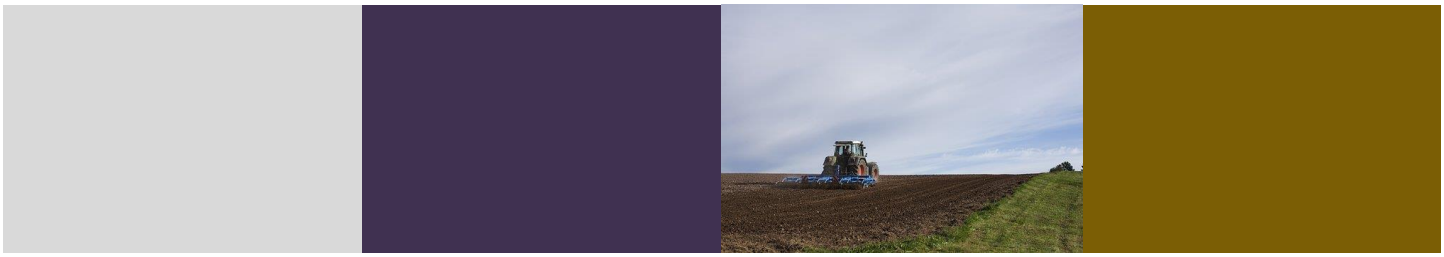
# The value of local vegetable production

David Moore, Ben Barton and Michael Young

August 2019



## Contents



## Figures

# Executive summary

You asked us to look for values other than the production value and sales price of locally grown vegetables.

Valuing local food production beyond the contribution to GDP and exports earning is difficult. We review the available literature and summarise interviews to provide an assessment of value. We do this

1. By identifying the premium consumers are willing to pay for attributes associated with local vegetables.

2. By identifying the value of New Zealand branding/marketing through Country of Origin Labelling.

We find the following:

- There is some evidence consumers are willing to pay a time persistent premium around 22-27% for a local vegetable basket, across different sales channels. This research is not easily generalised to New Zealand as the size of the premium varies with product and locations. One study identified an increased premium for more perishable vegetables.
- COOL research reveals NZ production is marketable and can capture a premium linked to food safety and quality perceptions. Consumers have become increasingly health and nutrition conscious, and are concerned more and more with the freshness, quality and safety of food.

We spoke to five public health experts. They told us:

- Local production becomes important when the sustainability of diets and the environmental impact on health is included in assessments
- From a nutrition perspective they focus on increasing vegetable intake rather than the source of the vegetables or whether the vegetables are fresh, processed or frozen
- Price and access are the key issues.

The public health impacts of local vegetable production are framed in terms of access to affordable nutrition and the link between healthy diets and environmental impact. The expected outcomes of increased dependence on fresh vegetables imports identified to us are:

- Higher price – via increased transportation cost component, highly perishable vegetables subject to airfreight, less seasonal harvest supply influences
- Less variety – driven by shorter shelf life due to increased supply chain length so less desirable for retailers to carry wide range of products
- Less availability – fewer sales channels such as market and road side stalls
- Increased food safety risk - longer supply chains increase opportunity for fraud
- Bio-security risk – increased volumes of imports
- Consumer perceptions of safety and quality in the food system would be reduced and the premium they are willing to pay lost
- Emissions from vegetable consumption would rise
- Less opportunity for farm-based recreation and education.

# 1. Background and approach

Horticulture is a significant contributor to the economy, as well as export earnings it provides jobs in rural communities, contributes to a safe and secure food system and public health benefits of fruit and vegetable consumption. The value of local production of vegetables is $2.8 billion in 2017 (Plant and food, 2018).

There are other aspects of value of locally grown vegetables:

- Existence and bequeath values
- Food security and resilience
- Environmental and health impacts of diets

Approximately two-thirds of domestic vegetable production serves local markets (Horticulture NZ, 2018). This varies significantly by the type of crop and its suitability for storage and transportation. Highly perishable vegetables are harder to substitute for processed or imported alternatives unless supplied by air-freight or delivered frozen.

We approach this task by:

- Reviewing literature on consumers' willingness to pay (WTP) a premium for local attributes and Country Of Origin Labelling (COOL).
- Interviewing public health experts to establish expert opinion of the extent of potential benefits from maintaining and growing the national production of vegetables.

The perspective on value differs according to income. High-income earners may be willing to pay a premium for local production. Low-income earners benefit from increased access and affordability of local production.

In the interviews, we posited an alternative scenario, that local[1] production may increasingly be constrained by a combination of regulatory change, land use change and climate change pressures.

[1] Used interchangeably with domestic or national

**Vegetables – some key facts**

Relative to fruit and other food products fresh vegetables are not a significant part of international trade. For most vegetables, the major producing countries are also the major consuming countries. Vegetable trade mainly flows from temperate to tropical regions and is in a preserved or processed format. Vegetables made up 1.88% of the March 2019 quarter CPI basket (Statistics NZ, 2018). Prices rose by 3.2% in the March 2019 quarter, and were 10% higher than they were in March 2014 (Statistics NZ, 2019).

**Global**

Economic expansion has produced a growing middle-class population in developing countries which has generated greater global demand for fruit and vegetables. Increased fruit and vegetable consumption in developing countries will likely continue with Asian and Pacific middle-class growth. In developed countries consumption of fruit and vegetables is shifting towards more expensive and a greater variety of fruit and vegetables.

**Production**

New Zealand is not a major fresh vegetable exporter, but many vegetables are exported in processed forms. Exports are growing but we expect most vegetables will continue to be grown for domestic supply. The NZ retail market has been shaped by increased demand for a year-round supply of fresh fruits and vegetables, as well as greater variety. New Zealand vegetable production area is falling but increased yields are maintaining output. This reduced area under cultivation is primarily a result of competing land uses from both other farming and increasingly urban sprawl. This is driving a round of industry consolidation.

**Consumption**

In the 2017-18 NZ health survey, about 6 in 10 adults (61%) ate at least three servings of vegetables each day, down from 64% in 2006/07. Adults living in the most socioeconomically deprived areas are less likely to eat the recommended three or more servings of vegetables each day than adults in the least deprived areas, after adjusting for age, sex and ethnic differences (MoH, 2019a).

# 2. There is evidence of a premium for locally supplied vegetables

We examine the value of domestic production of vegetable through:

- Willingness-to pay (WTP)
- Country of origin labelling (COOL) attribute signalling

We summarise this evidence below.

## 2.1 The meaning of 'local' is inconsistent across the literature

The term 'local' is vulnerable to misinterpretation by consumers as there is no formal definition or certification process (Adalia, Hanson, Towe, & Tselepidakis, 2015). The definition of local food usually relates to geographic boundaries. For example, the local food movement uses a 100-mile radius from the point of production to sale, and more flexible definitions use regional or national borders.

For our purpose, we use the term 'local' to mean national production. This allows us to look at the revealed preferences of consumers shopping with COOL, and to use research indicating consumers are willing to pay different premiums for the same products that are characterised by different or similar labels of origin.

## 2.2 Perceptions matter for the local premium

Consumer preferences for local food products can be associated with perceptions of freshness and health benefits, familiarity with its sources, environmental sustainability, and as a way of supporting small farms and local economies (Martinez, et al., 2010). Local food is seen as environmentally and climate friendly and perceived as fresher, safer and healthier than imported products (Hamm & Hempel, 2016). Australian studies find that consumer preference for local foods is due to local being associated with high-quality products (Mugera, Burton, & Downsborough, 2016).

## 2.3 There is a significant but variable premium for local produce

There is a significant body of literature that estimates consumer's willingness-to-pay (WTP) for local products. This literature finds specifics such as; product type, category, location, sales channel, associated attributes and research methods affect the premium level (Printezis, Grebitus, & Hirsch, 2019). While most studies highlight product-specific differences, there are few that have considered more than one product or investigated entire product categories (Hamm & Hempel, 2016). This significantly limited applicable studies.

Several studies claim that local food systems can improve local economies through import substitution and demonstrate a price premium that does not deviate substantially across the

definitions of local, though the average WTP tends to increase as the geographic interval shrinks (Burnett, Kuethe, & Price, 2011).

An American study found consumers are willing to pay an average premium of 27 per cent for produce grown within their state. While this study broadly captures the domestic vegetable category, transferring this general figure to the New Zealand context is problematic as premiums for local products can vary by state (Carpio & Isengil, 2008). A more recent American study found that online shoppers were willing to pay a similar premium of 22 per cent for a domestically grown bundle of fresh produce rather than the same bundle that was imported. Like other studies, the authors stressed that there are a number of factors that influence this premium. Factors such as income category, interests in online shopping, interest level for local food, interest level for organic food, and monthly spending on fresh produce have a significant positive impact on the WTP for locally grown fresh produce. (Gumirakiza & Choate, 2018)

Another US based study compared two plant products (spinach and carrots) to find WTP for the more perishable spinach was higher than for the longer storing carrots ($0.18/lb to $0.10/lb) (Hamm & Hempel, 2016). Combined with the increased transport and retail costs[2] associated with perishability this suggests that if local production is constrained there would be market incentives to shift local production towards more perishable vegetables.

## 2.4 The NZ brand offers safety and quality assurances to consumers

The New Zealand garlic market history shows local is marketable to capture significant premiums. Competition from Chinese-grown garlic arrived in the 1990s and hurt the NZ garlic industry. Chinese garlic was arriving in the country at prices less than 20 per cent of the local production cost. Local growers managed to push the NZ brand message, marketing their product with quality attributes such as; fresher, sweeter[3], juicer and more pungent than the imported variety. NZ garlic became a premium product compared to Chinese garlic. The sustained premium suggests taste attributes, perceptions of production and processing methods that influence environmental and safety concerns can be an important part of local premiums.

Part of the New Zealand market values quality and safety attributes over price. This preference for domestic production in the allium category is found in several countries with a 50 per cent to 130 per cent premium for domestic onions over imported (Ehmke, Lusk, & Tyner, 2008).[4]

Local reference studies have found that consumers are not willing to pay a premium, but require a discount for imported products, such as: imported potatoes in New Zealand (Kaye-Blake, Abell, & Zellman, 2009) .

[2] The more perishable the product the greater the likelihood of losses due to spoilage
[3] Important for the Garlic Noir brand, brix levels difficult to achieve in other countries
[4] New Zealand onions attract a premium in Europe due to their high quality; see section 2.1.5 for a discussion of this competing effect.

Local vegetables contain value, which is observable in the premium consumers pay for attributes they associate with local production.

## 2.5 COOL reveals the food safety and quality premium consumers' place on domestic vegetables

Like the estimated WTP for local production, COOL and associated attributes can vary significantly across countries and products. Overall there is a strong preference for domestic products indicating a favouring of home country products. (Miller, Driver, Saunders, & Dalziel, 2016)

COOL can serve as a proxy for, or encourage consumers to think about, other product attributes, such as food safety or quality. Hence COOL can influence consumer preferences and purchase choices (Miller, Driver, Saunders, & Dalziel, 2016). A study which involved 16 industry informants in New Zealand, supported this concept as the informants indicated that agri-food products with New Zealand COOL information leads to a premium in markets in relation to quality aspects valued by consumers (Insch, Williams, & Knight, 2015).

Many factors have contributed to New Zealand's image, assisting exports in many markets. These images can change quickly because of food safety scares or disclosures of production practices. If New Zealand gets premium prices for its produce in international markets, domestic prices will also be higher.

# 3. Access and affordability are important

In this section we assess the value of local production through a public health lens for the lower income segment of the market. There is some evidence that local production can increase access and affordability, but retail and home food environments, education and perceptions make attribution challenging.

The benefits of fruit and vegetable consumption are well established, particularly their role in preventing general micronutrient-deficiencies and chronic diseases. Consumers' choices about what to eat are influenced by personal factors such as accessibility, convenience and affordability, and external factors, such as availability, price, and perishability. Creating environments that foster consumer access to affordable fruit and vegetables is a global priority (Thow, et al., 2018).

Constrained local production will cause a shift towards the consumption of imported fresh or processed vegetables, this is expected to cause an increase in transportation and storage costs, and a shift in the mix of local production towards highly perishable vegetables.

## 3.1 Vegetables are a key part of our diet

There is clear evidence that vegetables are an important part of our diet and there has been considerable effort researching the link and developing healthy eating programmes. Boeing et al. (2012) completed a critical review of the literature on the links between fruit and vegetable consumption and many different diseases. They found:

- convincing evidence for risk reduction of hypertension, coronary heart disease, and stroke
- probable evidence for risk reduction of cancer
- possible evidence for prevention of weight gain and therefore a possible indirect reduction in risk of Type 2 diabetes mellitus (but otherwise no direct link once weight has been accounted for)
- possible evidence for risk reduction in other diseases such as some eye diseases, dementia, osteoporosis, asthma, chronic obstructive pulmonary disease and rheumatoid arthritis.

The Ministry of Health recommends adults should eat at least three servings of vegetables every day. (MoH, 2019a). The 2017/18 National Health Survey shows only 61 per cent of adults meet this recommendation, while only 52 per cent of children eat their recommended daily intake[5] (MoH, 2019b). There has been a general decline since the 2011/12 National Health Survey.

The statistics also show inequities when subgroups are compared.

- gender: males are less likely than females to eat the recommended daily intake
- ethnicity: Pacific and Asian peoples are less likely than non-Pacific and non-Asian peoples respectively. Māori children are less likely than non-Māori children
- deprivation: the most deprived are less likely than the least deprived.

[5] At least two servings of vegetables per day for children aged 2-4, and at least three servings for those aged 5-14

The Institute for Health Metrics and Evaluation (IHME) carry out the Global Burden of Disease (GBD) study. This study attempts to quantify the health loss due to various diseases and risks. For vegetable intake, this study only considers the link with cardiovascular disease. The study estimated that almost 800 deaths were caused by low vegetable intake in New Zealand in 2017, as well as quality of life lost due to morbidity (IHME, 2017).

This equates to approximately 12,000 disability-adjusted life years (DALYs) lost due to inadequate vegetable consumption.[6] To put this in perspective, this study estimates that low vegetable intake is responsible for 7.5 per cent of loss in health (measured in DALYs) due to cardiovascular diseases and 1 per cent of total loss in health across all factors.[7]

Consumption of vegetables is important; the literature and public health doctors are neutral as to where vegetables come from. They may be locally supplied, imported, frozen or canned.

## 3.2 Food prices are the key determinant of purchases

A change in price of one product can influence demand for complementary and substitute products. This effect can differ across socio-economic boundaries. So, while there is evidence that a price reduction or subsidy on vegetables would lead to increased consumption the net effect is uncertain, depending on what is done with the spare change. A recent NZ study highlighted the importance of substitution effects and how pricing interventions might work together (Waterlander, et al., 2019). A co-author of the study said in an interview with us,

> decreasing the price of vegetables by 12.5 per cent resulted in a 10 per cent increase in volume…. There are unintended consequences, when cross price elasticities are examined. We found with fruit and vegetable subsidies, the saving is spent in a way where sodium and saturated fat intakes increase, so the net benefit [to the healthiness of their overall basket] disappears.

Higher food prices don't affect everyone equally; generally low-income households have a stronger response to changes in cost. Healthier food has been the first essential that low income families compromise on in times of hardship, exacerbating existing nutritional deficiencies resulting from general lack of money (Cheer, Kearns, & Murphy, 2002). In New Zealand, for families living in deprived areas, increases in vegetable prices especially around their off-season compel them to substitute the purchase of healthier whole fruit and vegetables with cheap energy-dense nutrient-poor products (Rush, Savila, Jalili-Moghaddam, & Amoah, 2018).

Traditional methods to improve population diets have largely relied on individual responsibility, but there is some evidence that suggests food pricing policies can improve health outcomes:

[6] One DALY represents one year of healthy life lost.
[7] These estimates did not include any potential secondary impacts, for instance the impact of vegetable intake on weight and therefore the risk of Type 2 diabetes mellitus. However, overall, the impacts on cardiovascular disease are more likely to be overestimated as each dietary risk was calculated independent of each other, and therefore correlations between the dietary risks cause the sum of the individual risks to be higher than the true aggregate.

- Randomized controlled trials in New Zealand supermarkets found price discounts on supermarket food had a significant and sustained effect (Ni Mhurchu, Blakely, Jiang, Eyles, & Rodgers, 2010).
- A 20 per cent subsidy on fruit and vegetables showed the potential to result in 560 (95 per cent uncertainty interval, 400 to 700) deaths prevented or postponed in New Zealand (Ni Mhurchu, et al., 2015). It would, however, take many years for these health gains to accrue due to delays between changing diets and changes in disease rates and the net effect is uncertain due to complementary and substitute purchases.
- With that caveat, results suggest that a 10 per cent subsidy on vegetables could lead to an 11 per cent increase in consumption among the lowest income group. This suggests that targeted food pricing policies could alter the diets and nutritional health of priority groups making food pricing policy pro-health equity (Ni Mhurchu, et al., 2013).

Local production may provide a pseudo-subsidy through increased access to seasonal discounts and holding transports costs down. This would have long term public health benefits.

Research around climate change suggests extreme weather events may become more frequent, and more extreme. Modern farming technologies and techniques have helped to reduce the weather vulnerability and boost production, but weather events remain a key price determinant. A changing climate could affect the length and quality of the growing season and farmers could experience increasing damage to their crops. There is also the possibility of favourable growing conditions resulting in a bumper crop and a period of lower prices that may increase affordability and access.

The effects of extreme weather events are often moderated by supply coming from other New Zealand regions. The loss of growing areas may result in less price resilience (increased volatility) in the local market.

## 3.3 Seasonal price volatility

Vegetable prices currently vary significantly across regions, are highly seasonal and subject to weather conditions and events. We observe prices for fresh vegetables generally increase during autumn and winter and decrease during late spring and summer.

Within these seasonal and weather-based fluctuations there is an opportunity for consumers to shift consumption with the seasons and conditions to take advantage of price variation. More imports (or substitution to processed vegetables) may smooth prices[8] reducing the ability of consumers to save money by shifting consumption to take advantage of seasonal price effects. This could have implications for access and affordability. Price fluctuations can also have long memory, that is price spikes and troughs can produce perceptions of price that outlast the actual price effect. This is likely stronger for price increases than decreases.

A strong harvest causes a significant temporary shift in the supply curve providing downward pressure on retail prices. When domestic supply is abundant, both the domestic and export prices are lower, to

[8] The transport cost is stable and makes up a larger part of the price consumers face. Prices still change due to global supply conditions but are more consistent.

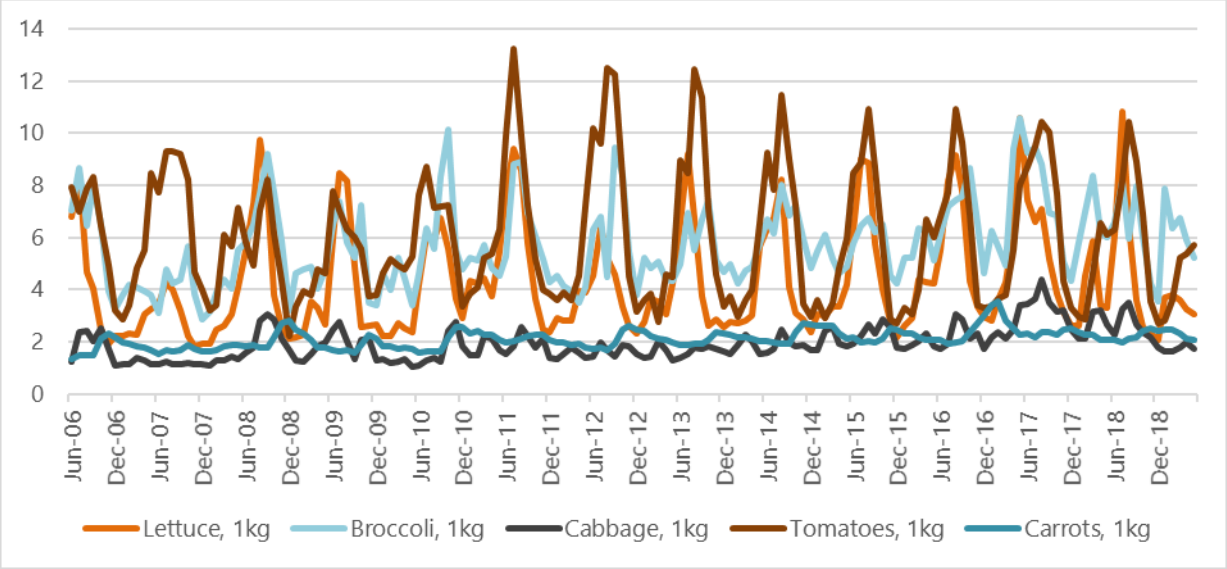
ensure the stock is sold and does not spoil. Bumper harvests provide the opportunity for retail promotions. If fresh vegetable imports were to increase, these opportunities may be reduced based on growing conditions in the producer country.

The prices for imported produce are much more stable over a year than prices for produce grown in New Zealand for export (Stats NZ). The same observation is present for the level of perishability; the better storing products (carrots and pumpkin) have less price variation over the year.

Increased exposure to foreign climate and weather conditions is seen in the tomato price spike in July 2011. Towards the end of 2010, Queensland floods affected horticultural production significantly. Following the floods, the New Zealand price of tomatoes increased far more than it had in previous seasonal cycles.

More trade may lessen the influence of domestic shocks, especially the ones associated with weather, but an increase in vulnerability to international factors can affect the domestic price paid.

Figure 1: Vegetable price volatility, $/kg




Source: Statistics NZ

## 3.4 Weather and climate drive supply and price

Food is one of society's key sensitivities to climate. A year of not enough or too much rainfall, a hot spell or cold snap at the wrong time, or extremes, like flooding and storms, can have a significant effect on local crop yields which is seen in both prices and retail availability. Likely, these fluctuations will become more common and supply chains more fragile.

### 3.4.1 Climate predictions

Based on the latest climate projections for New Zealand, by the end of this century we are likely to experience:

- higher temperatures- while the amount of warming in New Zealand is likely to be lower than the global average, we expect greater increases in the North Island than the South, with the greatest warming in the northeast
- rising sea levels
- more frequent extreme weather events - droughts (especially in the east of New Zealand) and floods.
- a change in rainfall patterns - increased summer rainfall in the north and east of the North Island and increased winter rainfall in many parts of the South Island (MfE, 2019).

Farms can spread the risk by growing a mix of produce, but that multiplies capital requirements for everything from tractors, to packing sheds in what is already a high cost production environment. The risk to the country is mitigated by spreading production over different geographical regions.

An increased reliance on imports exposes the local market to foreign growing conditions and the vulnerability of those countries to changing climate. Imports may not be a secure source of products, if source countries prioritise local demand in periods of low production.

## 3.5 Longer and more complex supply chains increase risk

In a constrained local production scenario, there would be an increased reliance on Australian or other nearby vegetable producing nations for vegetables imports. There is risk in the unknown impacts of climate change on these producers but also in lengthening the supply chain.

Transport and storage will affect nutritional qualities and change the risk of food contamination or poisoning. Imported vegetables may need to be processed or frozen due to perishability and transport constraints.

### 3.5.1 More opportunity for food fraud

Long and complex supply chains provide opportunity for fraudulent activity to occur as further processing or re-packing of products can mask opaque practices and non-compliant behaviour. High-value products, such as organic produce and produce of marketable provenance, provides motivation for fraudulent operators to present for sale produce that is mislabelled or misrepresented (Manning & Monaghan, 2019).

### 3.5.2 Increased emphasis on biosecurity

New Zealand's economy depends on its primary industries, it gets more than half its export income from the primary sector. This means that New Zealand is more dependent on biosecurity protection than many other developed countries and trades on a reputation for being largely pest and disease free. Biosecurity threats can cause significant disruption and losses to production and are therefore a significant risk for the horticulture sector. New Zealand has strict measures to manage biosecurity risk, including for fresh produce. An increased volume of imported vegetables increases the opportunity for biosecurity incursions and the emphasis on these systems.

### 3.5.3 More waste and nutrient loss

Each link in a food supply chain affects the availability, affordability, diversity and nutritional quality of foods. How foods are handled throughout a chain influences their nutritional content and prices as well as the ease with which consumers can access them. This, in turn, shapes consumer choices, dietary patterns and nutritional outcomes. In addition to quantitative food losses, qualitative losses also occur as nutrients deteriorate during storage, processing and distribution. Nutrient losses occur during processing and transport from farms to points of sale (FAO, 2013).

For highly perishable products longer supply chains alter the balance between the over and under stock cost by reducing the selling period. If we use bagged salad as an example that has a shelf life of less than a week, a two-day transport time will decrease the selling period and encourage retailers to sell out more frequently. This would reduce the availability of highly perishable vegetables. It will also encourage retailers to reduce the range of perishable products where there are known substitution effects.

## 3.6 Market dynamics may worsen

Local production is only part of the story, distribution and retailing is important. There are two large food retailers in NZ.

Reduced local production would likely reduce the number of sellers at local and roadside markets. The presence of this form of competition is found to have an effect on larger retailer's fresh produce prices. A study that compared the price of a "basket" of fruit and vegetables across sales channels found fruit and vegetable markets were the cheapest option, and that the presence of general markets could depress prices in neighbouring supermarkets (Pearson, et al., 2014). Decreased local production would likely erode the opportunity for savings by shopping at markets and the price suppressing benefit of competition from fruit and vegetable markets would be reduced.

The domestic price of a vegetable is unlikely to exactly match global price movements because:

- the domestic product may be differentiated in various ways from the product being traded internationally
- transport costs are unlikely to move by the same proportion as the international price of the product.

## 3.7 Land use can be irreversible

The demand for residential and lifestyle blocks has been outcompeting horticulture. The loss of high-class horticultural land is happening at the same time as our food production system is under pressure to increase production without increasing environmental effects and is facing the uncertainties of climate change (MfE & StatsNZ, 2018).

It is highly unlikely that conditions would shift so much that horticulture would become a more profitable use of land than housing development. A housing crash would likely need to coincide with booming demand for local vegetables and probably a number of other favourable conditions. In an

uncertain future the risk should not be ignored as once premium growing soils are built on, it is almost impossible to change the land use again.

# 4. Diets inextricably link human health and environmental sustainability

**"The food we eat and how we produce it will determine the health of people and planet, and major changes must be made to avoid both reduced life expectancy and continued environmental degradation."** (Eat-Lancet, 2019)

The interface of health and sustainability through food has been recognised by international science. Up until the Eat-Lancet report, the sectors had been largely separated. This has paved the way for national dietary guidelines to be updated and extended to include sustainability by moving populations towards consuming largely plant-based diets (Eze Eme, Douwes, Kim, Foliaki, & Burlingame, 2019).

Globally moving to healthy diets by 2050 will require substantial shifts, including a greater than 100 per cent increase in consumption of healthy foods, such as nuts, fruits, vegetables, and legumes (Eat-Lancet, 2019). The scale and urgency of addressing the combined challenges of obesity, undernutrition, and climate change is highlighted in another Lancet commission; The Global Syndemic, which claims those problems represent three of the gravest threats to human health and survival (Swinburn, et al., 2019).

To be part of the global solution New Zealand could provide incentives to shift agricultural production towards healthier and less environmentally burdensome products. Promoting a plant-based diet represents a double-duty action to reduce obesity, heart disease, and diet-related cancers, as well as to reduce emissions from agricultural activities (Swinburn, et al., 2019).

## 4.1 Reduced emissions, variable environmental impact

Shifting consumption towards imports will likely increase the emissions associated with food consumption through increased transport time and distance. Changes to environmental impact depend on the location of alternatives and the methods of production and transport; packaging selection and distance to market have a large influence on total environmental impacts. Examination of a wider range of regionally specific environmental impacts should be considered with any environmental claims., More detailed analysis shows that food miles do not tell the full story of environmental impact; the net effect is uncertain. (Saunders, Barber, & Sorenson, 2009).

Expected changes to environmental impact of diets:

- more air freight of highly perishable vegetables resulting in higher emissions
- increased food waste due to lengthened supply chains.

The net impact on the New Zealand environment depends on the resulting change in land use. The net global impact depends on the specifics of the production and processing of increased imports.

## 4.2 Interviews with public health and nutrition experts point to a complex systems perspective

We spoke to five experts (Boyd Swinburn, Sarah Gerritson, Cliona Ni Mhurchu, Barbara Burlingame and Carol Wham). We heard:

- the link between local production of vegetables and public health benefits is focussed on price, the perceptions of price are important
- from a public health perspective the focus is on eating more vegetables, rather than the origin of the vegetables
- once environmental considerations are included in diets local production becomes much more relevant
- NZ food policy is absent and does not function to capture health and environmental benefits.

### A strong theme was that the local production of vegetables becomes much more important when the environmental impact of diets is considered:

- "New Zealand has more access to fruit year-round than we used to because of imports, which is good from a health perspective that doesn't taking into account the climate change impact. If it gets wrapped up with resilience and climate change events and long supply chains all speak to climate resilience. Local production becomes an important part of the narrative. For NZ to eat a healthy and sustainable diet we need to pull back on meat and dairy and increase vegetables and legumes. Local production has a role in healthy eating within sustainable limits.
- "The case against meat is much stronger for the environmental than the health impact."
- "From a public health perspective it doesn't really matter where vegetables come from all that matters is that people eat them."
- "Environmental sustainability is a major lever. Nutrient guidelines are being upgraded to include environment considerations. This encourages more locally produced foods, in the future local is going to become much more important and have big impacts across the whole food systems. Locally grown is better. This is the way the world is going to go, we are thinking about the planetary impacts of the food we eat. It means less dairy, less meat, and vegetables can become a replacement for meat. Locally grown and locally sourced is going to become an important issue for most countries."
- "The affordable part of sustainable diets is an issue in NZ. We have dietary guidelines that most of NZ cannot afford to meet. The price of meeting micronutrient requirements it is very expensive in NZ and much less in other countries. Without changing the land use the situation could get worse and is unlikely to get better."
- "Since the Eat-Lancet report the focus has been shifting towards what would need to happen to move towards sustainable diets. Local production and less animal agriculture are needed."
- "Most nutritionists say frozen and canned veg are fine."

### Price and perceptions of price is an issue linked to time costs:

- "The health and access perspective relies on the effect on price. People tend to be blaming of parents, once the layers are peeled away it often comes down to low wages and people having to work long hours to make ends meet. This increases the value of time and makes buying takeaways a better option."
- "A major issue is people think vegetables are expensive. Price spikes have long memory - $8 cauliflower has been remembered long after prices retreated to half that level."
- "Consumption is not to do with access, it is all price and perception of price and time. Vegetables take a lot of time to prepare. The rise of Myfood bag and Uber eats – never thought Uber eats targeted at low income families."
- "There might be a loss in saving on eating seasonally – [there is] a lot of merit in eating seasonality [but] it is a consumer choice and limited to those who can afford to think about it."

### A national food policy is missing or misdirected for public health and environmental benefits:

- "NZ should have policies to ensure domestic production of the highly perishable kinds of fruits and vegetables. A lot of countries have a food security policy, NZ doesn't."
- "The NZ system has been set up so that primary production is driven to add value to products, so the country can achieve greater margins – this often means you have to process the food somehow. Processing gives added value and that is why our diets are becoming more processed. We need to go back to less processed diets. The NZ incorporated perspective is a focus on high value nutrition, for NZ to do well we need to sell food to the world and need to process and make health claims…. An alternative way is to sell food that has been verified as authentically healthy, socially and environmentally responsible. Walking the talk and living up to the clean green image by ensuring farms are doing the right thing. This would require a move from added value in processing to marketing of production methods."
- "NZ has no national food policy. With more dependence on imports we are exposed to risks other countries face. Australia is prone to climate change effects, we are already seeing great effects in crop losses from drought and floods."
- "Food policy is not setup to support sustainable diets. It is very sad that nobody is doing anything, there is not even the funding to update the NZ Nutrition survey. Nutrition has got to look at the whole food system issue not just marco and micro nutrients."

# 5. References

Adalia, A., Hanson, J., Towe, C., & Tselepidakis, E. (2015). An Examination of Consumer Willingness to Pay for Local Products. *Agricultural and Resource Economics Review 44/3*, 253-274.

Boeing, H., Bechthold, A., Bub, A., Ellinger, S., Haller, D., Kroke, A., . . . Watzl, B. (2012). Critical review: vegetables and fruit in the prevention of chronic diseases. *European Journal of Nutrition*, 637-663.

Burnett, P., Kuethe, T. H., & Price, C. (2011). *Consumer preference for locally grown produce: An analysis of willingness-to-pay and geographic scale.* Journal of Agriculture, Food Systems, and Community Development, 2(1), 269–278. http://dx.doi.org/10.53.

Carpio , C., & Isengil, O. (2008). Consumer Willingness to Pay for Locally Grown Products: The Case of South Carolina. *Southern Agricultural Economics Association Annual Meeting.* Dallas, TX,.

Cheer, T., Kearns, R., & Murphy, L. (2002). Housing policy, poverty, and culture: discounting decisions among Pacific peoples in Auckland, New Zealand. *New Zealand. Environ Plann C* , 497-516.

Eat-Lancet. (2019). *Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems.* The Lancet.

Ehmke, M. D., Lusk, J. L., & Tyner, W. (2008). Measuring the relative importance of preferences for country of origin in China, France, Niger and the United States. *Agricultural Economics*, 277-285.

Eze Eme, P., Douwes, J., Kim, N., Foliaki, S., & Burlingame, B. (2019). Review of Methodologies for Assessing Sustainable Diets and Potential for Development of Harmonised Indicators. *International Journal of Environmental Research and Public Health*.

FAO. (2013). Food supply chains for better nutrition. In FAO, *The State of Food and Agriculture*.

Flanigan, S., Blackstock, K., & Hunter, C. (2015). Generating public and private benefits through understanding what drives different types of agritourism. *Journel of Rural Studies*, 129-141.

Gumirakiza, J., & Choate, T. (2018). The Willingness to Pay for Local, Domestic, and Imported Bundled Fresh Produce by Online Shoppers. *Journal of Agricultural Science; Vol. 10, No. 12*.

Hamm, U., & Hempel, C. (2016). Local and/or organic: a study on consumer preferences for organic food and food from different origins. *International Journal of Consumer Studies*.

Horticulture NZ. (2018). *Annual report 2018.* Horticulture NZ.

IHME. (2017). *GBD Results Tool*. Retrieved from Insitute for Health Metrics and Evaluation: http://ghdx.healthdata.org/gbd-results-tool

Insch, A., Williams, S., & Knight, J. G. (2015). Managerial Perceptions of Country-of-Origin: An Empirical Study of New Zealand Food Manufacturers. *Journal of Food Products*, 304-319.

Kaye-Blake, W. H., Abell, W. L., & Zellman, E. (2009). Respondents' ignoring of attribute information in a choice modelling survey. *Australian Journal of Agricultural and Resource Economics*, 547-564.

Manning, L., & Monaghan, J. (2019). Integrity in the fresh produce supply chain: solutions and approaches to an emerging issue. *The Journal of Horticultural Science and Biotechnology*, 413-421.

Martinez, S., Hand , M., Da Pra , S., Pollack, K., Ralston, K., Smith, T., . . . Lohr, L. (2010). *Local Food Systems: Concepts, Impacts, and Issues.* Washington, DC.: U.S. Department of Agriculture.

MfE & StatsNZ. (2018). *New Zealand's Environmental Reporting Series: Our land 2018.* Ministry for the Environment & Stats NZ.

MfE. (2019, March 22). *Likely climate change impacts in New Zealand*. Retrieved from Ministry for the Environment: https://www.mfe.govt.nz/node/16596

Miller, S., Driver, T., Saunders, C., & Dalziel, P. (2016). *High Value Nutrition: Country of Origin Literature Review.* AERU Client Report, prepared for the High Value Nutrition National Science Challenge.

MoH. (2017). *Health survy data explorer*. Retrieved from Ministry of Health: https://minhealthnz.shinyapps.io/nz-health-survey-2016-17-annual-data-explorer/_w_f333adbe/_w_ec5c3473/_w_81ec63ac/#!/explore-indicators

MoH. (2019a, April). *New Zealand Health Survey. Annual Data Explorer.* Retrieved from Ministry of Health: https://minhealthnz.shinyapps.io/nz-health-survey-2017-18-annual-data-explorer/

MoH. (2019b, February 27). *The four food groups*. Retrieved from Ministry of Health: https://www.health.govt.nz/your-health/healthy-living/food-activity-and-sleep/healthy-eating/four-food-groups

Mugera, A., Burton, M., & Downsborough, E. (2016). ): Consumer Preference and Willingness to Pay for a Local Label Attribute in Western Australian Fresh and Processed Food Products,. *Journal of Food Products Marketing, Vol. 23, Iss. 4*, 452-472.

Ni Mhurchu, C., Blakely, T., Jiang, Y., Eyles, H. C., & Rodgers, A. (2010). Effects of price discounts and tailored nutrition education on supermarket purchases: a randomized controlled trial. *The American Journal of Clinical Nutrition, Volume 91, Issue 3,*, 736-747.

Ni Mhurchu, C., Elyes, H., Genc, M., Scarborough, P., Rayner, M., Mizdrak, A., & NNoaham, K. (2015). Effects of Health-Related Food Taxes and Subsidies on Mortality from Diet-Related Disease in New Zealand: An Econometric-Epidemiologic Modelling Study. *PLOS One*.

Ni Mhurchu, C., Eyles, H., Schilling, C., Yang, Q., Kaye-Blake, W., & Genc, M. (2013). Food Prices and Consumer Demand: Differences across Income Levels and Ethnic Groups. *PLoS ONE 8(10)*.

Pearson, A. L., Winter, P. R., McBreen, B., Stewart, G., Roets, R., Nutsford, D., . . . Wilson, N. (2014). Obtaining Fruit and Vegetables for the Lowest Prices: Pricing Survey of Different Outlets and Geographical Analysis of Competition Effects. *Plos One*.

Plant and food. (2018). *Fresh facts.* The New Zealand Institute for Plant & Food Research Ltd.

Printezis, I., Grebitus, C., & Hirsch, S. (2019). *The price is right!? A meta-regression analysis on the willingness to pay for local food.* Plos One.

Rush, E., Savila, F., Jalili-Moghaddam, S., & Amoah, I. (2018). Vegetables: New Zealand Children Are Not Eating Enough. *Front. Nutr.*

Saunders, C., Barber, A., & Sorenson, L.-C. (2009). Food Miles, Carbon Footprinting and their potential impact on trade. *AARES 53rd annual conference* . Cairns.

Sims, R. (2009). Food, place and authenticity: local food and the sustainable tourism experience. *Journal of Sustainable Tourism*, 321-336.

Statistics NZ. (2018, April 19). *Consumers price index review: 2017 (revised)*. Retrieved from https://www.stats.govt.nz/methods/consumers-price-index-review-2017-revised

Statistics NZ. (2019, April 17). *Consumers price index: March 2019 quarter*. Retrieved from https://www.stats.govt.nz/information-releases/consumers-price-index-march-2019-quarter

Swinburn, B. A., Kraak, V., Allender, S., Atkins, V. J., Baker, P., & Bogard, J. R. (2019). *The Global Syndemic of Obesity, Undernutrition, and Climate Change: The Lancet Commission report.* The Lancet.

Thow, A., Verma, G., Soni, D., Soni, D., Beri, D., Khandelwal, S., . . . Siegel, K. (2018). How can health, agriculture and economic policy actors work together to enhance the external food environment for fruit and vegetables? A qualitative policy analysis in India. *Food Policy*, 143–151.

Waterlander, W. E., Jiang, Y., Nghiem, N., Eyles, H., Wilson, N., Cleghorn, C., . . . Blakely, T. (2019). The effect of food price changes on consumer purchases: a randomised experiment. *The Lancet, 4*(8), E394-E405.

## About Us

Sapere Research Group is one of the largest expert consulting firms in Australasia, and a leader in the provision of independent economic, forensic accounting and public policy services. We provide independent expert testimony, strategic advisory services, data analytics and other advice to Australasia's private sector corporate clients, major law firms, government agencies, and regulatory bodies.

'Sapere' comes from Latin (to be wise) and the phrase 'sapere aude' (dare to be wise). The phrase is associated with German philosopher Immanuel Kant, who promoted the use of reason as a tool of thought; an approach that underpins all Sapere's practice groups.

We build and maintain effective relationships as demonstrated by the volume of repeat work. Many of our experts have held leadership and senior management positions and are experienced in navigating complex relationships in government, industry, and academic settings.

We adopt a collaborative approach to our work and routinely partner with specialist firms in other fields, such as social research, IT design and architecture, and survey design. This enables us to deliver a comprehensive product and to ensure value for money.

## For more information, please contact:


David Moore
Phone: +64 4 9915 7590
Mobile: +64 21 518 002
Email: dmoore@thinkSapere.com



| Wellington | Auckland | Sydney | Melbourne | Canberra |
|---|---|---|---|---|
| Level 9<br>1 Willeston Street<br>PO Box 587<br>Wellington 6140 | Level 8<br>203 Queen Street<br>PO Box 2475<br>Shortland Street<br>Auckland 1140 | Level 18<br>135 King Street<br>Sydney<br>NSW 2000 | Level 2<br>161 Collins Street<br>GPO Box 3179<br>Melbourne 3001 | PO Box 252<br>Canberra City<br>ACT 2601 |
| P +64 4 915 7590<br>F +64 4 915 7596 | P +64 9 909 5810<br>F +64 9 909 5828 | P +61 2 9234 0200<br>F +61 2 9234 0201 | P +61 3 9005 1454<br>F +61 2 9234 0201 (Syd) | P +61 2 6100 6363<br>F +61 2 9234 0201 (Syd) |


www.thinkSapere.com

independence, integrity and objectivity