



# Rethinking New Zealand's food security in times of disruption

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## KEY MESSAGES

New Zealand is a net food producer, with agriculture being a key component of the economy. We produce high-volume, high-quality protein (meat and dairy) and some fruits (kiwi, apples and grapes) in abundance.

However, there are certain key foods consumed in large quantities that cannot be grown in New Zealand, or for which we do not produce enough to meet domestic needs. These at-risk commodities include sugar, wheat, maize, rice, and coffee, which are staples in the New Zealand diet or for livestock production and are not easily substitutable. Furthermore, these foods are imported from only a small number of places, so any disruption in trade flows or production in those countries will severely affect New Zealand's food security.

Looking to the future, changes in food production or consumption patterns for vegetables and fruits, in which we are now largely self-sufficient, will be required to meet projected population growth.

Focus areas for improving New Zealand's food security include:

- Addressing consumer issues, such as meeting out-of-season demand and cultural requirements, increasing urban food production, and reducing food waste
- Exploring opportunities for greater domestic production of at-risk commodities
- Protecting versatile soils that produce many of the perishable food products important for the domestic market and whose production areas are under pressure from urban expansion.
- Balancing production of export commodities and local food consumption demands in land-use decisions

New Zealand's agricultural sector is seeking to transition from being a producer of lower value agricultural commodities to a producer of premium products for the global market.<sup>1</sup> This shift is driven by a vision of higher levels of economic well-being being realised with a lower environmental footprint.<sup>2</sup> Over the last decade, research

and policy advice have focused on how to achieve this transition with minimal adverse effects on our economy and communities.<sup>3</sup>

The focus on premium products for the global market<sup>4</sup> has meant New Zealand's domestic food security (Box 1) has not been a key feature of agricultural sector strategies or a key national policy driver. However, times are changing, and communities and regions are re-focussing on opportunities to secure sustainable local food supplies. Arguably, we should be paying more attention to food security at a national level. Climate change-induced droughts and floods temporarily change global and local food production patterns; crises, such as the COVID-19 pandemic, disrupt domestic and international food supply chains;<sup>5</sup> and the continued loss of versatile soils to urban development further restricts the capacity to produce some products domestically.<sup>6</sup> These, among other trends, affect New Zealand's food security.

### Box 1. Defining food security

*Food security* describes the access to sufficient safe and nutritious food for the whole nation, at all times – even in times of crisis.<sup>7</sup>

A nation's food security can be considered at risk when the supply of food (i.e. domestic food production plus food imports and minus food exports) is less than its population's food demand (i.e. domestic food consumption). In this policy brief, we provide a high-level overview of the state of New Zealand's food security and potential risks to food security. We document New Zealand's food imports that represent a large proportion of domestic consumption, and where they come from, to highlight at-risk food products. We also document New Zealand's food production for domestic consumption and export, and note some of the key export markets. Subsequent policy briefs will provide deeper analysis into some issues that may affect our food security as well as examine potential actions to improve New Zealand's food security.

## MOST FOOD PRODUCED IN NEW ZEALAND EXCEEDS DOMESTIC NEEDS AND IS EXPORTED

For decades New Zealand has sustained a strong agriculture-based economy with food products produced in large quantities and mostly exported to the rest of the world. New Zealand flagship food exports include dairy products (e.g. milk powder, cheese, and butter), red meat, and some fruit and vegetable products (e.g. kiwifruit, apples, and potatoes).

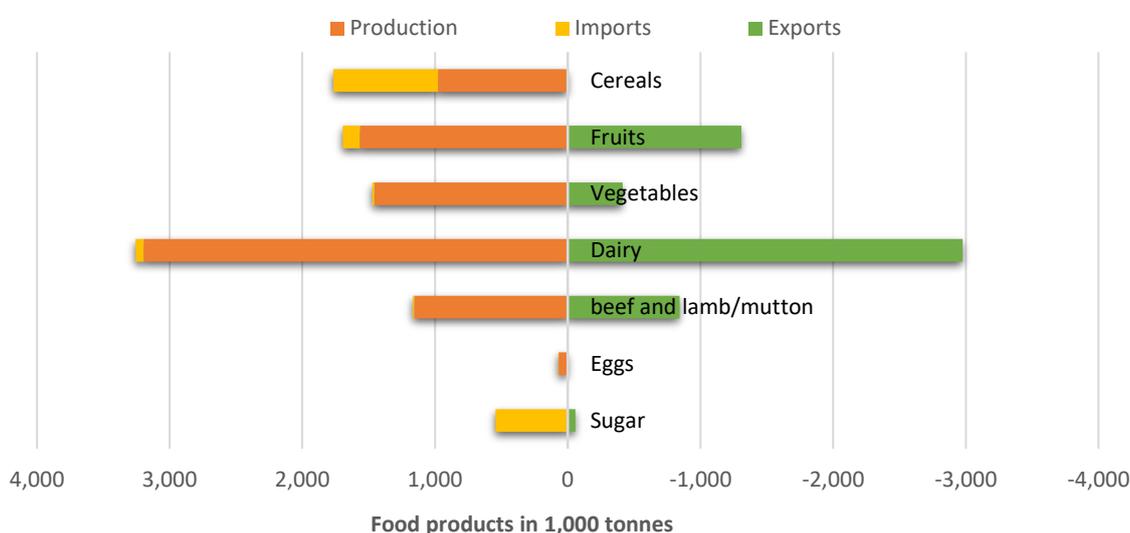
In 2018,<sup>8</sup> an estimated 95% of all dairy products and 74% of all beef and lamb/mutton products were exported (Fig. 1). The primary export destinations for dairy products are China (28%), US (9%), and Australia (7%), and for beef and lamb products China (25%), US (21%), and the EU (excluding the UK) (17%). Despite pressures to de-intensify livestock farming to meet freshwater regulations and

climate change targets, it is reasonable to assume that New Zealand will continue to produce sufficient meat and dairy for the domestic market as well as for export. New Zealand is also self-sufficient in eggs, producing about one billion eggs annually, with about 30 million being exported. The large export volumes for livestock products means these products are a low food security risk for New Zealand.

### Some key food products for New Zealand are imported

To meet domestic needs, New Zealand imports relatively large volumes of sugar (Fig. 1) and some cereals (Figs 1 and 2). In 2018,<sup>9</sup> approximately half a million tonnes of sugar were imported for direct consumption and food processing (e.g. beer and bread); with most coming from Australia (201 kt), United States (54 kt), Thailand (46 kt), and the EU (40 kt).

**Figure 1. Domestic food production, exports, and imports in 2018**

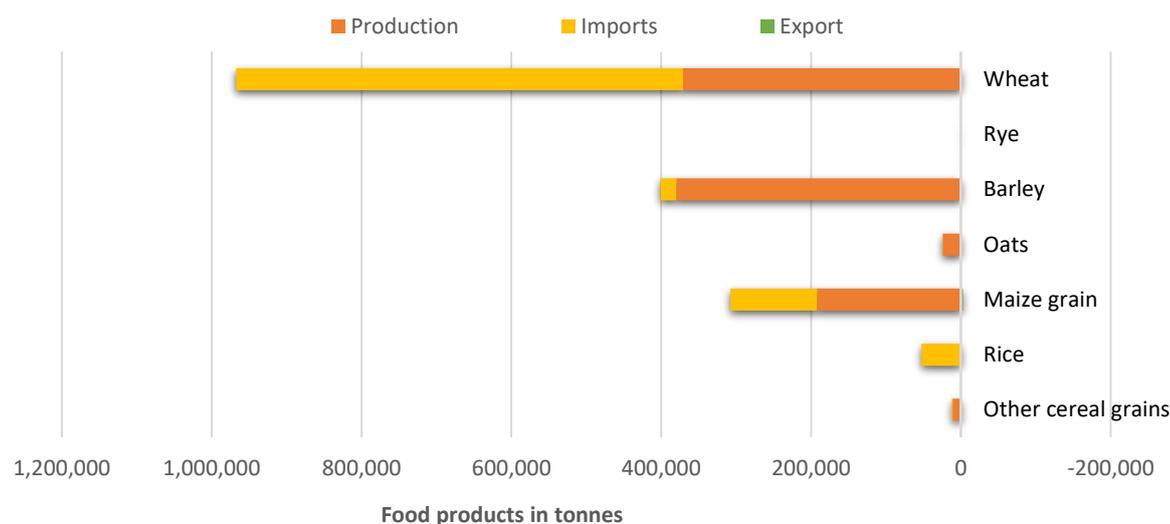


Source: Statistics NZ,<sup>9,10</sup> MPI outlook report,<sup>11</sup> Beef and Lamb NZ,<sup>12</sup> DairyNZ,<sup>13</sup> and horticulture fresh facts report<sup>14</sup>

Although New Zealand produces about one million tonnes of cereal grains, the limited land area suitable for cereal cropping and competition from other production systems (e.g. dairy) means New Zealand imports almost an equivalent amount to meet domestic demand. Cereals are used for food products and livestock feed. Wheat and barley are the main crops grown in New Zealand, followed by maize and oats (Fig. 2). New Zealand produces

approximately 296 kt of feed wheat, 81 kt of milling wheat, 192 kt of maize, 309 kt of feed barley, and 63 kt of malting barley annually. Oats production is relatively small at approximately 13.4 kt for milling oats and 4.1 kt for feed oats.<sup>15</sup> New Zealand cereal and grain exports are minimal (~ 3.6 kt). Approximately 22% of cereals produced domestically are used directly in food products; the remainder is used for livestock feed.

**Figure 2. Cereal production, imports, and exports in 2018**



Source: Statistics NZ<sup>9,10</sup>, and MPI outlook report<sup>11</sup>

Wheat constitutes the largest volume of cereal imports, followed by maize, rice, and barley. Australia provides the bulk of our cereal imports (89% of our wheat, almost all of our barley, and 35% of our rice; Table 1). We import 59% of our maize from the European Union and 40% from the United States. Only rice has a diversified supply chain. It is the lack of diversification in cereal supply that is one food security risk for New Zealand. Any disruption in one trade channel could mean we no longer have sufficient access to

cereal grains to meet domestic needs at an affordable price.

Steps could be taken to reduce this risk, such as reducing food waste. To put this risk in perspective, approximately 320 kt of bread is made from domestically produced and imported wheat. In 2018, an estimated 17.7 kt of bread and 4 kt of rice was wasted by New Zealand households.<sup>16</sup> Such steps, though small, are a step in the right direction.

**Table 1. Cereals imports in 2018**

Product	Country of origin	Quantity: tonnes	Percent of total quantity imported: %
<b>Wheat</b>	Australia	530,623	89%
	South America	64,165	11%
	other	1,557	0%
<b>Barley</b>	Australia	21,201	99.6%
	European Union	87	0.4%
<b>Maize (corn)</b>	European Union	68,709	59%
	United States	46,566	40%
	South America	171	0.1%
	Australia	132	0.1%
	Other	280	0.2%
<b>Rice</b>	Australia	18,673	35%
	Thailand	12,834	24%
	India	7,642	15%
	US	4,042	8%
	Pakistan	3,081	6%
	Viet Nam	2,910	6%
	Other	3,480	7%

Source: Statistics NZ<sup>9</sup>; rounding may mean some percentages do not add to 100%.

## NEW ZEALAND PRODUCTION AND IMPORTS OF FRUIT AND VEGETABLE PRODUCTS VARIES

Fruit and vegetable products in New Zealand can be classified into three main categories: 1) products produced in excess of domestic demand with much exported (e.g. apples, kiwifruit, wine); 2) products requiring some importation to meet domestic demand (e.g. citrus, pears and nuts); and 3) products not produced in New Zealand or produced in very low quantities (e.g. bananas, pineapples, dates and coffee).

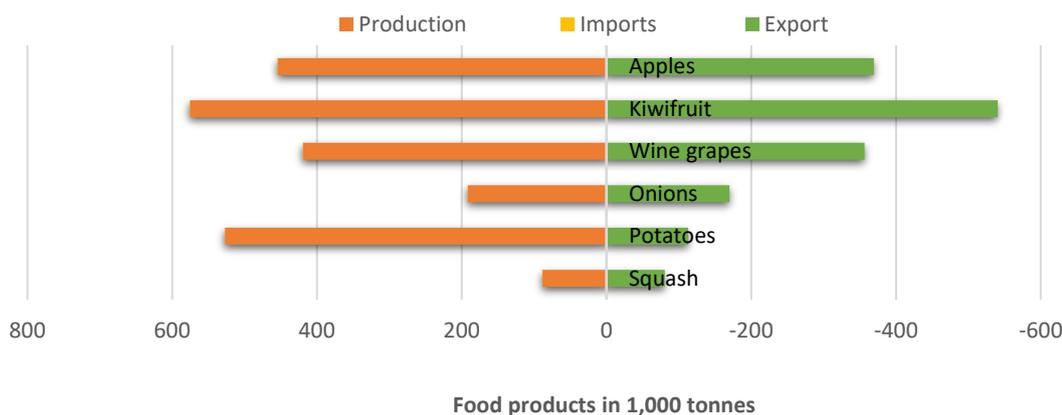
### 1) Fruit and vegetables exported

New Zealand's largest fruit exports are apples, kiwifruit, and grapes as wine, with smaller export volumes of avocados, persimmons, and berryfruits (Figs 3 & 4). Apple production is increasing as a result of productivity improvements and expansion of planted area.<sup>14,17</sup> New apple varieties have achieved success in Asian markets.<sup>17</sup> The apple industry, like many other horticultural crops and some livestock sectors, relies on migrant labour, particularly from the Pacific Islands. Any disruption in the availability of foreign workers

could impact the harvest of horticultural crops, reducing supply and potentially putting at risk access to these fruit and vegetables for both domestic consumption and export.

Over the last two decades, kiwifruit production and exports have been increasing, although with a slight stagnation in the 2014/15 season.<sup>14</sup> Main export markets are the EU (28%), China (25%), and Japan (21%).<sup>14</sup> Free trade agreements have reduced trade tariffs and increased the access of New Zealand kiwifruit to Asian markets such as Japan and South Korea.<sup>11</sup> Wine exports are also increasing in volume and value. International demand for premium New Zealand wine has triggered the expansion of domestic production. The biggest offshore markets for New Zealand wine are US (31% of total export value), UK (23%), and Australia (21%).<sup>14</sup>

**Figure 3. Production, imports, and exports of major fruit and vegetables commodities in 2018**

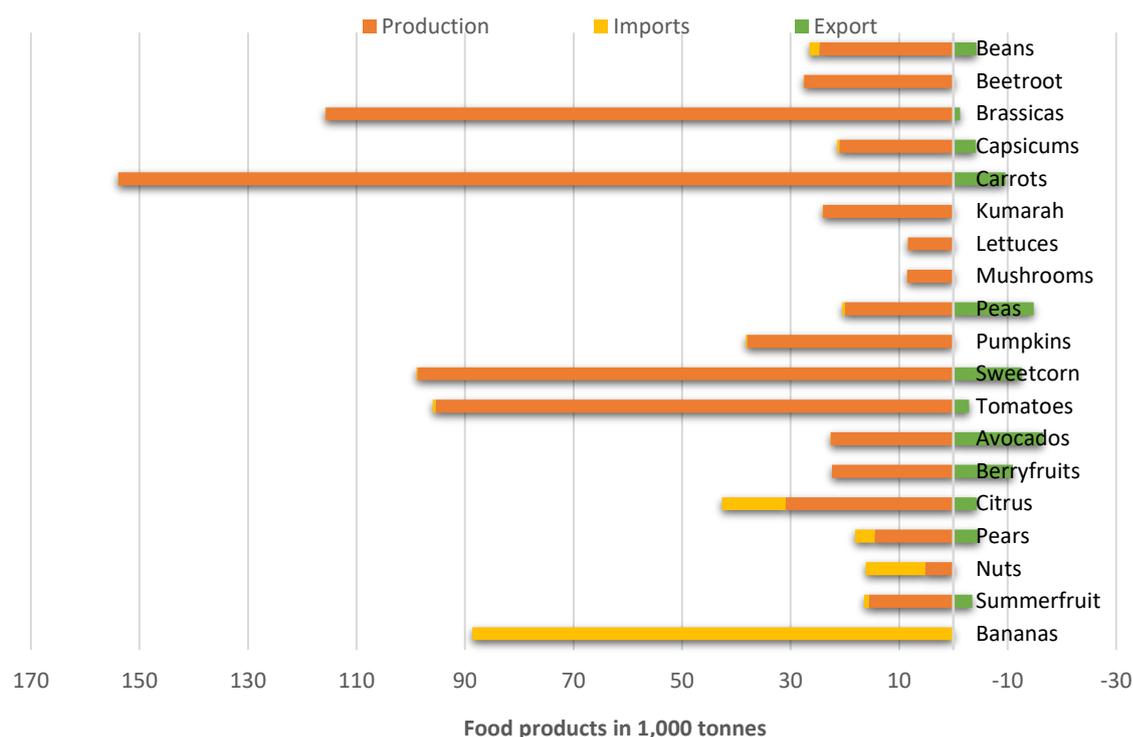


Source: Statistics NZ<sup>9,10</sup>, MPI outlook report,<sup>11</sup> and horticulture fresh facts report<sup>14</sup>

Onions, potatoes, and squash are the largest vegetable exports for New Zealand (Fig. 3). Of the 191 kt of onions grown in New Zealand, approximately 170 kt are exported. Similarly, 88 kt of squash are produced, and 80 kt are

exported. For potatoes, New Zealand produces 527 kt of potatoes and exports 113 kt. Pea production, though relatively small (~20 kt), is mostly exported (~15 kt).

**Figure 4. Production, imports, and exports of fruit and vegetables commodities in 2018**



Source: Statistics NZ,<sup>9,10</sup> MPI outlook report,<sup>11</sup> and horticulture fresh facts report<sup>14</sup>

The total export value of New Zealand fruit and vegetables was approximately \$5.4 billion in 2018. Table 2 shows

New Zealand’s main export markets for fruit and vegetables.

**Table 2. Main export markets for NZ fruit and vegetables**

Destination	Export value: million dollars	Percent of total fruit and vegetable exports: %
Continental Europe	914	17
Australia	815	15
USA	713	13
China	627	11
Japan	595	11
UK	472	9
Taiwan	244	4
Canada	157	3
Korea	116	2
Hong Kong	97	2

Source: Horticulture fresh facts report<sup>14</sup>

## 2) Fruit and vegetables both produced and imported

In this category, the dependency on imports to satisfy domestic consumption differs between products. For example, New Zealand grows approximately 30 kt of citrus fruit and imports a further 11 kt, and grows approximately 13.8 kt of pears, importing approximately 3.6 kt. New Zealand imports more than twice the amount of nuts (~11

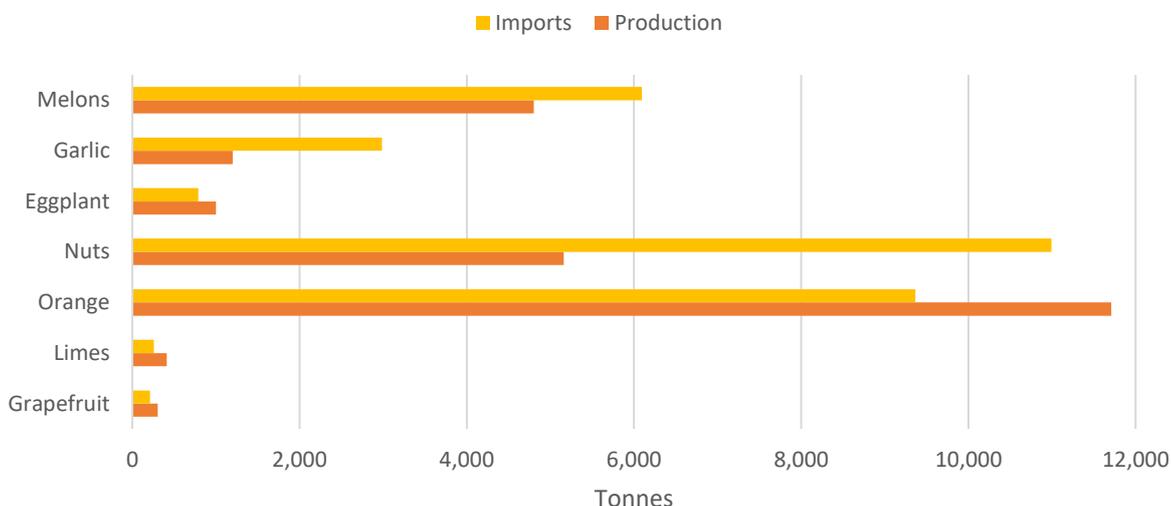
kt) that it produces (~5 kt). Within citrus, there are different levels of import dependency. For example, relative to domestic production, New Zealand imports more oranges (11 kt produced; ~9 kt imported) than lemons (6 kt produced; 1.5 kt imported), and does not import mandarins.

In general, New Zealand’s dependence on vegetable imports is low. The exceptions are garlic and melons, for which imports exceed production. New Zealand produces

approximately 1.2 kt of garlic and imports a further 3 kt, and produces 4.8 kt of melons with a further 6 kt imported. Domestic eggplant consumption also depends on imports but to a lesser extent (1kt produced; ~0.8 kt imported). The

highest at-risk products for food security in this category are grapefruit, limes, oranges, and nuts, as well as eggplant, garlic, and melons (Fig. 5). Some imports will also reflect out-of-season demand for some of these products.

**Figure 5. Production and imports of at-risk fruit and vegetable products**



Source: Statistics NZ<sup>9,10</sup> and horticulture fresh facts report<sup>14</sup>

**3) Fruit and vegetables not produced or produced in small quantities in New Zealand**

Some fruit and vegetables are almost entirely imported, especially those that cannot be grown in the New Zealand climate, such as coffee, banana, pineapple, and dates. NZ imports approximately 14 kt of coffee annually, primarily from Brazil (2.6 kt), Vietnam (2.3 kt), Colombia (1.9 kt), and Papua New Guinea (1.5 kt). These products are high risk products for food security. Any trade or production disruptions in these countries will impact on the availability of these products for domestic consumption.

Overall, the greatest food security risks for New Zealand are for those food products with high import volumes (or those where imports are a high percentage of consumption) and where there are domestic production constraints, such as climate or sufficient suitable land area. Currently, sugar, cereals, and coffee present the greatest risks. These are staple or popular foods that are not readily substitutable.

**NEW ZEALAND'S FOOD CONSUMPTION NOW AND IN THE FUTURE**

The New Zealand diet is diverse, covering many food groups including bread, pasta, and other grain- based foods; dairy products (milk, cheese, and butter); different types of meat (chicken, pork, beef, and lamb); seafood; fruit

and vegetables; eggs; and sugar. Based on per capita food consumption,<sup>12,18</sup> food consumption for New Zealand in 2018 was estimated at around 305 kt of milling wheat used for bread, 811 kt of vegetables, 422 kt of fruit, and 84 kt of beef (Table 3). Coffee consumption in New Zealand is among the highest in the world at about 0.94 cups/person/day.<sup>19</sup> This translates to approximately 13.7 kt of coffee consumed annually.<sup>20</sup> The total consumption of all food groups (shown in Table 3) is estimated at about 2.46 million tonnes.

With population projections of 5.38 million in 2028 and 5.76 million in 2038,<sup>21</sup> New Zealand's food demand will increase (Table 3), putting further pressure on our food system. For instance, there may be greater pressure put on vegetable production as expected future domestic demand for vegetables will be just met by current production levels; for some vegetable products, however, domestic production may be insufficient. Eggs and chicken meat are other products where expected future domestic demand is greater than current production levels. This poses some potential challenges for the affordability of some food products in the future unless domestic production increases or the quantity exported or wasted reduces.

**Table 3. Total New Zealand 2018 food consumption and projected 2028 and 2038 food consumption<sup>1</sup>**

Food components	Production kt (for domestic market <sup>2</sup> /exported)	Consumption kt (kt of consumer waste)		
	2018	2018	2028	2038
Dairy	3,196 (220/2,976)	279 (13)	310	332
Fruit	1,566 (257/1,309)	422 (77)	468	501
Vegetables	1,458 (1,044/415)	811 (74)	899	962
Milling wheat	81 (81/0)	305 (18)	339	363
Sugar	0 (0/57) <sup>3</sup>	225 (NA)	250	267
Chicken meat	240 (232/8)	235 (17)	260	279
Lamb and mutton	478 (70/408)	28 (NA)	31	33
Beef	680 (245/435)	84 (7)	94	100
Eggs	68 (66/2)	67 (5)	75	80
<b>Total</b>	<b>7,768 (2,216/5,610)</b>	<b>2,460 (211)</b>	<b>2,725</b>	<b>2,918</b>

Source: Our own estimation based on 2009 per capita food consumption for New Zealand 12 18

<sup>1</sup> Projected food consumption is based on 2018 food consumption and projected population; potential changes in food preferences were not taken into account.

<sup>2</sup> Proportion of domestic production available for the domestic market, calculated as production less exports. This value does not include imports, stocks from previous years, and production waste (losses during transportation and storage).

<sup>3</sup> Some of the imports are re-exported.

Food waste is noted as a significant issue in the fruit and vegetable sector.<sup>16</sup> It is estimated that about 77 kt of fresh fruit and 74 kt<sup>16</sup> of fresh vegetables are wasted each year as consumer leftovers. Half of all consumer food waste is fresh fruit and vegetables. Consumer waste from potatoes and lettuce alone was estimated at 12 kt and 5 kt<sup>16</sup> in 2018. Similarly, substantial consumer fruit waste occurs: approximately 17.8 kt, 7.6 kt, and 22 kt of orange/mandarin, apples, and bananas, respectively, are wasted annually.<sup>16</sup>

### TAKING STOCK OF OUR FOOD SECURITY RISKS

New Zealand produces an abundance of food – particularly high value proteins – which enables us to meet domestic demand while exporting significant volumes. New Zealand will always need to import foods that cannot be grown here. However, steps can be taken to improve the resilience of domestic supply and reduce the existing or future reliance on imports for many key food products. This policy brief focused on identifying risks to New Zealand's food security to highlight areas of concern to be addressed in future Briefs. Some actions that could be taken to address potential food security risks include:

- Promote greater domestic production of more at-risk commodities, particularly wheat, nuts, and some fruit (i.e. grapefruit, limes, and oranges) and vegetables (i.e. eggplant, garlic, and melons).
- Promote diversification in production systems, e.g. increase urban or garden production of perishable at-risk commodities, such as citrus fruit (grapefruit, limes, and oranges), eggplants and melons, or changes in consumption patterns, e.g. less out-of-season food consumption.
- Protect versatile soils that produce many of the perishable food products important for the domestic market.
- Reduce food waste, especially perishable vegetable food products and bread and rice, where we are exposed in terms of food security due to large import volumes.

These actions, while not exhaustive, provide some focus areas for improving New Zealand's food security.

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<sup>1</sup> Pawson E 2018. The new biological economy: how New Zealanders are creating value from the land. Auckland: Auckland University Press.

<sup>2</sup> *ibid.*

<sup>3</sup> BERG 2018. Final report of the Biological Emissions Reference Group. 56 p.

<sup>4</sup> MPI 2019. MPI Strategic Plan 2019 – Year 1. 24 p. Retrieved from: <https://www.mpi.govt.nz/about-us/our-strategy/> (accessed June 2020).

<sup>5</sup> ANZ 2020. Difficult road ahead. ANZ research agri-focus report. 23 p.

<sup>6</sup> Curran-Cournane F, Vaughan M, Memon A, Fredrickson C 2014. Trade-offs between high class land and development: Recent and future pressures on Auckland's valuable soil resources Land Use Policy 39: 146–154.

<sup>7</sup> Adapted from definitions from the World Food Summit 1996, Rome Declaration on World Food Security and FAO 2006. Food security, Policy brief, issue 2. Rome, Italy: FAO. Retrieved from [http://www.fao.org/fileadmin/templates/faoitally/documents/pdf/pdf\\_Food\\_Security\\_Concept\\_Note.pdf](http://www.fao.org/fileadmin/templates/faoitally/documents/pdf/pdf_Food_Security_Concept_Note.pdf) (accessed June 2020).

<sup>8</sup> We used 2018 as the base year for comparison as this is the most recent year where all relevant data are fully compiled.

<sup>9</sup> Statistics New Zealand 2018. Imports and exports tables. Retrieved from [www.stats.govt.nz](http://www.stats.govt.nz) (accessed June 2020).

<sup>10</sup> Statistics New Zealand 2018. Agricultural production statistics. Retrieved from [www.stats.govt.nz](http://www.stats.govt.nz) (accessed June 2020).

<sup>11</sup> MPI 2018. Situation and outlook for primary industries. Retrieved from <https://www.mpi.govt.nz> (accessed June 2020).

<sup>12</sup> Beef and Lamb NZ 2019. Compendium of farm facts, 43<sup>rd</sup> edition, publication no. P19012. 27 p.

<sup>13</sup> DairyNZ 2019. QuickStats about dairying – NEW ZEALAND.

<sup>14</sup> Fresh Facts 2018. Fresh Facts – New Zealand Horticulture. Report by Plant & Food Research.

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<sup>15</sup> Foundation for Arable Research 2018. AIMI Survey of Cereal Areas and Volumes. Retrieved from <https://www.far.org.nz/> (accessed June 2020).

<sup>16</sup> WasteMINZ 2018. New Zealand food waste audits. 50 p.

<sup>17</sup> MPI 2020. Situation and outlook for primary industries. Retrieved from <https://www.mpi.govt.nz> (accessed June 2020).

<sup>18</sup> University of Otago and Ministry of Health 2011. A focus on nutrition: key findings of the 2008/09 New Zealand Adult Nutrition Survey. Wellington: Ministry of Health.

<sup>19</sup> Statista 2015. World coffee consumption by country (in liters per capita). Retrieved from <https://www.statista.com/> (accessed June 2020).

<sup>20</sup> Based on the assumption that 1 tonne could make around 100,000 cups of coffee; thus, this consumption estimate differs from the stated imported quantities.

<sup>21</sup> Statistics New Zealand 2020. Population estimates and population projection tables (2013–2043). Retrieved from [www.stats.govt.nz](http://www.stats.govt.nz) (accessed June 2020).