



New Zealand domestic vegetable production: the growing story

2017

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Horticulture New Zealand Foreword

Horticulture New Zealand's vision is 'healthy food for all forever.' Now, more than ever, people are seeking out healthy food and lifestyles. Indications from the health sector are that diet is linked to long-term health outcomes. The ideal diet includes plenty of fresh fruit and vegetables.

In addition to seeking out healthy food, people worldwide are making purchasing decisions based on values. These values might include wanting to know where the food comes from, and that it is sustainably and ethically produced. Growers and food retailers need to provide shoppers with this information.

In parallel, there is a perfect storm brewing for New Zealand's supply of healthy food. Prime fruit and vegetable growing land is being squeezed by rapid growth in towns and cities and high demand for new housing. Emotional battles over water have the potential to leave growers high and dry. Changes in weather patterns across regions and extreme unseasonal weather events such as rain, hail, snow, frost or drought becoming more frequent and damaging, are impacting the supply of fresh, healthy food. When supply is short and demand high, prices are subject to wide variations. This can potentially put healthy food out of reach for some people.

We believe it is time to take stock. There is an assumption that New Zealand is a land of plenty and we will always have enough locally-grown food to feed our population, supplemented by imported food where there is demand. But things are changing, fast. We need to look closely at our domestic food supply and be sure that town, city and regional planning decisions are seen in the context of impacting the whole of New Zealand's food supply.

The solution is not as simple as picking up and moving growing operations somewhere else, or moving growing indoors and vertical. Horticulture started on the outskirts of towns and cities to ensure fresh produce could get to market quickly, without spoiling. Each growing area is an ecosystem that has developed over generations and supports local, regional and the wider New Zealand economy in many ways, including employment.

Growers are definitely looking at how they can do more with less. The population they feed is growing, but access to land and water is challenging. Our growing areas and the businesses that grow vegetables in New Zealand have consolidated meaning the need to protect them for the future is more important than ever.

Science and technology is driving change and helping meet consumer demands. People all over the world

want our food and exports are vital to the growing economy, but are we in danger of leaving New Zealanders with not enough locally grown food to eat?

This report is the first step in taking stock of what we need to continue to grow the vegetables that form the staple base of healthy New Zealanders' diets. It is part of a body of evidence Horticulture New Zealand is compiling to persuade decision-makers across all levels of government that we need a domestic food security policy.

Before more houses are placed on fertile and unique growing land and more decisions are made about water, we want there to be a pause for breath and some big picture planning.

Julian Raine
President, Horticulture NZ

Mike Chapman
Chief Executive, Horticulture NZ



KPMG Foreword

On a global scale, New Zealand's agri-food sector is made up of a plethora of niche, boutique and artisan businesses. Greater value can be generated by joining the dots between the producers and the communities from which our products originate and those that ultimately experience the product.

In a world of almost limitless choices for premium consumers, something being facilitated by rapidly evolving technologies, New Zealand's vegetable and fruit producers need to create experiences that fully engage with their consumers. Keeping domestic consumers enthusiastic and passionate about our products, will help our nation to flourish not only as a nation, but on the global stage.

Capturing value relies on telling the stories that underlie the products we grow. These stories must be substantive and leverage all aspects of the products we grow. The provenance story of our products is a key differentiator for both domestic and international consumers, with traceability back to the grower a fundamentally important attribute.

As technology evolves, New Zealand has an opportunity to add value to our natural products through securing our reputation as a sustainable and ethical nation.

Delivering nutritious produce that is affordable by all New Zealanders is a key enabler to encourage a wider health discussion around healthy diets and food options.

The industry is working collaboratively to lead science and technology to secure and maintain market leading positions.

Connecting the passion of the producer, and their desire to create amazing products in the way that is best for their land, family, community and country, to the consumer will differentiate a product and help secure a premium. This is ultimately connecting farmers with their reason for being. Most forget to acknowledge our farmers as the providers of our food and our health and, ultimately, as those who support society to function effectively.

Ian Proudfoot
KPMG Global Head of Agribusiness





Executive Summary

New Zealand horticulture is big business, and growing fast. With an industry value of \$5.6 billion (excluding wine), we export 60 percent of what we grow, that is, \$3.4 billion in value to 124 countries. Exports increased by 40 percent from June 2014 to 2016. The 5,500 commercial fruit and vegetable growers employ about 60,000 people and the demand for workers across the skill spectrum is outstripping supply.

Such growth doesn't come without some growing pains. While there has been a strong focus on more exports, with primary production still being New Zealand's big economic driver, what is happening to our domestic food supply?

Trends indicate a strong desire by consumers to buy fruit and vegetables that are locally grown, and to understand what has gone into producing their food. While some will always buy on price, a section of the population seek more information before they buy.

A Consumer New Zealand survey in early 2017 showed that 71 percent of New Zealanders want to know where their fruit and vegetables come from and 70 percent also want to buy New Zealand-grown. Consumers want mandatory Country of Origin Labelling (CoOL) for fresh fruit and vegetables, something New Zealand lags behind other countries on – it is only voluntary here and not law.

Off shore, our food commands a premium because it is known to be safe, high-quality and healthy. There is a lot of talk about selling the New Zealand story, yet we don't even label our own fruit and vegetables in our own country. Tourists who have bought into the clean and green image and travelled all the way here, struggle to get a New Zealand food experience.

The make-up of New Zealand's population is changing, with city dwellers no longer having connections with rural communities that they once might have had. There is not the understanding of what goes into getting fresh food onto their plates, but there are a lot of demands for convenient packaging and year-round availability at an affordable price.

New Zealand growers are early adopters of science and technology to match changes in consumer demands. There has been considerable investment in all aspects of production and some of our packhouses are driving efficiencies and improving quality with cutting-edge technology and innovative working practices.

We have the ideal climate and soils, efficient people and systems, and ideal location with proximity to key markets.

So what is missing?

Domestic supply is not being viewed as a national system, with identified strengths and weaknesses, to give New Zealanders continued access to all the fresh fruit and vegetables they need in the future. Local, district and regional decision-making doesn't look beyond its borders. While this is appropriate in the context of their planning, no consideration is given to national food supply when land is zoned for housing, or water is allocated. A decision made in Hawke's Bay for example, may impact on food supply to the whole South Island.

Assumptions are made without substance, about the footprint of horticulture production. Growers have been busy working sustainably and improving environmental outcomes without telling the world about it. They need to better engage with their communities so there can be broader understanding of seasonal food supply and greater trust in its provenance.

This report looks at domestic vegetable supply, particularly of what would be considered staple vegetables, to examine all the factors that go into getting them from the field to the plate. It looks at the challenges to supply, through to what is driving demand and price. Most of the vegetables grown in New Zealand are eaten here, which is why they make a strong study group.

Information and evidence is required to enable good decisions about New Zealand's domestic food supply going forward.

Security of supply is essential. We need to look at the full picture of what is grown where and when; where it goes and who it feeds; what the future 'disruptors' to the supply chain will be – beyond the standard variables growers have managed for decades; the importance of balancing housing and water supply with food supply; what role vegetables play in a healthy nation; what our import needs might be should we lose domestic supply; and how we might feed a growing population.

This report doesn't answer all the questions. It provides a snapshot of domestic vegetable production to start the conversation about food security in New Zealand.

To give an example of the New Zealand domestic food story, we have focused on key vegetables that are staples of the Kiwi diet:

Broccoli & Cauliflower

Carrots & Parsnips

Cabbage

Kumara

Lettuce

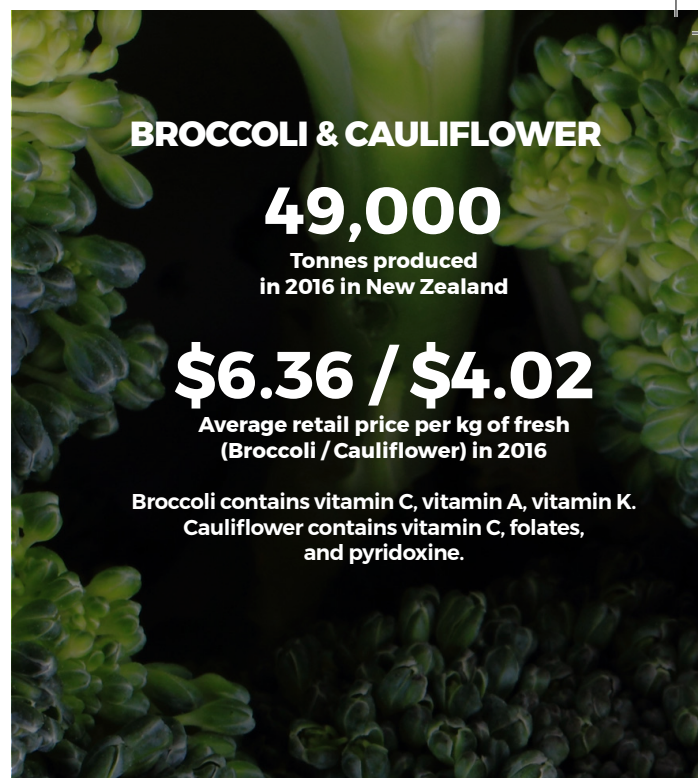
Onions

Potatoes

Tomatoes

Sources:

Fresh Facts 2016 Report - www.freshfacts.co.nz/files/freshfacts-2016.pdf
Statistics New Zealand Average Food Prices 2006-2017
www.vegetables.co.nz/health/vegetable-nutrition/ www.nutritionfoundation.org.nz/nutrition-facts/
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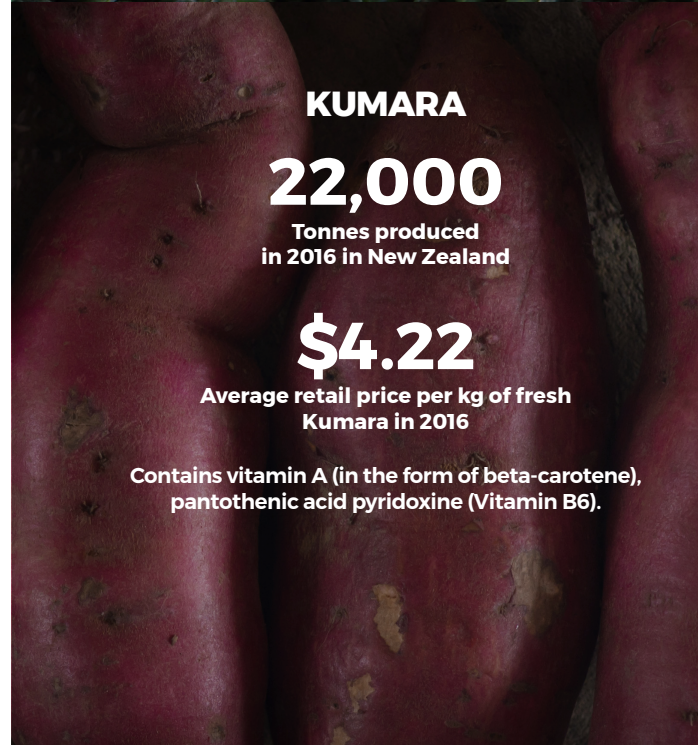


BROCCOLI & CAULIFLOWER

49,000
Tonnes produced
in 2016 in New Zealand

\$6.36 / \$4.02
Average retail price per kg of fresh
(Broccoli / Cauliflower) in 2016

Broccoli contains vitamin C, vitamin A, vitamin K.
Cauliflower contains vitamin C, folates,
and pyridoxine.



KUMARA

22,000
Tonnes produced
in 2016 in New Zealand

\$4.22
Average retail price per kg of fresh
Kumara in 2016

Contains vitamin A (in the form of beta-carotene),
pantothenic acid pyridoxine (Vitamin B6).



ONIONS

211,510
Tonnes produced
in 2016 in New Zealand

\$2.26
Average retail price per kg of fresh
Onions in 2016

Contains vitamin C, pyridoxine and
magnesium.

CARROTS & PARSNIPS

159,000

Tonnes produced
in 2016 in New Zealand

\$2.26 / \$5.43

Average retail price per kg of fresh
(Carrots / Parsnips) in 2016

Contains vitamin A, vitamin C, vitamin K.

CABBAGE

56,000

Tonnes produced
in 2016 in New Zealand

\$2.12

Average retail price per kg of fresh
Cabbage in 2016

Contains vitamin C, vitamin K, folates.

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**Key vegetables
that are staples
of the Kiwi diet**

LETTUCE

8,400

Tonnes produced
in 2016 in New Zealand

\$4.98

Average retail price per kg of fresh
Lettuce in 2016

Contains vitamin A, vitamin K, vitamin C.

POTATOES

525,000

Tonnes produced
in 2016 in New Zealand

\$1.83

Average retail price per kg of fresh
Potatoes in 2016

Contains vitamin B complex, vitamin C
and high in fibre.

TOMATOES

102,900

Tonnes produced
in 2016 in New Zealand

\$5.97

Average retail price per kg of fresh
Tomatoes in 2016

Contains vitamin A, vitamin C, vitamin K.

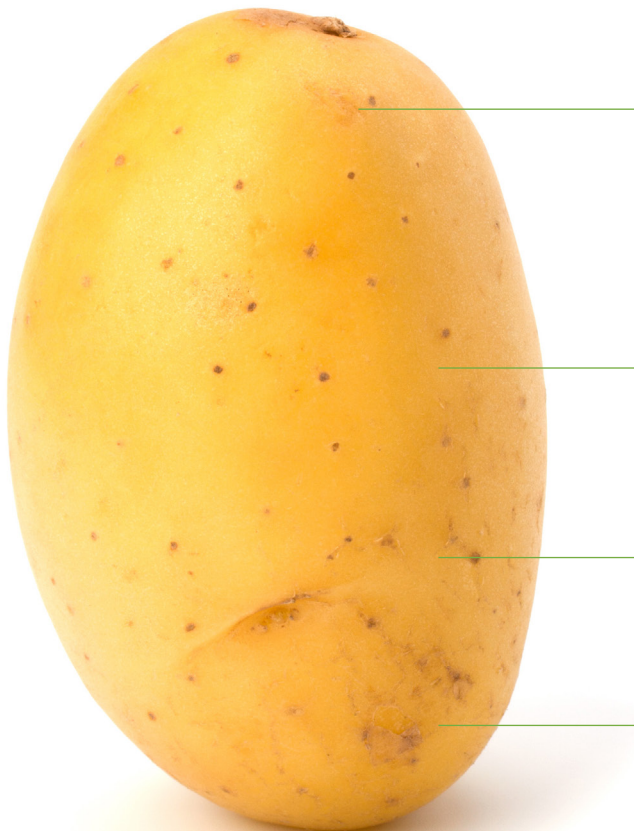
New Zealanders eat most of the vegetables grown here. Some parts of our country grow and harvest all year-round. The value of the domestic vegetable supply is \$1.26 billion, and exports currently sit at \$615 million. While exports are growing, and new markets are being explored, most vegetables will continue to be grown for domestic supply.

Kumara has increasingly gained popularity in the New Zealand diet. However, the unreliability of New Zealand's weather has impacted on supply, particularly in 2017. Given that supply has not been able to keep up with demand, this has resulted in higher prices for locally grown kumara and has opened the door for kumara imports.

New Zealand is a leading producer of **onions**. Excellent soil types and climate conditions are suited to growing quality onions. Of the nation's fresh vegetable exports, onions are the star. New Zealand serves as a counter season to the Northern Hemisphere, which provides us with export market opportunities.



Production



New Zealanders love potatoes. **Potatoes are New Zealand's largest crop** in terms of production hectares and volumes produced.



They are a high-yielding crop. They **require less water than comparable crops**, and they adapt to growing in a range of conditions.



They are one of the few crops grown outside that can be produced in most regions of New Zealand and **harvested all year round**.



They contribute significantly to the New Zealand diet; by combining nutritional value with **low cost due to high production**, ensuring accessibility to the population.



In 2016...



1,133,800

TONNES
PRODUCED IN NZ
(OF THE 10 KEY VEGETABLES)

What we do with our New Zealand production

(Estimated figures)



Tomatoes

96%

NZ consumed or processed

4%

Exported



Potatoes*

94%

NZ consumed or processed

6%

Exported



Cabbage

97%

NZ consumed or processed

3%

Exported



Onions

10%

NZ consumed or processed

90%

Exported



Carrots

91%

NZ consumed or processed

9%

Exported



Kumara

99%

NZ consumed or processed

1%

Exported



Lettuce

99%

NZ consumed or processed

1%

Exported



Broccoli & Cauliflower

99%

NZ consumed or processed

1%

Exported

*42% of total sales revenue for potatoes is from processed potato exports

Sources: Statistics New Zealand Household Economic Survey 2016 Expenditure tables | Statistics New Zealand Overseas Trade Exports - Merchandise Trade 2016
Fresh Facts 2016 Report - www.freshfacts.co.nz/files/freshfacts-2016.pdf | Consumer NZ and Horticulture NZ Consumer Survey, February 2017 | Potatoes New Zealand



Regions

The location of where vegetables are grown in New Zealand has changed significantly over the years. This is due to a variety of factors, including the increasing ability to chill and transport food, as well as developments in packaging and processing to suit market demand.

While the majority of vegetables were grown near main centres 40-50 years ago, there is now more of a reliance on large food production hubs - such as Pukekohe, the Horowhenua and Canterbury - to feed New Zealand's various population bases.

Below is an outline of where some of the main staple vegetables (for New Zealand consumption) are grown.

Potatoes are grown throughout the country, with the main growing regions being Auckland, Waikato, Manawatu/Wanganui and Canterbury. Crops are grown all year around, and potatoes keep well in cool storage which contributes to the low and stable price throughout the year. It is worth noting that two-thirds of New Zealand's potato production goes into processing.

Due to Northland's warm climate, 97 percent of **kumara** is grown in the region. Kumara production is highly impacted by extreme weather events, so any severe weather events in Northland will have an impact on the country's supply.

Broccoli and **cauliflower** production is mostly in New Zealand's northern and mid-regions, with warmer climate conditions allowing year-round production. Production is also impacted by extreme weather events, which can create large peaks in pricing. Similarly, **cabbage** can be planted and harvested anytime during the year, leading to relatively stable pricing year-round (subject to weather conditions).

Almost all (93 percent) of **tomato** supply originates from the North Island, where tomatoes are mostly grown indoors. Accordingly, prices increase during the winter due to increased cost of heating glass houses.

Lettuce is both an indoor and outdoor crop in New Zealand. It is not an export crop due to its short shelf life. Like tomatoes, lettuce is more expensive during winter months due to heating costs for indoor production and the length of time it takes to grow outdoors.

Production of **onions** is fairly evenly split between the growing regions of New Zealand, with the predominant onion-growing regions being Auckland, Waikato, Canterbury and Hawke's Bay. Onions have the largest export production of New Zealand vegetables.

Approximately half of the **carrot** and **parsnip** production is in Canterbury, followed by Manawatu/Wanganui and Southland. Southland's unique growing conditions and winter chill temperatures produces sweet parsnips and carrots. Another famed carrot-growing region, Ohakune, also experiences winter chilling.

Depending on their climate, New Zealand's vegetable-growing regions supply markets at different times of the year. For instance, Pukekohe supplies the market with Christmas new potatoes, while Oamaru is famous for Jersey Benne potatoes that are harvested around November. During winter, there are times when Southland is the only region supplying the domestic market with carrots.

Understanding domestic food supply - and potential risks to this supply in the long-term - is one of the purposes of this document. Extreme weather events can be mitigated against if there is supply coming from other New Zealand regions that have not been affected. One example of this is the rural suburb of Outram, in Otago. Formerly a large market garden and orchard area supplying the city of Dunedin, there are now only a few smaller market gardens remaining. Most of the produce for Dunedin now comes from outside the immediate area. Market gardening in this area has now made way for lifestyle blocks and pasture.

Growing vegetables for commercial supply requires the right soils and microclimates. While technology and centralised distribution have made it easier to transport vegetables from A to B, it is important that we don't 'put all our veges in one basket'. The aim is to have a sustainable, year-round supply of produce for New Zealand. This will only be possible if the different growing regions work in conjunction to ensure that seasonality and other variables, such as diseases and weather, do not drastically interrupt that supply.

Main growing regions by volume for the 10 key vegetables (2014)



Note, only showing main growing areas.

*Percentages of Southland figures represents planted hectares for these vegetables



From the grower



Kylie Faulkner

Sutherland Produce Ltd -
Pukekohe

"For our business, access to irrigation isn't a nice-to-have, it's essential. For leafy vegetable crops, especially in summer, it really is a case of no water, no crop. Water is critical to maintaining the consistent volumes and quality of our crops needed to supply our supermarket customers almost every single day of the year. Some of our products are eaten uncooked so microbiological quality of the water applied to them is also very important."



Terry Olsen

Olsen Partnership - Manawatu

"The vegetable industry in New Zealand is taken for granted. All the things we are used to such as a continuous supply of safe, affordable, wholesome vegetables are under increasing threat. It is everyone's responsibility to ensure that the industry can continue to flourish."



Allen Lim

Jade Garden Produce -
Canterbury

"Growing vegetables on a large scale all year round, like we do in Canterbury, can be challenging. The produce is delicate and susceptible to weather events. Parts of Canterbury have top quality soils and mild climatic conditions that are vital, but increasingly hard to come by. Access to this type of land needs to be protected to ensure fresh affordable food."



Brent Wilcox

A.S.Wilcox and Sons Ltd -
Pukekohe

“Customers today want year-round continuity of supply, so this is a business necessity for us. To keep up this supply, we must have access to land to grow on a regional and seasonal spread, so if one region is impacted for some reason we can supply from another region.”



Brent Lamb

Pypers Produce Ltd - Southland

“Southland is a wonderful place but is a very hard place to grow produce in as we can get four seasons in one day. Due to the climate we have to organise our planting and staff around the weather. Sometimes this can mean a very small margin to plant to have produce ready in time for the new season.”



Bharat Jivan

Jivan Produce Limited -
Pukekohe

“Urban encroachment on valuable food growing soils is threatening the sustainability of growers in the Pukekohe region. Pukekohe's frost free slopes which for years grew the country's first new season potatoes are now covered in bricks and mortar. A lot has been lost but it's not too late to protect this valuable resource for future generations.”



Climate

Weather is one of the variables of food production. While some events may be considered “business as usual”, growers have faced extreme weather in the past couple of years. These more extreme floods and droughts affect supply - and consequently, pricing - of some of the staple vegetables.

Broccoli has been significantly affected by weather events. The March/April 2017 North Island flooding had a direct effect on crop supply. With about 50 percent of supply grown in the North Island, this reduced supply for the entire country and raised prices significantly from March 2017 to May 2017.

Potatoes and **carrots** are seemingly less sensitive to weather extremities. Large production volumes, spread across the country, reduces the risk that supply of these crops will be impacted by extreme weather conditions. However, long periods of wet weather can prevent harvesting.

To some degree, the spread of crops across New Zealand can mitigate extreme weather impacts on vegetable supply. With localised weather events, if one area is hit by bad weather, another region can meet supply. However there can be years where all production areas are hit by extreme weather at the same time.

Research around climate change suggests extreme weather events may become more frequent, and more extreme. To mitigate this, promoting greater land utilisation for horticulture and protecting existing high-production areas will ensure food security and sustainability.

**Average
2016 - 2017**

**Average weather
conditions across
New Zealand**



**Average retail price
August 2016 -
August 2017**



Broccoli

\$7.62
per kg



Carrots

\$2.58
per kg



Potatoes

\$1.93
per kg

The following weather events had a strong impact on the growth and supply of vegetables (predominantly broccoli) causing a price difference shortly after each event.

August
2016

Middle / South of NZ, heavy snow fall with rain warnings



Price one month after the weather event:

\$7.60
per kg

January
2017

Middle / South of NZ, torrential downpours with strong winds



Price one month after the weather event:

\$5.67
per kg

March
2017

North NZ, Tasman Tempest, Auckland's wettest March in 58 years



Price one month after the weather event:

↑ ABOVE AVERAGE
\$9.41
per kg

April
2017

Cyclone Debbie, a month of rain in 24 hours, extreme floods



Price one month after the weather event:

↑ ABOVE AVERAGE
\$10.56
per kg

May
2017

North Middle NZ, Cyclone Donna, torrential downpours with slips and flooding



Price one month after the weather event:

↑ ABOVE AVERAGE
\$9.25
per kg

\$2.01
per kg

↑ ABOVE AVERAGE
\$3.53
per kg

\$2.53
per kg

\$2.29
per kg

\$2.30
per kg

\$1.69
per kg

↑ ABOVE AVERAGE
\$2.07
per kg

\$1.86
per kg

↑ ABOVE AVERAGE
\$2.03
per kg

↑ ABOVE AVERAGE
\$1.96
per kg



Water

Water is a vital resource to help New Zealand secure its place as a world-leading food producer, as well as maintain a year-round production base for domestic consumption (including the staple vegetables we have looked at in this report). The reliability of water supply for vegetable crops during growth periods is very important to ensure quality as well as yield. During dry periods, access to water is essential to sustaining crops and maintaining quality and quantity of supply required by the market.

As increasing pressure is placed on water resources in New Zealand, the question of ensuring reliability of supply becomes more pronounced. We face the twin demands of ensuring that we can feed our growing population domestically, while maintaining our valuable exports.

Water is used throughout the horticultural supply chain; from growing the plants, to frost fighting (e.g. some fruits), and washing and processing for market. To service these activities, the industry requires sufficient quantity of water supply, particularly in summer. For crops that are grown above ground – such as lettuce, broccoli, cauliflower and cabbage – the quality of water is also critical in terms of food safety.

The key constraints to growth in horticultural production are access to land and water. **Of the 5.5 percent of land appropriate for vegetable production in New Zealand, roughly 1/10th has been subdivided for lifestyle blocks in the past 15 years.** Access to water and land is becoming a key constraint to growth, due to a number of factors. These include competition for versatile land for housing, the availability of highly-reliable water sources, and water quality constraints.

Irrigation schemes such as the Waimea Community Dam, which is proposed in the Tasman region, will provide growers with a continuous and reliable water source year-round. By securing reliability of water supply, such schemes provide the potential – and confidence – to grow New Zealand's wider horticultural production.

Diversification of land offers a buffer against unpredictable markets, in other sectors such as dairy or livestock production, which in turn benefits the rural community and the economy.

At the other end of the scale, some regions are facing a future of potential water scarcity. Pukekohe is a key region for vegetable production, which sources its irrigation needs from ground water and from the Waikato River. There is competition for water from the river from municipal and industrial



users, and with increasing pressure on the water resource, the ability for growers to maintain a reliable supply of water for irrigation and processing can be compromised. This, along with pressure from urbanisation, means that the ability for the region to grow its horticultural area is severely limited.

At this stage, under the Resource Management Act, water is allocated on a first-in-first-served basis.

This means that water for food production is competing with all other uses of water; and is not elevated in status to ensure that domestic food supply is maintained. Future allocation of water in fully allocated catchments may have to assess water use on a value-based framework, to ensure that New Zealanders can be sustainably 'fed and watered' as a priority above other uses.



Sources: The Water Footprint of Agriculture Products in New Zealand, The Impact of Primary Production on Water Resources, Massey University, 2013 | Ministry for the Environment, Stats NZ, and data providers, licensed by the Ministry for the Environment and Stats NZ for re-use under the Creative Commons Attribution 3.0 New Zealand licence Resource Management Act, Ministry for the Environment, 1991



Distribution

When it comes to New Zealand's domestic market, distribution channels have evolved over time. Due to innovations in technology, these channels have become more efficient and streamlined.

While the ability to transport chilled fruit and vegetables has reduced reliance on locally-grown produce, it also creates risk if distribution channels are unexpectedly altered. For example, a blocked highway following an earthquake could restrict access between fruit and vegetable hubs and their markets.

Another emerging concern in our food system is tracking the country of origin. New Zealand has started down the path of implementing Country of Origin Labelling; a move which is viewed as adding value to our food system. The country's reputation for high-quality produce, coupled with the consumer preference to 'eat locally', supports the strategy to origin-label our food.

Consumer behaviour and preferences are also influencing new, dynamic distribution channels. My Food Bag is an example of meeting consumer preferences for instant access to convenient food, delivered to the doorstep. With ingredients measured to fit exactly to a desired recipe, food wastage is virtually eliminated. The ingredients provided are also locally grown and fresh.

In 2016, an estimated \$330 million was spent on processed vegetables in New Zealand households.

This diagram (to the far right) is a macro-level view of the food ecosystem. Other channels not considered include the likes of food for hospitals, schools, prisons, family home and farm composting, and farmers markets. While we recognise the future's evolving supply chain (with the likes of My Food Bag), for the purpose of this report, we are focusing on the typical consumer journey for whole fruits and vegetables.

Estimated percentage of distribution based on annual household expenditure of fresh produce:



43% Ready-to-eat food



29% Restaurant meals



28% Retail

Below is an example of what a potential fruit and vegetable supply chain in New Zealand can look like covering multiple channels:





Consumption

Consistency of price and quality are key influencers for New Zealanders to purchase and consume specific vegetables.

From the 10 vegetables analysed, potatoes are by far the most highly-consumed vegetable, at nearly 23 kgs per year per person. Kumara is viewed as a similar product, however we only consume approximately 3.66 kgs per year per person. The significant difference in consumption between these two very similar vegetables is predominantly due to difference in price – driven by potatoes year-round availability and the spread of growing regions. Compared to kumara, potatoes are a lower cost option. This is reflected in the wider picture, with New Zealand's vegetable consumption being largely governed by price and availability.

In order for New Zealanders to meet their recommended dietary requirements, and promote good health, it is important to protect and strengthen our local supply to ensure seasonal vegetables are affordable for all.

New Zealand eats 1,800 tonnes of fruit and vegetables per day

(Based on recommended servings of fruit and vegetables per day and 2016 volumes)



In 2016, each New Zealander consumed approximately the following portions of these fresh vegetables:

Tomatoes
7.56kgs

Broccoli & Cauliflower
4.43kgs

Cabbage
4.37kgs

Carrots & Parsnips
7.88kgs



Potatoes
22.90kgs

Onions
7.44kgs

Lettuce
5.06kgs

Kumara
3.66kgs



There has been a constant national increase in **obesity in New Zealand** over the last 10 years.

Human health

In New Zealand, almost one-third of adults are obese, with a further 35 percent being overweight.

One in nine children are obese, with a further 21 percent being overweight.

Globally, eighty percent of deaths are caused by chronic health conditions that are largely preventable. Of the 80 percent, six percent are diabetic, five percent have heart disease, and 31 percent are obese - all of which are conditions that can be addressed via good nutrition.

Low fruit and vegetable intake is a risk factor for global mortality. Globally, approximately 1.7 million (2.8 percent) of deaths worldwide are attributed to low fruit and vegetable consumption.

As a nation, New Zealand has enviable access to year-round fresh fruit and vegetables. As our population grows, increased supply will be required to maintain this access to healthy food. If we cannot supply fresh locally-grown fruit and vegetables to an increasing population, prices will inevitably increase. This will both reduce or limit the population's access to healthy food, and open the door to increased imports. A Consumer survey released in March

2017 showed that 70 percent of those surveyed wanted to buy New Zealand grown fresh fruit and vegetables. Our strong connection to our food creates trust in our growers, and consumers are more likely to eat food they know the provenance of.

Due to high concentrations of vitamins and minerals, diets high in fruits and vegetables are recommended for their health-promoting properties. The World Health Organisation (WHO) has identified vegetables as playing a vital role in providing a nutritious diet, contributing to health outcomes and lessening the burden of chronic disease in Western societies.

New Zealand has high consumption rates of broccoli, potatoes and carrots; all of which have high levels of vitamin C. Vitamin C helps contribute to prevention of inflammatory diseases, fighting infections, and the growth of bones, tendons, ligaments and skin. It also facilitates the absorption of iron from our foods.

A diet rich in fruits and vegetables also provides necessary micronutrients that cannot be found in staple grains, meat or dairy.

Science continues to explore the wellness and health-promoting compounds within vegetables, and identify the best way to consume them.

Education campaigns can help drive consumption choices. **5 + A Day** is a charitable trust set up to encourage New Zealanders to eat five or more servings of colourful, fresh fruit and vegetables every day. Its purpose is not only to encourage consumption patterns; but also to help people understand the benefits of eating a diet rich in fruit and vegetables, and how this contributes to health.

A recent survey by the 5 + A Day Charitable Trust found that **New Zealanders are rated among the highest consumers of fruit and vegetables globally**, but that there was still room for improvement.

A 2015 joint study between Auckland, Otago and Oxford Universities investigated the potential impact of price subsidies on fruit and vegetables in New Zealand. It found that a **20 percent subsidy on fruit and vegetables, with the resulting impact on affordability, could prevent or postpone around 560 deaths a year.**



1.7m deaths →

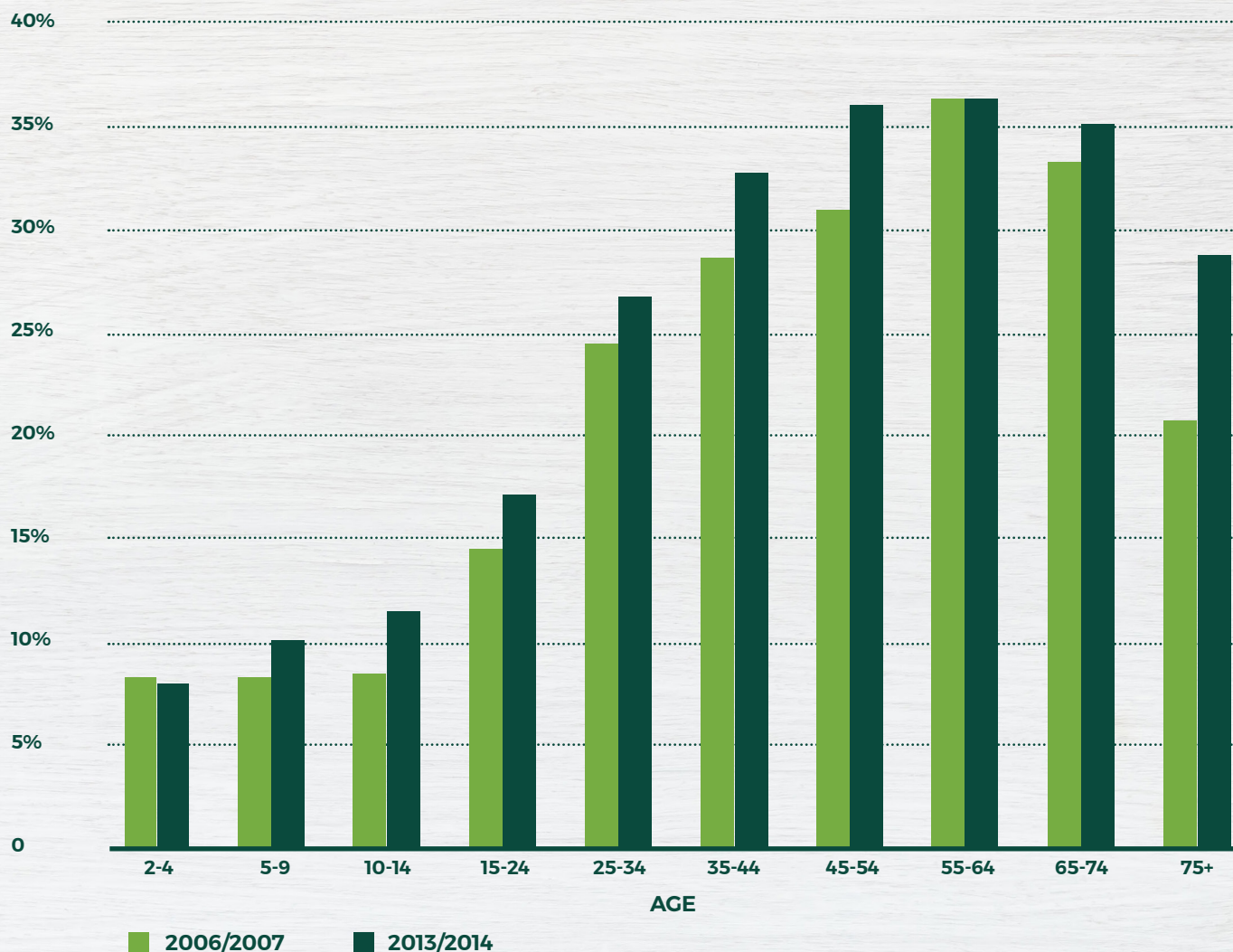
Globally, approximately **1.7 million (2.8%)** of deaths worldwide are attributed by low fruit and vegetable consumption.



31% obese

Of those numbers, **6%** are diabetic, **5%** have heart disease, **31%** are obese; all of which are conditions that nutrition, or lack of, have a heavy contribution.

World Health Organisation (WHO) global statistics on obesity increase



Sources: Environmental Health Indicators New Zealand, Massey University | Ministry of Health, 2013, New Zealand Health Survey: Annual update of key findings 2012/13, Wellington: Ministry of Health Statistics New Zealand, Disability Survey: 2013, Hot Off the Press, Wellington: Statistics New Zealand. | Obesity and Overweight fact sheet June 2016, World Health Organization Boeing, Heiner et al. "Critical Review: Vegetables and Fruit in the Prevention of Chronic Diseases" European Journal of Nutrition 51:6 (2012): 637-663. PMC, Web, 5 Oct. 2017. Report on New Zealand Cost-of-Illness Studies on Long-Term Conditions, 2009, Ministry of Health New Zealand. | New Zealand Nutrition Foundation, Vitamin Facts Effects of Health-Related Food Taxes and Subsidies on Mortality from Diet-Related Disease in New Zealand, 2015, University of Auckland, University of Otago and Oxford University



Prices

Production and prices for broccoli, carrots and potatoes only.

2012

**NZ domestic production:
687,000TN**

**Average price per kg:
\$1.70**

2014

**NZ domestic production:
609,000TN**

**Average price per kg:
\$1.93**

2016

**NZ domestic production:
632,000TN**

**Average price per kg:
\$2.03**

To gain a better understanding of price and production, we have taken three vegetables in focus and mapped domestic annual production against an annual average weighted retail price per kg. As the production tonnes of broccoli, carrots and potatoes has decreased, this has had a direct correlation to an increase to the average weighted retail price per kg.

New Zealand's diverse geography leaves the country susceptible to rapid weather changes. This unpredictability can influence local production, supply and ultimately pricing.

Production of vegetables can be affected by weather conditions, available land, and natural resources. Inconsistent weather conditions (such as floods and droughts), coupled with the effects of climate change, have an impact on vegetable production. If natural resources are altered significantly due to weather

conditions, the ability to produce vegetables also changes. When there is a drop in production, and demand is unchanged or increased, prices start to rise. Demand for fresh produce has been driven by shifts in consumer preferences to whole fresh foods as part of a healthy diet.

Stable production throughout the year results in more consistency of pricing. Some vegetables are more prone to be impacted by weather changes. For example, broccoli is more dependent on weather than carrots and potatoes.

Protecting the supply of fruits and vegetables against varying weather conditions is challenging.

There are specific areas across New Zealand which are naturally more conducive to fruit and vegetable growth. Where there is neighbouring land accessible, this represents an opportunity to replicate production in similar conditions – and therefore reduce the risk of unstable production. In turn, this results in more stable prices and creates greater access to fresh fruit and vegetables.



Broccoli snapshot



Of our 10 vegetables studied in this report, broccoli has seen the most significant price increase over the past 24 months.



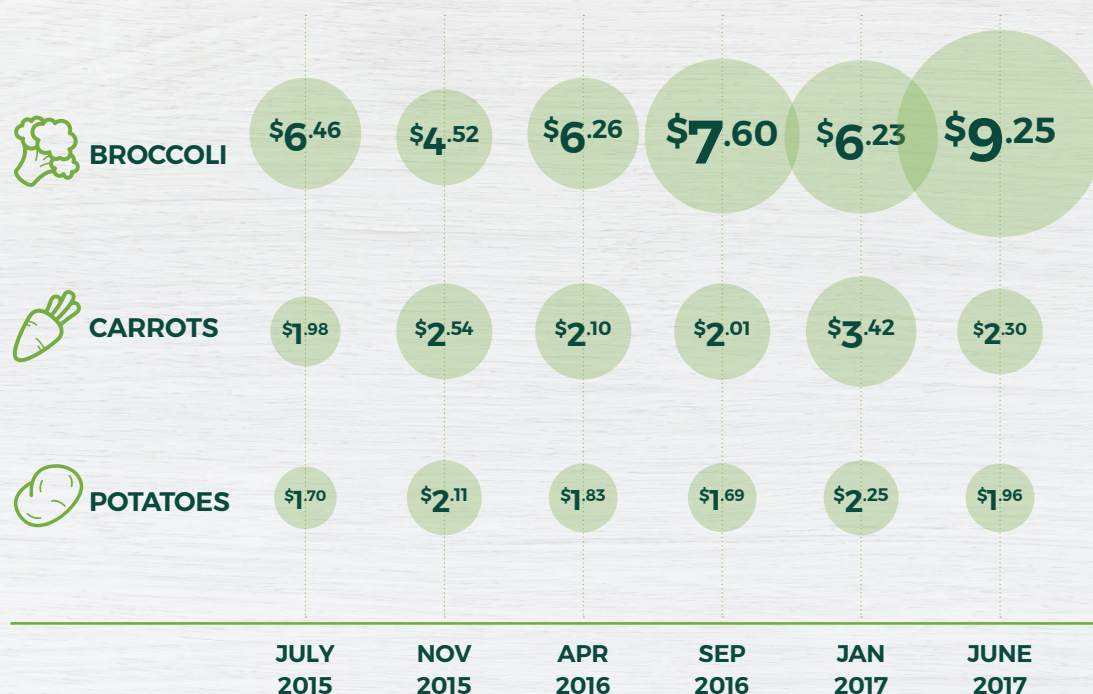
Strong broccoli production is reliant on stable weather. This is reflected in events such as the North Island storms, early in 2017, when there was a spike in broccoli price shortly after the weather event. This suggests there is a high variation to price when there are weather events which cause a decrease in production, coupled with the inability to compensate in other areas and grow more to fill the gap.



Prices reached their lowest point in the past 24 months during the period of November/December 2016. The majority of supply is split between the top and middle of the North Island; with the lowest price points coinciding with the peak harvesting period in the middle of the North Island.

Average Retail Prices per kg over the 24 month period (July 2015 - June 2017)

We looked at three key vegetables - broccoli, carrots and potatoes to understand their pricing trends. Using Statistics New Zealand data, we have taken the monthly retail price per kg for each vegetable from the 24 months from July 2015 through to June 2017. The average price across all three has increased steadily over the past two years.



The prices of carrots and potatoes have remained stable compared to broccoli which had a few fluctuations. Carrots and potatoes are grown across wider regional geographies, which could help explain their price stability.

Sources: Statistics New Zealand Average Food Prices 2006-2017 | Fresh Facts 2016 Report - www.freshfacts.co.nz/files/freshfacts-2016.pdf



Imports

To understand how imports and exports will impact local fruit and vegetable availability, we have measured the impact of both imports and exports on total domestic production tonnes available.

This data helps us to better understand the effect of imports and exports, and how we can look to utilise our local production to feed our population. Some fruit and vegetables that do not grow in New Zealand will always be imported to meet demand.

New Zealand has successfully concluded Free Trade Agreements (FTAs) with 16 World Trade Organisation members. It is important to understand that while domestic production is preferable to New Zealanders, our vegetables will be replaced by imports if we cannot sustain local supply. For this reason, New Zealand is

in a fortunate position to have these agreements in place.

Our data shows that imports make up a very small portion of New Zealand's domestic food availability.

Any food that is imported is typically in order to fill any seasonal gaps in availability.

Our 10 key vegetables made up only 0.1 percent of total imports in 2016. With a focus on fresh local food, New Zealanders have a preference to eat locally-grown over imported fruit and vegetables. This contributes significantly to our economy, and clearly places our growers and producers in a good position.

In 2016...



1,200

TONNES
IMPORTED IN TO NZ

(OF THE 10 KEY VEGETABLES)



Location breakdown of where our imported produce in 2016 came from:

(Vegetables - fresh or chilled)



Potatoes (processed)*

70%

Tonga

30%

China

Total Tonnes Imported:

18.5



Carrots

71%

United States

29%

China

Total Tonnes Imported:

37.7



Cabbage

73%

United States

27%

Australia

Total Tonnes Imported:

11.8



Kumara

42%

Tonga

51%

China

7%

Fiji, India and Vietnam

Total Tonnes Imported:

321.8



Onions

100%

United States

Total Tonnes Imported:

555.6



Lettuce

97%

Australia

3%

United States

Total Tonnes Imported:

122.5



Tomatoes

100%

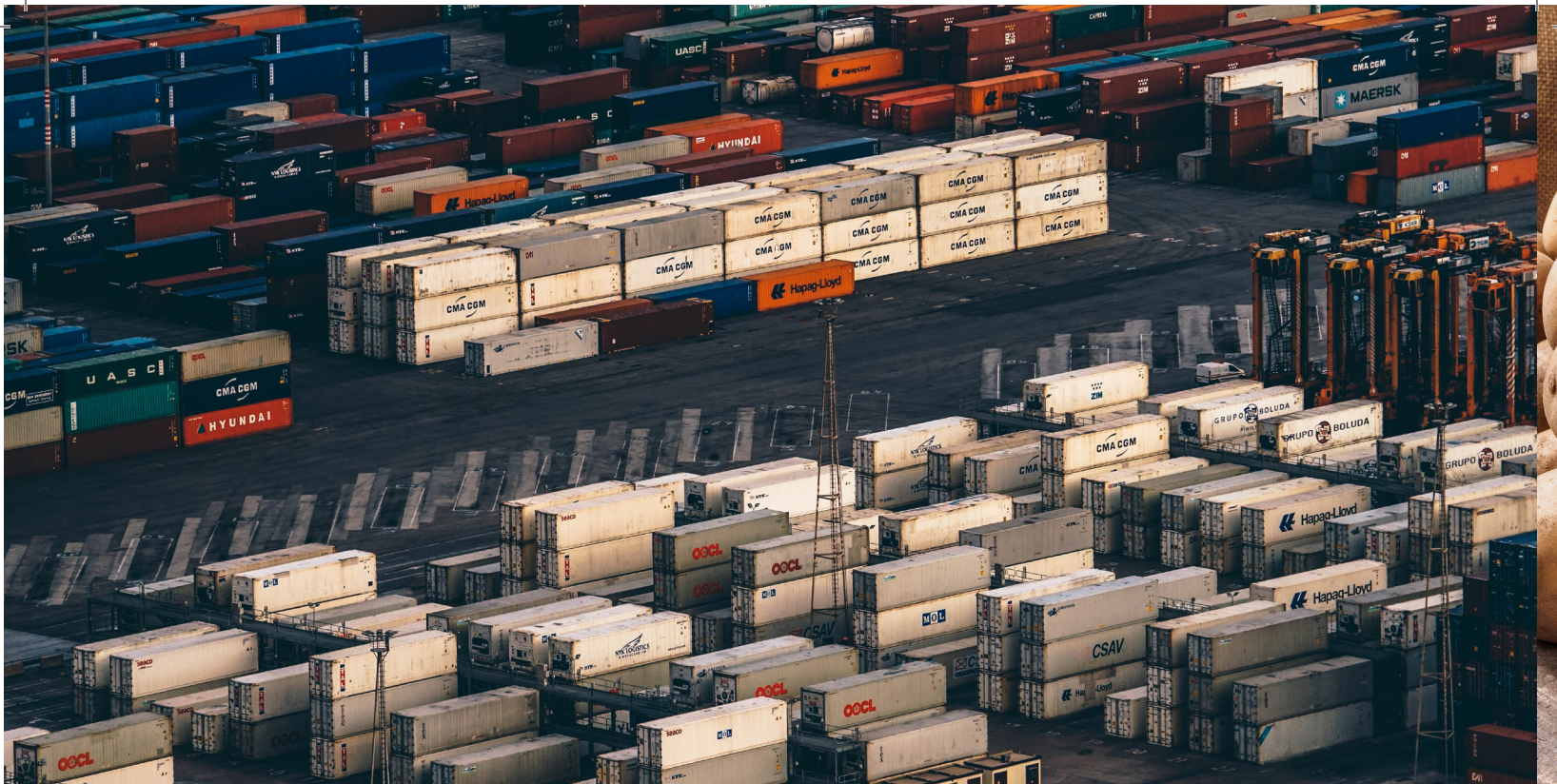
Australia

Total Tonnes Imported:

132.2

*Fresh potatoes cannot be imported into New Zealand so this only refers to processed potato products such as crisps/fries

Sources: Statistics New Zealand Overseas Trade Imports - Merchandise Trade 2016 | Fresh Facts 2016 Report - www.freshfacts.co.nz/files/freshfacts-2016.pdf
www.mfat.govt.nz/en/trade/free-trade-agreements/free-trade-agreements-in-force/ | Potatoes New Zealand



Exports

Around the world, New Zealand is regarded as a grower of top quality fruit and vegetables.

Fresh Facts recorded that 1,148,316 tonnes of vegetables were grown in New Zealand in 2016. According to Statistics New Zealand, 23 percent of this volume was exported.

The challenge New Zealand faces is finding the balance between feeding our domestic population, while capitalising on the strong prices that international markets will pay for our fresh products.

The main countries we export vegetables to are our closest neighbours, such as Pacific countries and Australia.

Given fresh produce has a limited shelf life, it is unsurprising that our key export countries for vegetables are in close proximity to New Zealand.

In 2016

76%

of total exported

Potatoes

went to **Fiji**

Fiji is a key vegetable export destination; where tropical weather patterns limit stable supply and local consumption exceeds production.

Where do New Zealand vegetable exports* end up?

(2016 top export countries by percentage)



Kumara

55%

to French Polynesia

20%

to New Caledonia

12%

to Solomon Islands

Total Tonnes Exported:

12

(Vegetables - fresh or chilled)



In 2016...



242,400
 TONNES
 EXPORTED FROM NZ
 (OF THE 10 KEY VEGETABLES)



Broccoli

32%

to Fiji

22%

to French Polynesia

13%

to Samoa

Total Tonnes Exported:
28



Cabbage

34%

to Fiji

26%

to New Caledonia

15%

to French Polynesia

Total Tonnes Exported:
1,396



Cauliflower

41%

to Fiji

35%

to New Caledonia

6%

to Samoa

Total Tonnes Exported:
50



Carrots

28%

to Fiji

15%

to Japan

12%

to Taiwan

Total Tonnes Exported:
14,614



Lettuce

47%

to Fiji

17%

to Samoa

10%

to Hong Kong

Total Tonnes Exported:
47



Onions

18%

to Indonesia

13%

to Belgium

11%

to Germany

Total Tonnes Exported:
189,776



Tomatoes

37%

to Japan

20%

to Australia

14%

to Canada

Total Tonnes Exported:
3,704



Potatoes

76%

to Fiji

6%

to French Polynesia

6%

to New Caledonia

Total Tonnes Exported:
32,773



New Zealand

Horticulture is core to providing our nation with locally grown fruit and vegetables. New Zealand is in a unique position, in that we have the ability to grow fruit and vegetables directly in our collective backyard.

Food systems around the world are rapidly changing. Innovation is disrupting traditional methods of farming and distribution. New Zealand has an opportunity to provide high quality food if we can ensure we continue to have enough access to natural resources and land. We are fortunate to have access to natural resources. As a nation, we are at an advantage as we can add value to our products that other countries naturally do not have the ability to do.

As demand for housing increases, rural areas located close to urban areas are coming under pressure for land use change. While housing may achieve the highest value for the land, it reduces New Zealand's ability to support horticulture and secure year-round supply of fresh fruit and vegetables.

To maintain our premium position in the global marketplace, the New Zealand horticulture industry aims to increase total export revenue to \$10 billion by 2020, with a focus on innovation. As New Zealand's population is predicted to grow to just over five million by 2020, we also need to secure access to sufficient resources to feed our nation.

A consumer survey released in March 2017 proved the importance to New Zealanders of buying local.

Clearly labelled local produce creates a compelling reason for consumers to purchase home-grown products.

Temperature and oxygen exposure will affect fresh produce and can alter the nutritional composition, making it less nutritious, supporting the need for local food. For example, transporting fruit without refrigeration or adequate packaging may cause over-ripeness and potentially damage the fruit.

Additionally, the organic market highlights the power of consumers wanting fresh fruit and vegetables, in their most natural form. Organic consumers have demonstrated a willingness to pay a premium for crops grown in a way that they believe benefits the environment. This premium provides an incentive for growers to grow crops using organic methods.

Labelling food and educated purchasing decisions will support the New Zealand horticulture sector to grow, flourish, and be first choice when people pick their food.



New Zealand would benefit from an authentic food story. The story we create behind our food captures added value for New Zealand. We need to identify our regional ‘superfoods’ and encourage chefs and foodservice distributors to promote these products so they can be experienced to their full capacity.

Consumers have said they want **Country of Origin Labelling.**

71% of New Zealanders want to know where their fruit and vegetables come from.

70% consider New Zealand-grown fruit and vegetables as being important to them.





Population

Will New Zealand be able to feed its future population?

Using Statistics NZ import and export data, combined with the Fresh Facts 2016 Report, we have made projections around annual food volumes available for consumption in New Zealand.

This is based on assumptions that every New Zealander will eat all 10 vegetables - at the same current proportions and at the same rate - across retail, fresh and food services.

With New Zealand's population expected to reach 5,045,000 by 2020 (based on annual growth between 1.5 - 2 percent), domestic food supply will not be able to sustain our future population consumption needs.

Our current consumption levels of fresh produce in retail and food service shows that net production is already below what is required for domestic consumption, meaning we can expect food shortages.

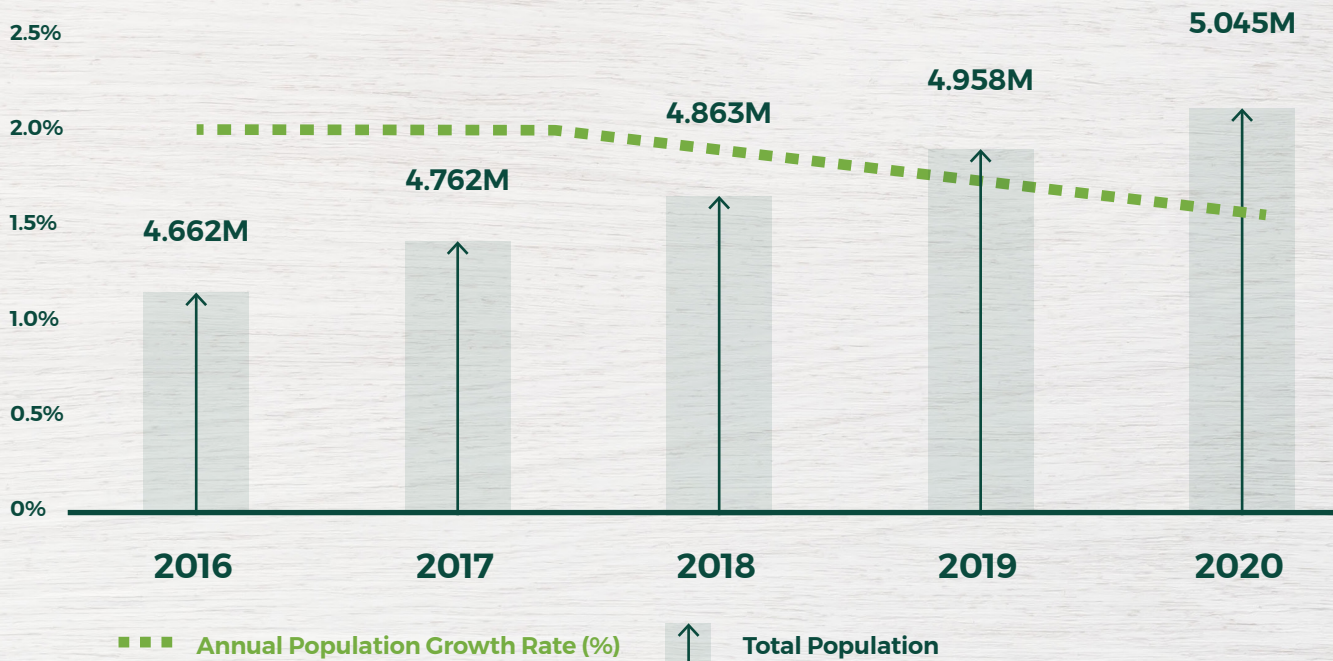
This further highlights the importance of food security, land production and future-proofing the availability of resources to supply our growing population.

While we have plenty of land available for fruit and vegetable growth, there is no strategy in place to protect this valuable land as a way to future-proof our food supply.

To forecast domestic consumption, we first estimated the weekly average consumption per person in 2016. (We took the average household weekly spend on fresh vegetables and divided this by the average retail price per kg of fresh vegetables). Given that the average household consists of 2.7 people, we are able to calculate the average weekly consumption per person. Using Statistics New Zealand population growth forecasts, and assuming consumption per person does not change over the next five years, we can forecast the increase in domestic consumption as our population grows.

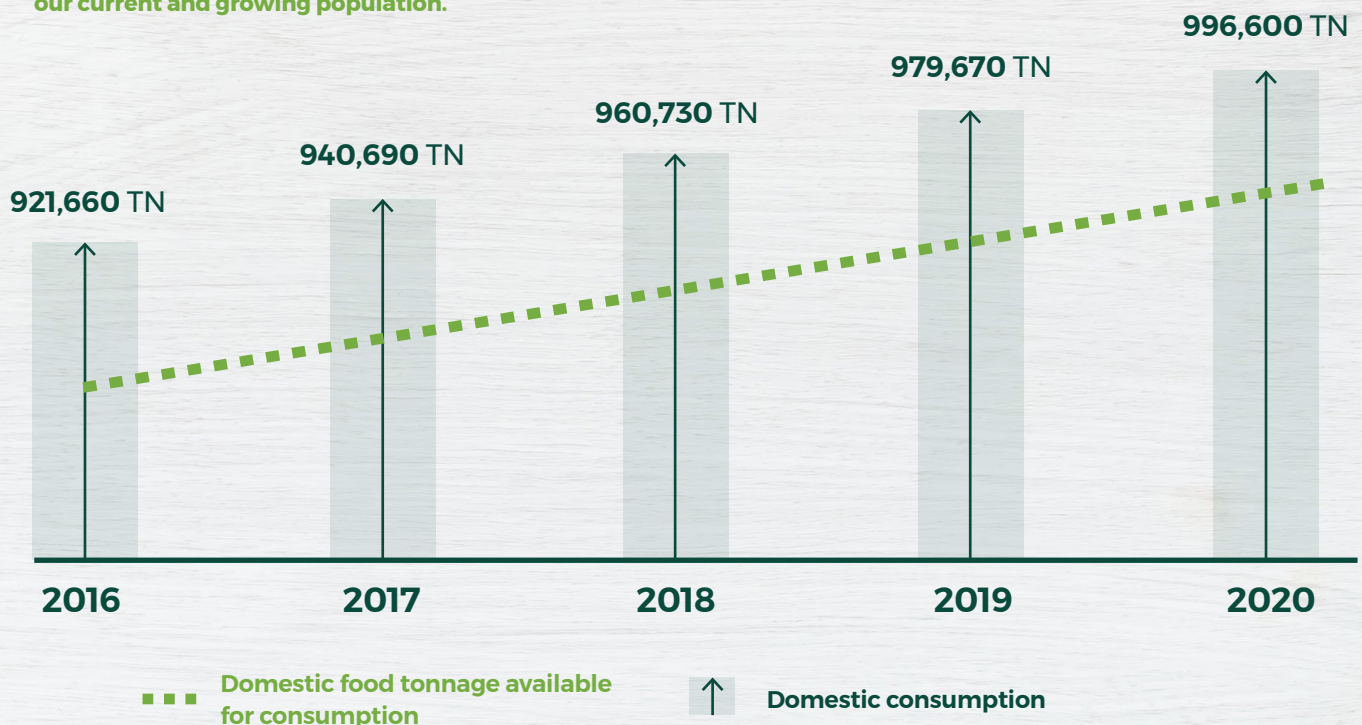
New Zealand's population growth forecast to 2020

New Zealand's population is forecast to grow annually for the next three years, which highlights the need to increase our food production.



Domestic consumption vs net availability of the 10 key vegetables

If we apply our 2016 food availability estimate, we won't be able to feed our current and growing population.





A self-sufficient New Zealand

The horticulture sector not only provides our population with vital nutrition, it also makes a significant contribution to the wider economy; building a stronger, more self-sufficient New Zealand.

Horticultural exports are valued at \$3.4 billion with vegetable exports valued at \$615 million. Maintaining and growing this level of economic contribution is heavily reliant on having a sufficient labour force. The 5,500 fruit and vegetable growers in New Zealand employ about 60,000 people.

Continued growth in the sector will require greater numbers of skilled, educated workers available to work in the sector. Not only does this include those that work on-farm; but also the related professions of scientists, agri-tech specialists, educators, and even robotics designers.

Without planning to attract and keep younger generations interested and passionate about a career in horticulture, we will not have enough workers in the industry.

Highlighting the natural connections between people and food can be a powerful way to get the community involved and interested in horticulture. For example, urban gardens and organic collectives create an emotional connection between the food we eat, the value of the land it comes from, and the grower.

Horticulture in New Zealand also plays an important role in supporting our Pacific neighbours. The Recognised Seasonal Employer (RSE) scheme allows companies in the horticulture industry to recruit seasonal staff from other Pacific countries, when there is a limited amount of resource in New Zealand. This scheme sees more than \$40 million invested back into Pacific nations, and is used to fund housing and education in local communities.



Despite these good news stories, there are also some sobering statistics. The spread of new housing areas around our cities is resulting in prime growing areas for horticulture being lost. Between 1975 and 2012, nine percent of our growing land (or 10,399ha) was converted from horticulture to other land use. If this rate of conversion continues, it will have long-term consequences for New Zealand, and place at risk the country's ability to feed its population.

If we do not have enough land to produce the fruit and vegetables our population requires, prices will increase as demand increases, resulting in more imports to fill the gap.

Sources: 2016 NZIER report 'Horticulture and Viticulture Labour Market Forecasts -- Kiwifruit, Pifruit, Summerfruit Fresh facts 2016 | Data: Plant & Food Research's Fresh Facts annual accumulated statistics. Implications of Urban Form on Suburban Food Production Potential: The Case of Auckland City-New Zealand, June 2016, ResearchGate Horticulture New Zealand





Megatrends

1. Future world consumers

More than ever before, consumers are shaping and influencing our food systems. Technology is providing them with instant access to the latest in food solutions via multiple digital platforms.

As populations increase, and ethical standards for food production hit the spotlight, novel ways to create “clean” food will flood the food systems. Cellular agriculture and agri-food technologies will recreate food to get more out of less resources. Foods that are specifically tailored to meet unique requirements for each individual will recreate how we eat food, and reflect the move towards ‘food as fuel’ for maximum nutrition.

People want to know where their food comes from and would like to connect with the grower directly and understand their story. Companies such as My Food Bag are changing our access to food. The provision of these food solutions - delivered straight to our doorstep, with customised ingredients and instructions on how to create chef-inspired meals - is changing the convenience of food and and shaping our food systems.

2. Growing populations

By 2050, it is projected that the global population will reach nine billion. Growers and agricultural companies will be required to re-think how they can grow more with less. As life expectancy increases, and health improves, it is estimated that globally we will need 60 percent more food by 2050.

Increasing resource constraints - coupled with the effects of climate change and water scarcity - mean that growers are under pressure to find viable alternatives to traditional farming practices. As a nation with access to natural resources, New Zealand can capitalise on this and add value to the wider food system with our natural products.



We identified five megatrends that we believe will have a significant impact on the horticulture sector in New Zealand. These trends are changing the food landscape as we currently know it.

3. Urbanisation

By 2050, 70 percent of the global population will live in cities.

Already we're seeing innovative farming techniques being created as a way to ensure populations can be provided with year-round fresh fruit and vegetables. Climate-controlled, LED-enabled, indoor hydroponic farms are being developed in the heart of cities, to ensure local fresh produce is available.

In Auckland, a farm is being developed in the middle of the City aimed at educating and attracting youth to the food producing sector, and better understand the link from rural to urban areas.

4. Emerging technology

Emerging technologies, such as data analytics tools, will significantly influence the future practices of growers.

Digital, physical and biotechnologies are converging to disrupt traditional farming – and helping to improve both financial and environmental performance.

For example, New Zealand agri-tech companies are working on monitoring and predicting weather events, so growers can have more certainty around how and when to harvest their produce.

5. Sustainability

Management of water and sanitation is crucial. As with all food production sectors, the horticulture sector has a responsibility to implement sustainable management into their farming systems as part of their 'social license to operate'.

Technology will also contribute to the management of food waste; and technologies such as block chain are being adopted through businesses to provide assurances around traceability and provenance.



Food security

Biosecurity

The maintenance of a world-class biosecurity system is one of the highest-ranking priorities among our primary industry leaders in New Zealand. Recognising the impact that a serious incursion would have on the horticulture sector, and therefore the wider economy, calls for a collective and sustained response.

A successful biosecurity system must be proactive. Government, industry groups and research centres are working to collaborate and develop strategies to mitigate threats before they meet our national borders. Positioning our security to eliminate any potential threats before they enter New Zealand, and/or cause any negative perceptions around our produce is crucial.

The Government recognises the importance of maintaining a world class biosecurity system; and through the Biosecurity 2025

strategy, has allowed for NZ\$18.4 million of new spending. This is dedicated to boosting offshore biosecurity management activities, as well as lifting public awareness and participation in biosecurity management.

The biosecurity status of New Zealand influences horticulture directly. The sector has the ability grow its contribution to national wealth by remaining pest and disease free. Sufficient resource and careful planning must be applied in maintaining this status, and continuing to monitor emerging risks in the sector.

It is crucial that Government, industry and research centres take a collaborative and connected approach. These key players need to be at the heart of the ongoing solution for the sector; in designing procedures and measures to protect our borders, and thus our economy, against harmful biological and chemical substances.

Food security

Unlike other countries, New Zealand currently has no food security policy. We complacently believe that we will always be able to sustainably grow enough food to feed ourselves, and contribute to the country's economic well-being. However with prime production land being lost, climate change, competition for water resources, extreme weather events and the constant threat of pests and disease we must turn our minds to food security issues for the future of New Zealand's domestic production.

While the majority of the vegetables investigated in this report are sold domestically there are some (such as carrots, onions and potatoes) that are exported. While we may consider it a moral obligation for growers to 'feed New Zealand first' they are running a business that is market driven and this may not always be the case depending on supply and demand pressures internationally.



Developing a food security policy requires us to take a wider perspective of the food chain. Growers hold responsibility for the sustainability of the environment as well as production for the domestic market throughout the year. Some of the root vegetables grown in the winter for New Zealand have a larger environmental footprint due to the ground being wetter and conditions not always being conducive to harvesting. Developing a food security policy has been identified as a central way to address sustainability concerns. It is about planning for appropriate land use, as well as ensuring there are guidelines in place to facilitate plentiful supply of safe fruit and vegetables to feed our population sustainably throughout the seasons.

Developing a food security policy that has a future-proof lens will ensure there is an abundance of fresh vegetables and fruit at reasonable prices, grown locally, to provide healthy food for our nation. This is not a region-by-region issue, but a national issue that needs to be addressed by central Government.

As the impacts of climate change and more adverse weather conditions make growing more challenging, we also need to ensure that the most appropriate land is used.

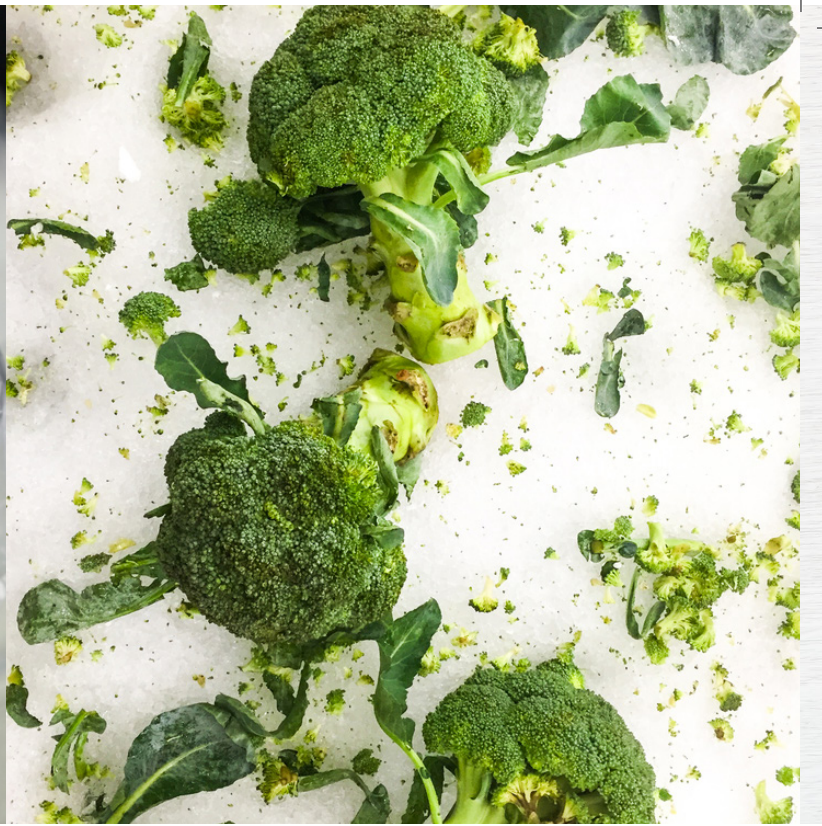


CASE STUDY

Although the industry has recovered and is now thriving, the PSA bacterial disease crippled New Zealand's kiwifruit industry, causing an approximate \$885 million hit to the industry.

Between late 2010, and October 2011, 369 orchards were affected. Less than one year later, by July 2012, this had increased to 1,239 orchards. More than 1,500 jobs were also affected (according to Lincoln University Agribusiness and Economics Research Unit). This demonstrates the crippling effect a biosecurity incursion can have on our economy if we are not 'hands-on' with our approach. The power of a cohesive and coordinated response is also apparent - with the industry having sufficiently recovered to deliver returns in the year to March 2017.

Source: Agribusiness Agenda 2017 :
The Recipe for Action, KPMG



Waste

In New Zealand approximately 229,022 tonnes of fresh vegetables are wasted a year. This is almost a third of the total food waste in New Zealand; totalling \$135,481,268 annually and approximately \$563 per household a year. In addition to fresh vegetables, processed vegetables contribute to 0.2 percent of the total wasted food.

The impact of food waste is enormous; and it affects climate, water, land and biodiversity. Food waste is a critical global issue that can be solved locally.

A large portion of food waste comes from fresh food becoming perishable in transit through poor quality storage standards. Having access to fresh produce and eating locally will diminish perishable food lost in transit.

There are two main reasons why we throw away food:

1. Leftover food is not being consumed; and
2. Products are perishing before consumption because they are not stored properly.

To a large extent, food waste is a solvable problem. Both at macro and individual household levels, it can be reduced by better planning.

For consumers, **5+ A Day** is already providing tips and resources to educate consumers on storage and maximising use of produce. This could be supported by an integrated approach from government, businesses, and schools to fully educate consumers on best practice around food waste.

New Zealand has a number of food recovery programmes in place that assist in redistributing wasted food to those that need it. Others provide resources to re-purpose parts of produce that may otherwise be thrown out. **KiwiHarvest**, **FoodShare**, and **Good Neighbour** are examples of companies set up to alleviate the problem and close the gap.

Supermarkets also contribute. Foodstuffs partners with a variety of schools and community groups dedicated to food rescue. They have a focus on recycling and reusing waste back-of-store, with landfill being a last resort.



Potatoes are the third highest food waste contributor, costing New Zealand **\$10,818,171** a year.



The largest proportion of food wasted in New Zealand comes from households.



New Zealand's yearly food waste produces **325,975 tonnes** of carbon emissions. To offset our total amount of waste we would need to take **118,107 cars** off the road for one year or plant **130,390 trees**.

Such initiatives address two issues in one: feeding those in need, and combating food waste. They are also helping to mitigate the environmental impacts of food wastage, and optimise resource use along the food chain.

Supermarkets are supporting programmes to sell "ugly" fruit and vegetables at discounted prices also provide solutions. Supermarkets such as Countdown are adopting these types of programmes that focus on rescuing food from going into landfill; as well as making healthy food more affordable and enabling growers to sell more of their crops.



