as China and Indonesia shift towards protein-based products. Solid growth is also expected across Europe, Latin America and the Caribbean and North Africa.

Figure 20 Per capita consumption growth of dairy products to 2025

Compound average growth rates, 2016-2025, in consumption per capita



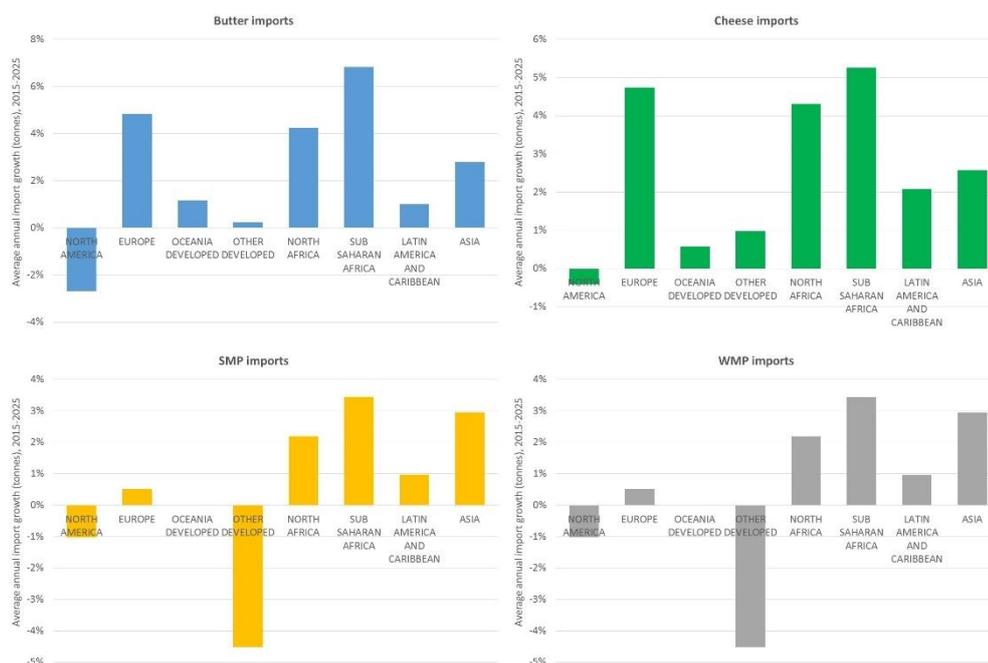
Source: OECD/FAO, NZIER

⁸ OECD/FAO. 2016. *OECD-FAO Agricultural Outlook 2016-2025*. Paris: OECD.

Some of this additional demand will be met by increased domestic production, especially in developing economies seeking to lift their self-sufficiency, but the vast majority of this domestic expansion will come from China, India and Pakistan. In other regions such as North Africa and Sub-Saharan African in particular, there is limited capacity for more production, so increased demand will be met through increased imports (Figure 21).

Figure 21 Demand for dairy product imports to 2025

Compound average growth rates, 2016-2025, in import volumes



Source: OECD/FAO, NZIER

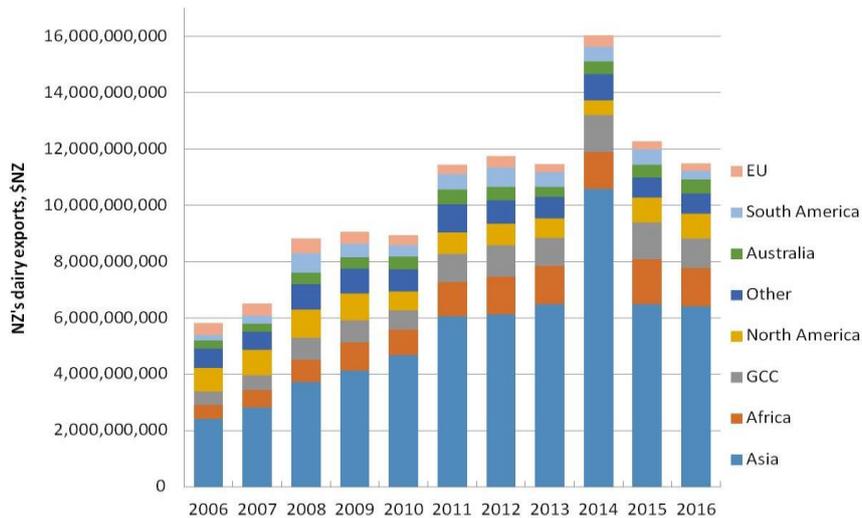
5.2. New Zealand's current dairy markets

New Zealand exported dairy products to 160 markets in the year to June 2016, with 72 markets taking more than \$10 million. While Asian markets accounted for well over half of these dairy exports, Africa now accounts for 12% and the Gulf Cooperation Countries (GCC) a further 9%.

To provide a sense of the importance of these dairy markets to New Zealand, our dairy exports to Africa and the GCC were around \$2.5 billion in the year to June 2016. This is greater than New Zealand's exports to *all* markets of fruit and nuts (\$2.4 billion), wine (\$1.5 billion) or seafood (\$1.5 billion).

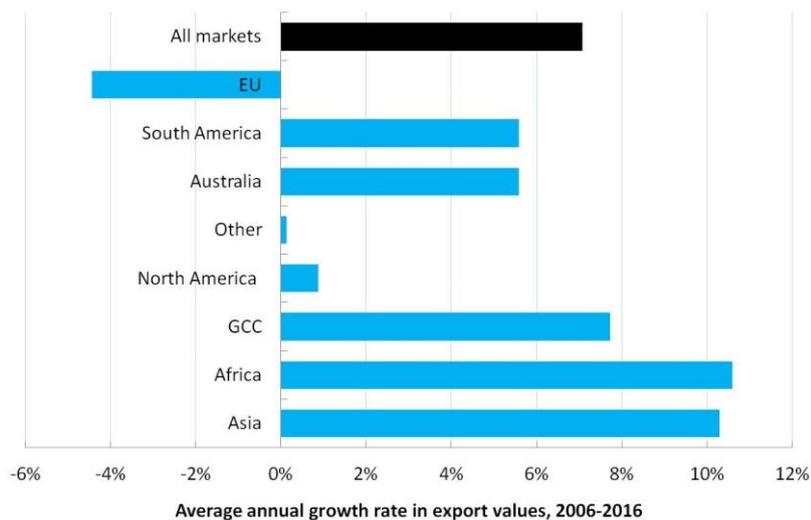
Figure 22 Asia dominates NZ's dairy exports; but Africa is second...

Share of New Zealand dairy exports, June 2016 year



...and growing rapidly

Average annual growth rate in dairy exports, 2006-2016



Source: NZIER, Statistics New Zealand

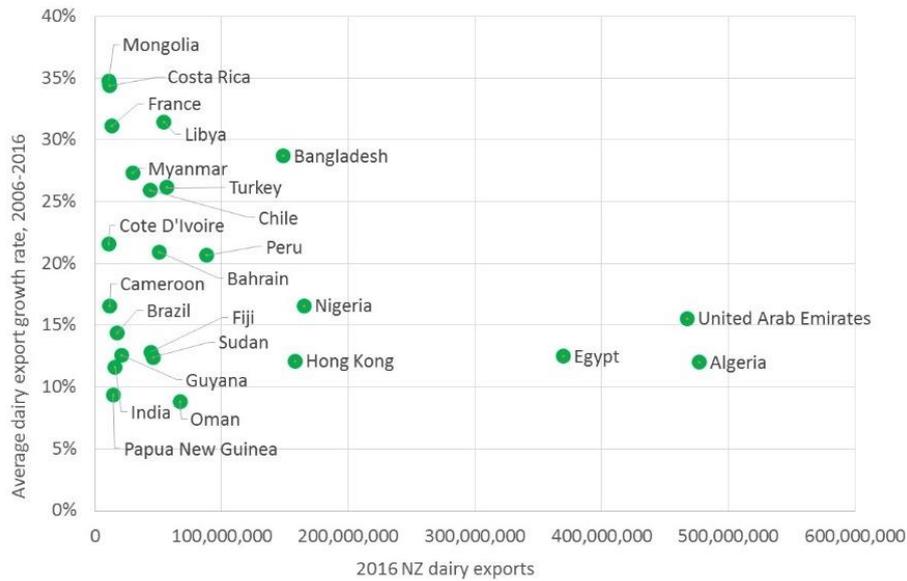
Indeed, many of New Zealand's fastest growing dairy export markets are developing countries in Africa and Asia (Figure 23). As mentioned above in section 5.1, this reflects these markets' ongoing economic development, which is boosting per capita incomes and hence moving dietary products towards dairy and meat and away from staples such as rice, legumes and pulses.

Admittedly, some of these growth rates are from low bases a decade ago, but others such as Algeria, Egypt and the UAE are both large *and* growing at 12-15% per year on average. Markets such as Bangladesh, Nigeria⁹ and Peru also appear to offer both size and rapid growth potential.

⁹ Nigeria's imports of dairy products from the world have grown at an average of 14% per year since 2000, for example.

Figure 23 The fastest growing 25 markets cover all continents

CAGR in New Zealand dairy exports, 2006-2016 for any market over \$10 million in 2016



Note: Excludes China, which has a CAGR of 22% over this period and \$2.7 billion of exports in 2016.

Source: NZIER, Statistics New Zealand

The scale and growth of New Zealand’s exports to these markets is particularly impressive when you consider the extent of tariff barriers in play.

Figure 24 overleaf shows the average MFN tariffs on imports of HS0402 (largely WMP and SMP) and HS0405 (butter and spreads) from all sources, including New Zealand, going into these markets.

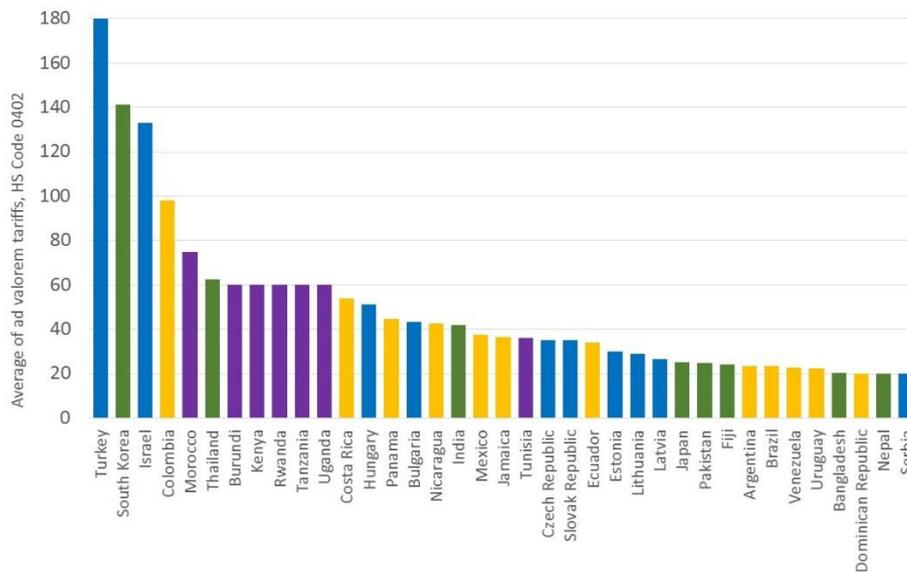
There are 37 markets which have MFN tariffs over 20% on HS0402 and 45 with tariffs over 20% on HS0405.

Figure 24 Prohibitive tariffs still abound

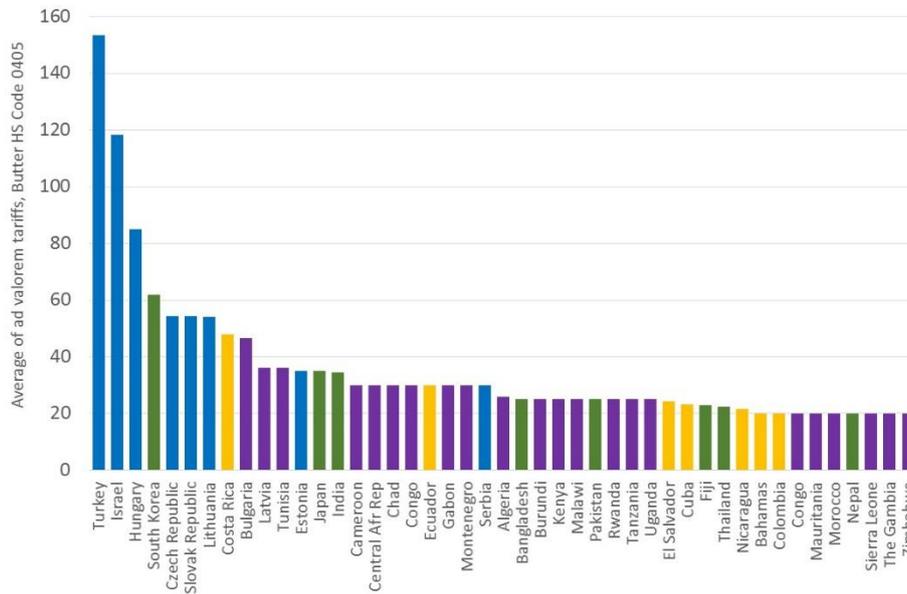
Average of MFN ad valorem tariffs in HS0402 (WMP/SMP) and HS0405 (Butter and spreads); all markets over 20% ad valorem tariff

Purple = Africa Gold = Americas Green = Asia/Pacific Blue = Europe

HS0402: WMP and SMP



HS0405: Butter and spreads

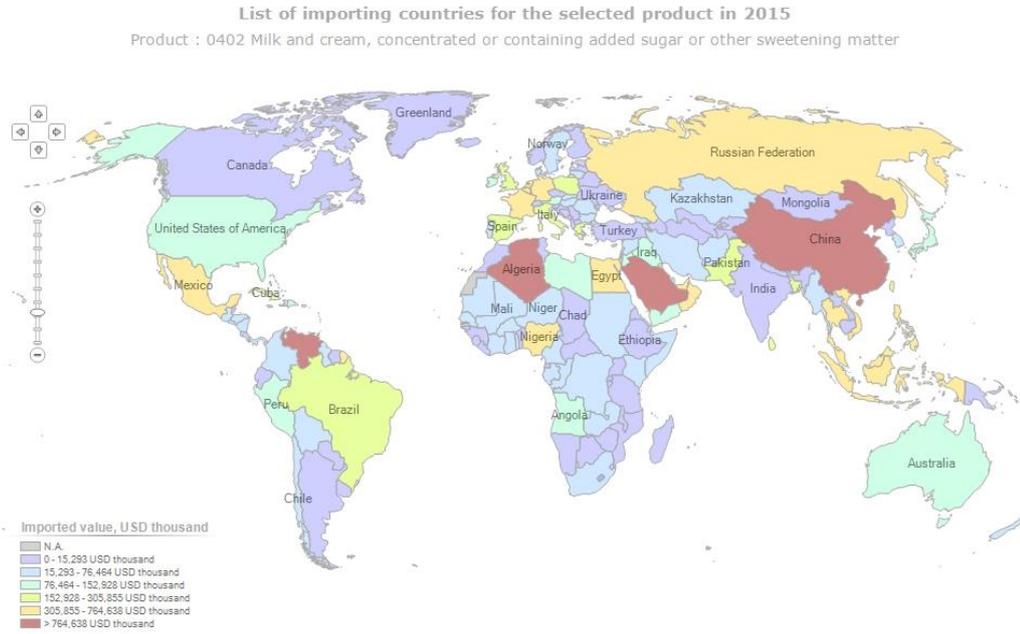


Source: NZIER, WTO Tariff Download Facility

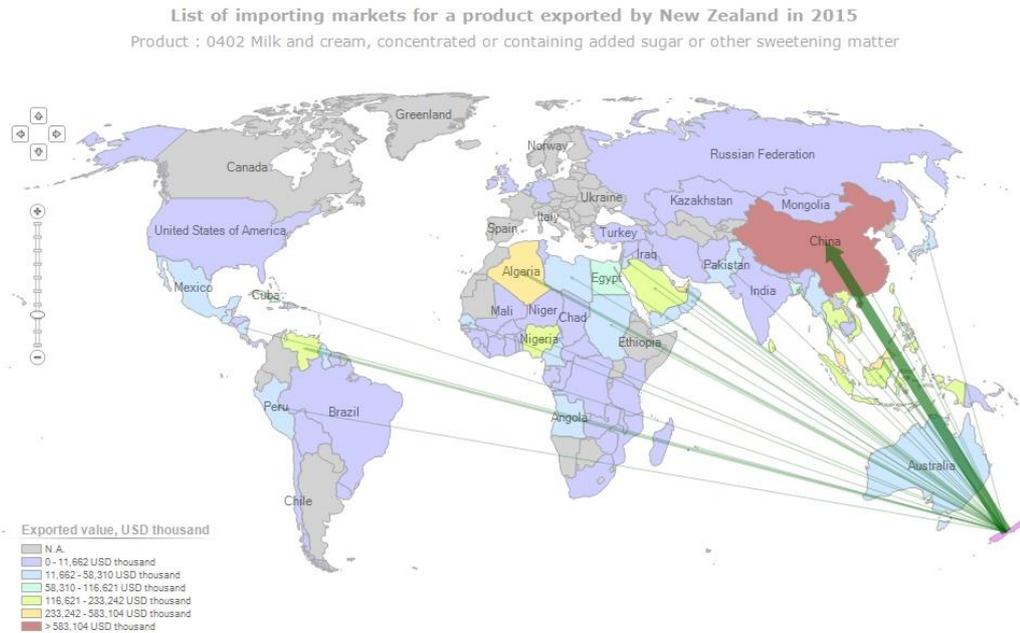
As the maps below show, Africa remains highly underdeveloped in terms of its imports of dairy products, both from all sources and from New Zealand. Purple and blue shading denotes economies that import very little dairy products. The arrows in the 'Imports from New Zealand' maps are proportionate to the size of New Zealand's exports of that product to each market, for the 40 largest markets.

Figure 25 Dairy import maps show huge gaps in trade flows

Imports of HS0402 (WMP and SMP) from the World



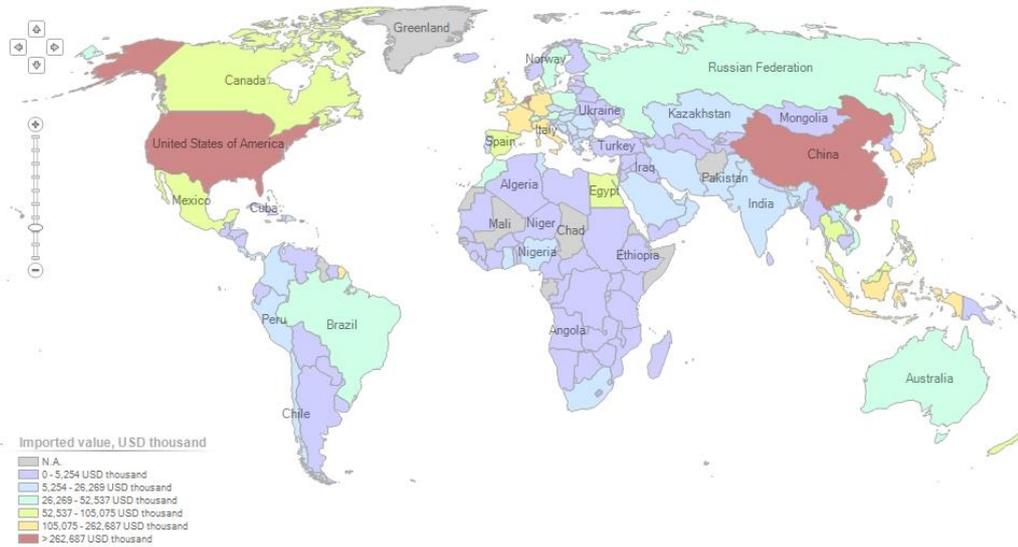
Imports of HS0402 (WMP and SMP) from New Zealand



Imports of HS0404 (Whey) from the World

List of importing countries for the selected product in 2015

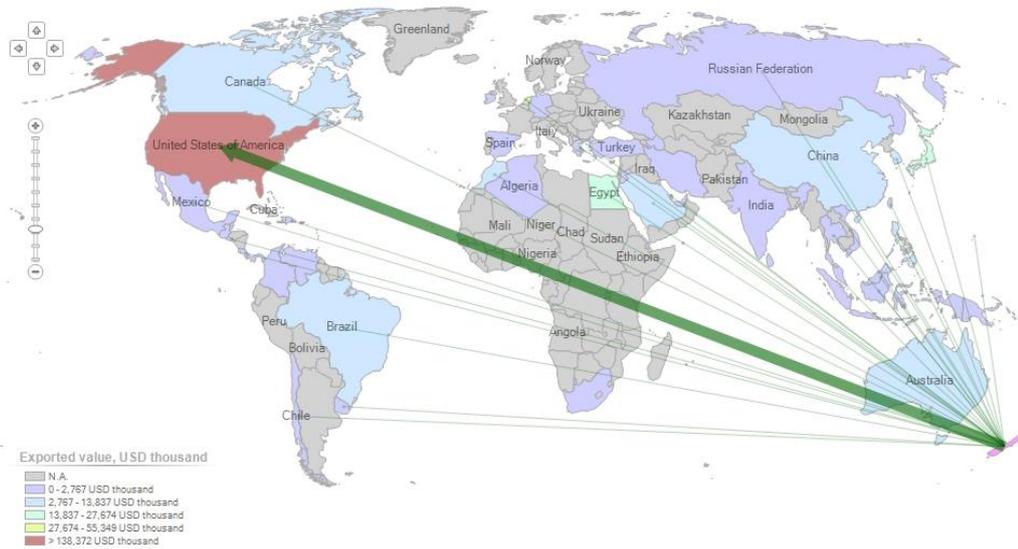
Product : 0404 Whey, whether or not concentrated or containing added sugar or other sweetening matter; products consisting of natural milk constituents. whether or not containing added sugar or other sweetening matter. n.e.s.



Imports of HS0404 (Whey) from New Zealand

List of importing markets for a product exported by New Zealand in 2015

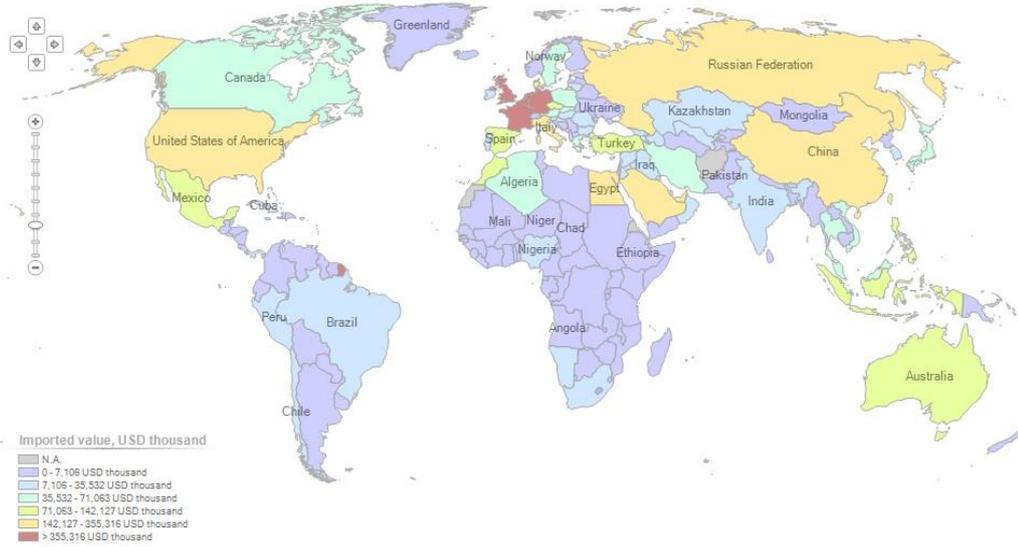
Product : 0404 Whey, whether or not concentrated or containing added sugar or other sweetening matter; products consisting of natural milk constituents. whether or not containing added sugar or other sweetening matter. n.e.s.



Imports of HS0405 (Butter and spreads) from the World

List of importing countries for the selected product in 2015

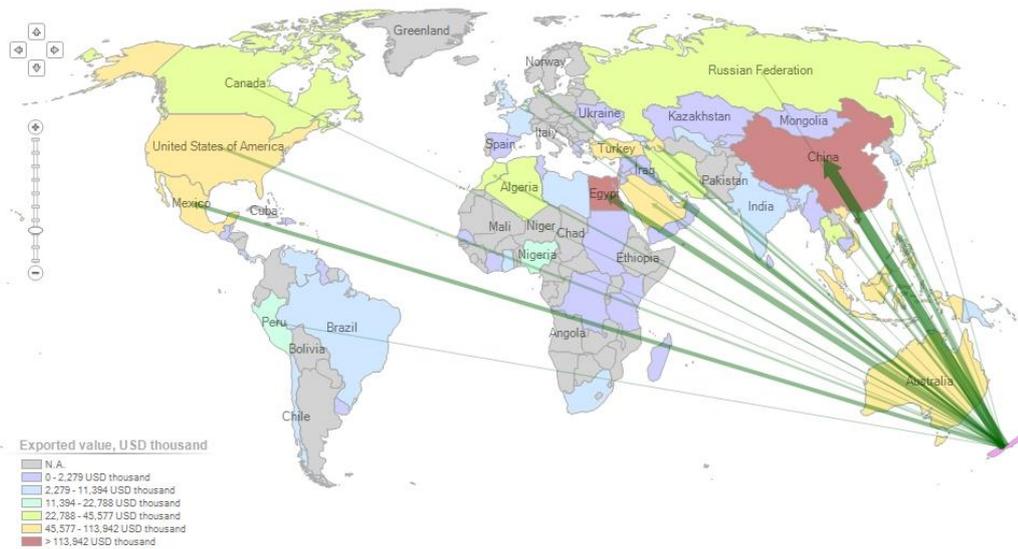
Product : 0405 Butter, incl. dehydrated butter and ghee, and other fats and oils derived from milk; dairy spreads



Imports of HS0405 (Butter and spreads) from New Zealand

List of importing markets for a product exported by New Zealand in 2015

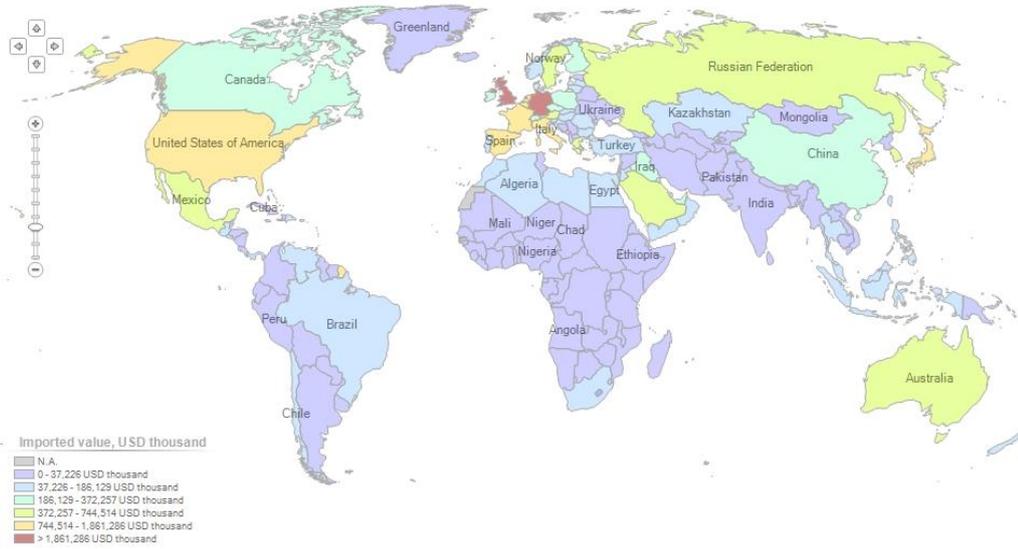
Product : 0405 Butter, incl. dehydrated butter and ghee, and other fats and oils derived from milk; dairy spreads



Imports of HS0406 (Cheese and curd) from the World

List of importing countries for the selected product in 2015

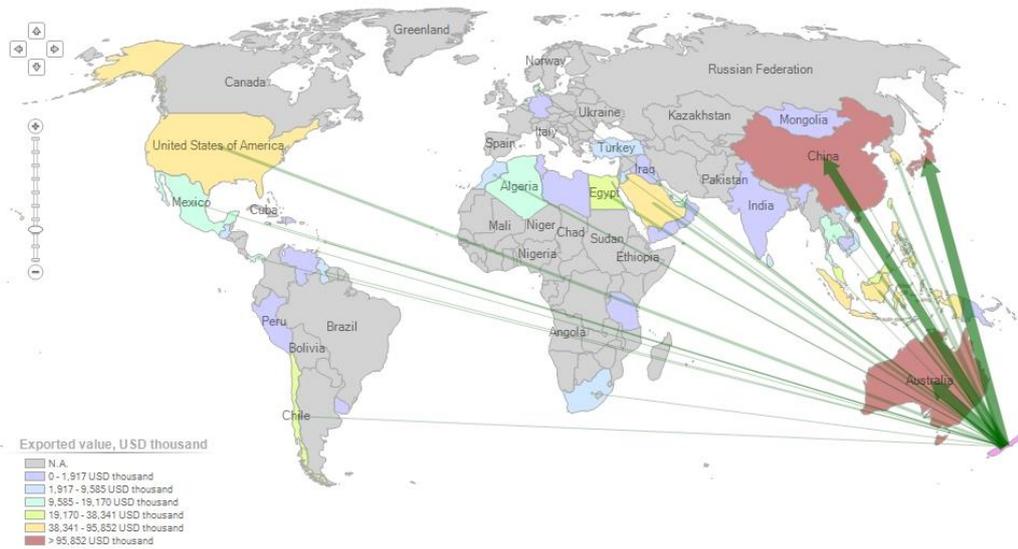
Product : 0406 Cheese and curd



Imports of HS0406 (Cheese and curd) from New Zealand

List of importing markets for a product exported by New Zealand in 2015

Product : 0406 Cheese and curd



Source: UN COMTRADE

5.3. Potential gains from further tariff reductions

The section above has shown that there are numerous trade expansion opportunities for the New Zealand dairy sector, and that punitive tariffs remain in place in many markets.

To highlight the potential benefits to New Zealand from ongoing tariff liberalisation, we use the GTAP computable general equilibrium (CGE) model of the global economy¹⁰ to run a simple hypothetical scenario where we eliminate all dairy tariffs and tariff equivalents of dairy quotas. We then link the GTAP model's results with our domestic model of the New Zealand economy, ORANI-G-NZ, via changes in export prices and volumes.

We hold milk production constant at baseline levels, fixing it so that it cannot expand in response to trade liberalisation. We do this because there are natural limits as to how much further dairy production can expand in the future.

GTAP is a model of the global economy, comprising 140 regions/countries and 57 sectors. The GTAP version 9 database that the model uses is benchmarked to 2011.

The GTAP model we use is a 'static' model. This means we simply compare the world before and after the tariff reductions. We make no judgement about the precise timing of any reductions or the adjustment path of economies and sectors, or about the likelihood of such tariff reductions occurring.

As such, this modelling is best seen as an indicative, long-run, way of answering a "what if...?" type question. It is not a forecast or prediction.

The key results are summarised below.

Table 1 Gains to New Zealand from global dairy tariff removal

Compared to 2015 baseline; assuming dairy production does not change

Measure	Change
Nominal GDP	\$1.04 billion
Nominal exports	\$533 million
Nominal household consumption	\$598 million
Change in volume of dairy exports	2.1%
Change in value of dairy exports	\$1.29 billion
Change in dairy products export price	7.8%
Change in terms of trade	1.85%

Source: NZIER GTAP modelling

The removal of all dairy tariffs would push down the global price of dairy products slightly. This induces additional global demand, and New Zealand benefits accordingly. The volume of dairy exports would lift by 2.1%. The export price for New Zealand's dairy products increases by 7.8%.

¹⁰ For more information on GTAP, see <https://www.gtap.agecon.purdue.edu/>

While dairy cattle output (i.e. raw milk) is held fixed, the additional demand for dairy products in overseas markets results in more demand for capital and labour in milk processing, which generates productivity gains – essentially allowing more processing per unit of raw milk.

Because of the increase in dairy export prices and the terms of trade benefits associated with the tariff removal, dairy export values rise by \$1.29 billion.

The New Zealand economy benefits considerably under this scenario. Nominal GDP rises by \$1.04 billion, and household incomes rise by almost \$600 million as the terms of trade increase increases their purchasing power.

Nominal total exports rise by \$533 million, with the gain in dairy exports partly offset by decreases in other export sectors as additional resources are directed towards the dairy sector as it expands.

5.4. The benefits of preventing a slide back to protectionism in dairy

In the current global trading system, the tide of protectionism is rising. Brexit and the initial trade policy proclamations by Donald Trump both point to a challenging environment for further trade liberalisation, at least in the short term. There is an increasing risk that tariffs could be lifted rather than reduced.

In this environment, just maintaining the status quo in terms of agricultural market access is likely to be a good outcome for New Zealand. Even if there is no additional market access for New Zealand exporters through multilateral, plurilateral or bilateral trade agreements in the short term, just resisting a backslide where tariffs start to rise is important.

To get an indication of the value of preventing such a backslide in dairy trade, we use the GTAP and ORANI-G-NZ models to explore what would happen if average global dairy tariffs increased from their current applied rates to their potential bound rates.¹¹ This equates to a 28 percentage point increase in average global dairy tariffs.

In this scenario, we do not hold milk production fixed, as increased dairy protection would lead to a drop in domestic supply (i.e. there is no reason to impose fixed production in this scenario as any natural limits would not bite).

The key results are summarised overleaf in Table 2.

In this scenario, increased tariffs push up the global dairy price by around 0.5%. This makes dairy products relatively less attractive to global consumers. Global demand falls accordingly.

The demand for New Zealand's dairy exports drops sharply, which pushes export prices down. The result is a 7.4% decrease in dairy export volumes and a 10.2% drop in export prices, leading to an overall drop in dairy export revenue of \$2.3 billion. Milk production falls by 4.4%.

¹¹ We used data on bound and applied tariffs from the WTO's Tariff Database to inform this calculation.

The New Zealand economy would suffer under a retreat to protectionism in the global dairy sector. Nominal GDP would fall by \$1.66 billion, and nominal household consumption would fall by \$958 million.

These results outline how important previous tariff reductions have been for the New Zealand economy, and hence the potential costs of moving backwards from the status quo. In short, maintaining and improving upon current market access delivers considerable benefits for the dairy sector and wider New Zealand economy.

Table 2 Costs to New Zealand from increased dairy tariffs

Compared to 2015 baseline; average dairy tariff rises to bound rates

Measure	Change
Nominal GDP	- \$1.66 billion
Nominal exports	- \$874 million
Nominal household consumption	- \$958 million
Change in volume of milk production	- 4.4%
Change in volume of dairy exports	- 7.4%
Change in value of dairy exports	- \$2.30 billion
Change in dairy products export price	- 10.2 %
Change in terms of trade	- 2.4%

Source: NZIER GTAP modelling

6. Opportunities from subsidy reform

While the WTO continues to struggle to keep the Doha Development Agenda round alive, the 2015 'Nairobi Package' that included the elimination of agricultural export subsidies is evidence that it's still relevant and capable – over time – of tackling the big multilateral issues that FTAs simply can't, in addition to its highly valuable disputes settlement role.

Since subsidies are not generally covered in FTA negotiations, it is easy to forget that global agricultural markets remain heavily distorted by such measures. While commodity price cycles cannot be eliminated altogether, there is little doubt that the muting of dairy price signals at the farm gate due to subsidies, tariffs and non-tariff barriers is exacerbating price fluctuations. Global dairy farmers are slow to respond to market signals such as the recent price drop because they are subsidised to keep producing, when the market needs less supply, not more.

To give a sense of how significant these distortions are in the global agricultural market, Banga (2014)¹² explores the impact of cutting green box subsidies by 50% in the EU and 40% in the US. The results show a major restructuring of agricultural production and trade as farmers respond better to price signals and competitive forces:

- Developed country production falls by 5%, and imports rise by 22% as developing countries become more competitive
- Developing countries see a 12% increase in export volumes and a 17% increase in export revenue.

Banga (2014) also looks at a scenario where green box subsidies are held at 2001 levels in the US and EU. Under this scenario, global agricultural production grows by 3%, export volumes grow by 17% and export revenue is boosted by 25%.

There are few recent studies on dairy-specific liberalisation, but OECD (2004)¹³ found that if dairy tariffs, quotas, support prices (but not direct payments) and consumer subsidies were eliminated on a multilateral basis, global dairy prices would rise significantly: by 57% for butter, 35% for cheese, 17% for WMP and 22% for SMP.

FAO (2005)¹⁴ find similar outcomes when comparing the results from various economic models of full dairy trade liberalisation. They note that world butter prices would rise by 46-60%, cheese prices by 20-35%, and SMP prices by 10-22%, depending on the model used and precise scenario modelled.

The message from these studies is clear: distortions in the global dairy market, and especially subsidies, are keeping global prices lower than they would otherwise be, and preventing global dairy producers from adjusting efficiently to relative price signals.

¹² See <http://www.oecd-ilibrary.org/docserver/download/5ixswbjhkszx-en.pdf?expires=1487627379&id=id&accname=guest&checksum=BA1BC0D297E0BCA35584DF237F1B42B2>

¹³ OECD. 2004. 'An analysis of dairy policy reform and trade liberalisation'. Joint Working Party on Agriculture and Trade. COM/AGR/TD/WP(2004)20/FINAL. Paris: OECD.

¹⁴ FAO. 2005. 'Dairy – measuring the impact of reform'. FAO Trade Policy Technical Notes no. 11.

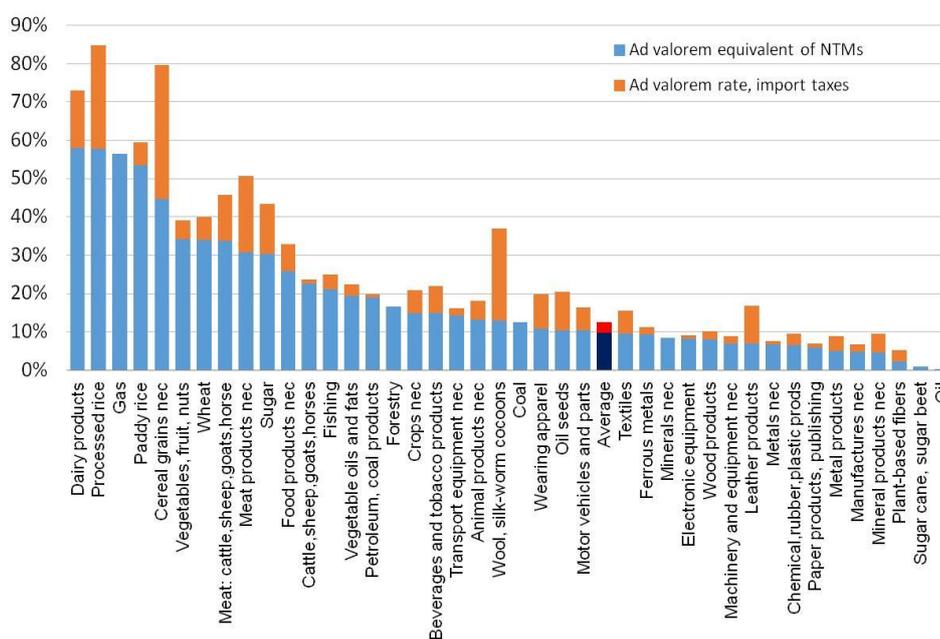
7. Opportunities from reductions in non-tariff barriers

The impact of non-tariff barriers on agricultural trade is growing in importance, both domestically and offshore (for example at the Peru APEC Leaders' meeting in November 2016).

A recent NZIER Working Paper has estimated the potential cost of non-tariff measures on New Zealand's exports, and on APEC trade more widely.¹⁵ While this analysis did not split out the more trade-distorting and inefficient non-trade *barriers* from the wider set of non-tariff *measures* (some of which are imposed for legitimate public policy purposes), we made the point that all such measures (NTMs) impose costs on businesses and consumers.

We estimate that the ad valorem equivalent (AVE) of dairy NTMs in the Asia-Pacific region is around 58%, compared to an average tariff rate of around 14% (Figure 26). Applying these AVEs to trade dairy flows within the APEC region, we estimated the cost of NTMs for dairy imports to be US\$14 billion, based on 2011 data.

Figure 26 AVEs of NTMs and tariff rates in the APEC region



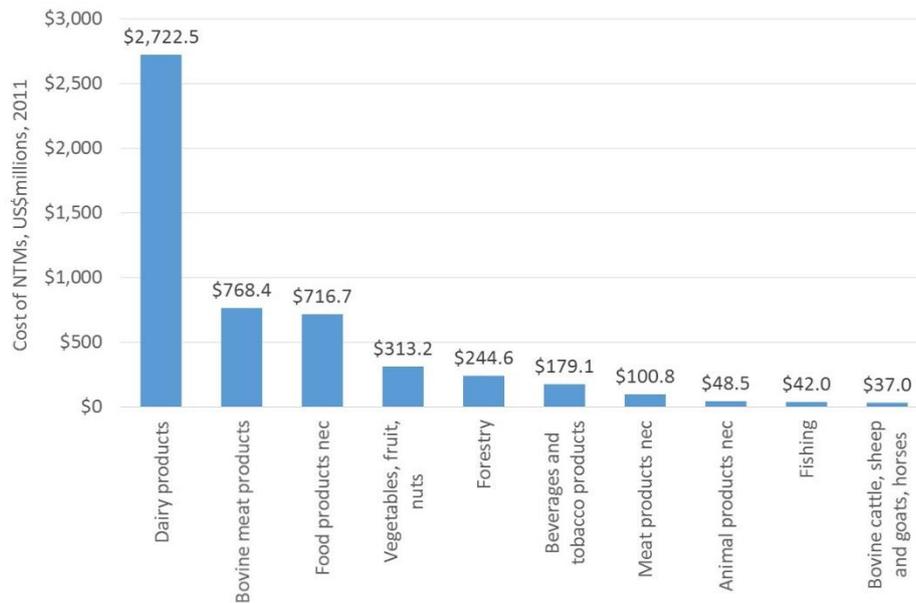
Source: Ballingall and Pambudi, 2016.

¹⁵ J. Ballingall and D. Pambudi. 2016. 'Quantifying the costs of Non-tariff measures in the Asia Pacific region: initial estimates'. NZIER Working Paper 2016/04. <http://nzier.org.nz/publication/quantifying-the-costs-of-non-tariff-measures-in-the-asia-pacific-region-initial-estimates-nzier-public-discussion-paper-20164>

The overall cost of NTMs on New Zealand’s primary sector exports to the APEC region is US\$4.7 billion, of which the bulk is imposed on the dairy sector (US\$2.7 billion).

Figure 27 Costs of APEC NTMs on NZ’s primary sector exports

US\$ millions, 2011



Source: Ballingall and Pambudi, 2016.

While these estimates are indicative only, and require further exploration to refine, they do at least highlight the potential costs of NTMs on the New Zealand dairy sector. This suggests there needs to be a build-up of public and private sector expertise on, and resources applied to, NTMs in coming years to complement existing levels of resources on tariffs and subsidies.

8. Conclusion

Dairy continues to make a significant contribution to the New Zealand economy. It:

- Contributes \$7.8 billion (3.5%) to New Zealand's total GDP: comprising dairy farming (\$5.96 billion) and dairy processing (\$1.88 billion).
- Supports rural New Zealand, with the sector accounting for 14.8% of Southland's economy, 11.5% of the West Coast, 10.9% of the Waikato, 8.0% of Taranaki and 6.0% of Northland.
- Remains New Zealand's largest goods export sector, at \$13.6 billion in the year to March 2016. Export growth has averaged 7.2% per year over the past 26 years, faster than any primary industry apart from wine and wood and wood products.
- Exports twice as much as the meat sector, almost four times as much as the wood and wood products sector and nine times as much as the wine sector.
- Accounts for more than one in four goods export dollars coming into New Zealand, despite the recent price downturn.
- Employs over 40,000 workers, with dairy employment growing more than twice as fast as total jobs, at an average of 3.7% per year since 2000.
- Creates jobs at a faster rate than the rest of the economy in all but 5 territorial authorities across New Zealand.
- Provides over 1 in 5 jobs in three territorial authority economies (Waimate, Otorohanga, Southland); and over 1 in 10 in a further eight (Matamata-Piako, South Taranaki, Hauraki, Waipa, South Waikato, Clutha and Kaipara).
- Delivered \$2.4 billion in wages to farmers and processing workers in 2016.
- Supports a range of supplying industries: in 2016 farmers spent \$711 million on fertilisers and agro chemicals, \$393 million on forage crops and bought over \$190 million of agricultural equipment. Farmers also spent \$914 million on agricultural services, \$432 million on financial services and \$197 million on accounting and tax services.
- As well as taking farmers' raw milk, the dairy processing sector also spends significant amounts on packaging (\$288 million in 2016), hired equipment (\$199 million) and plastics (\$174 million).

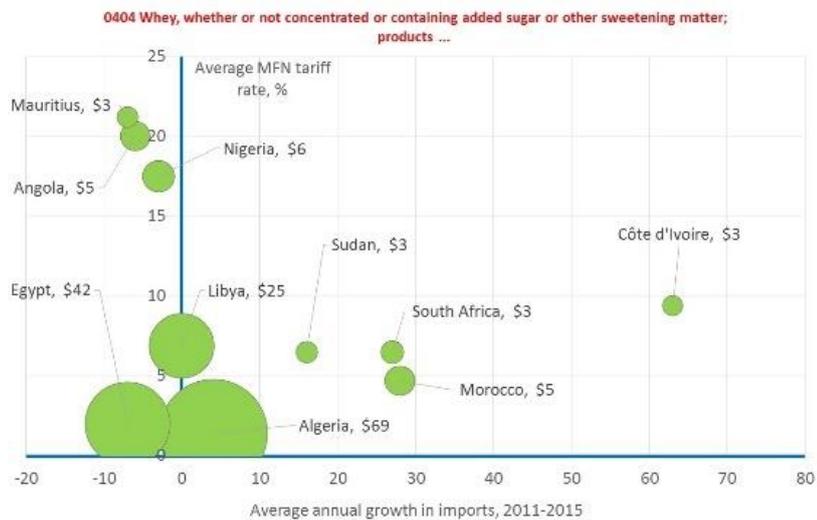
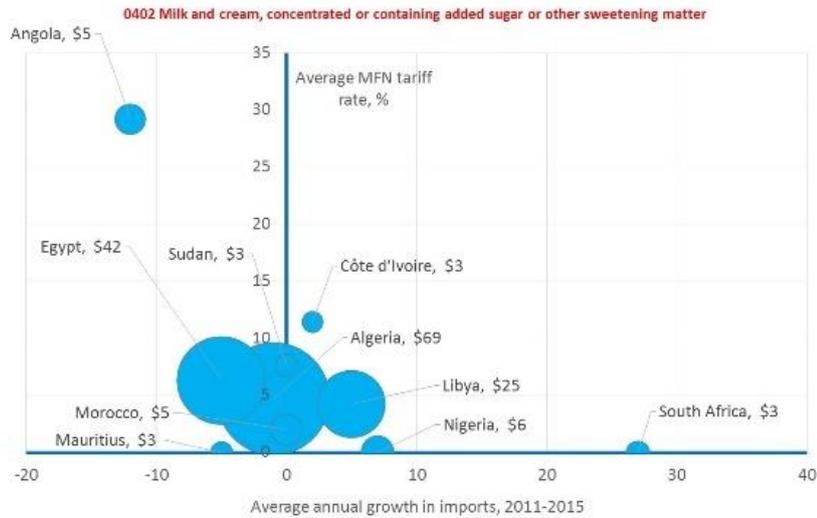
We have also explored the potential for additional gains to the dairy sector from further trade liberalisation:

- If all global dairy tariffs were eliminated, and New Zealand's milk production is held constant, the value of New Zealand's dairy exports would increase by \$1.3 billion, generating a \$1.03 billion increase in New Zealand's nominal GDP.
- In a separate modelling scenario, if global dairy tariffs *increased* from their average applied rate to their average bound rate, New Zealand's dairy exports would fall by \$2.3 billion, leading to a \$1.66 billion fall in New Zealand's nominal GDP. This provides an indication of the value of historical dairy tariff reductions due to multilateral, plurilateral and bilateral trade negotiations, or the benefits of preventing any backsliding towards trade protectionism.

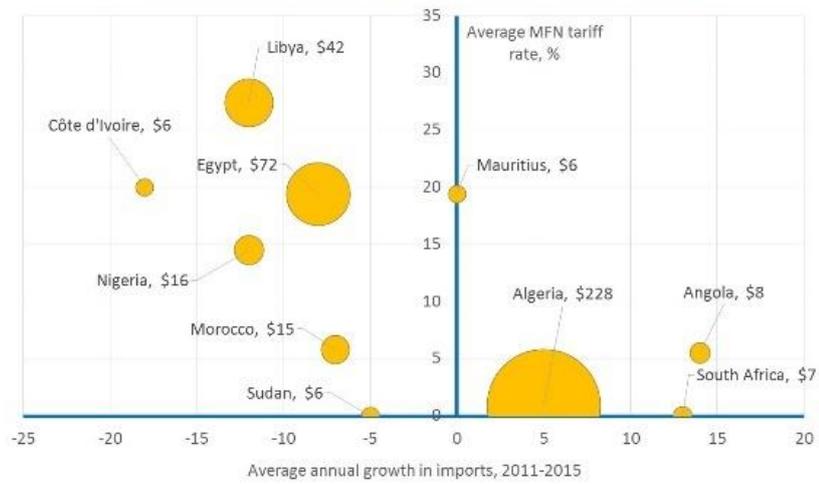
Appendix A African markets

Figure 28 African dairy tariffs, import levels and growth, by product

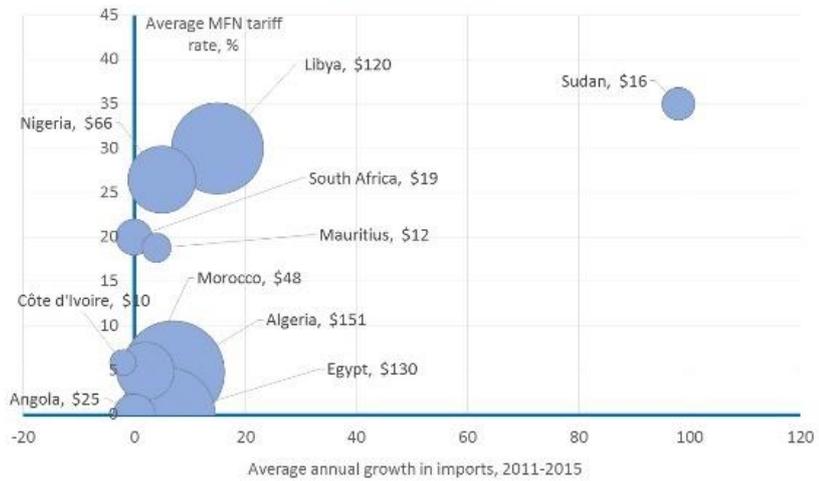
Average MFN tariff rate (vertical axis); average growth in value of imports from the world 2011-2015 (horizontal axis); value of imports from the world in 2015, US\$ millions (size of bubble)



0405 Butter, incl. dehydrated butter and ghee, and other fats and oils derived from milk



0406 Cheese and curd



Source: NZIER, COMTRADE