



Economic contribution of the New Zealand Apple and Pear Industry 2024

New Zealand Apples and Pears Inc
Final Report

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Commercial in Confidence



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Preface

This report has been prepared for New Zealand Apples & Pears by Stephen Knuckey, Aaron Gabbie and Alice Russon from MartinJenkins (Martin, Jenkins & Associates Ltd).

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Executive summary

This report provides an update on the economic contribution of the apple and pear industry at the national level and in major apple and pear growing areas of New Zealand. The report quantifies the total impact of the industry after taking into account the direct and multiplier effects of its production activities. It also describes the broader contribution of the industry to innovation, skills, sustainability and internationalisation.

Economic impacts

Table 1 below summarises the total economic impacts of the apple and pear industry for New Zealand as a whole and for the key regions.

Table 1: Apple and pear industry – total national and regional economic impacts 2023

Economic Impact Measures	Area				
	Hawke's Bay	Gisborne	Nelson/Tasman	Central Otago	Total NZ
Revenue (\$m)	\$911	\$55	356	\$60	\$1,959
Net Household Income (\$m)	\$156	\$9	60	\$10	\$340
Employment	6,414	82	3,194	122	12,820
Value added/GDP (\$m)	\$424	\$26	\$166	\$28	\$918

Source: MartinJenkins calculations

The results in Table 1 indicate that the total revenue impact of the New Zealand apple and pear industry, including its direct total production, indirect (industry purchasing) linkages, and induced (household spending) impacts, is around \$1,959 million. However, the key contribution of the industry to the national level of economic activity, as best measured by the total value added/GDP impact, is \$918 million.

The multiplier analysis generates a total employment impact for the industry of 12,820 jobs. However, this likely excludes the impact of a proportion of seasonal employment in the industry. For example, direct seasonal picking and packing employment in the industry in 2023 was estimated at 10,635 jobs.

As shown in Table 2, the main regional contributions to the direct value added or GDP of the industry nationally (\$348 million) are the Hawke's Bay (contributing \$212 million or 67% of the national figure) and Nelson-Tasman (\$92 million or 27% of the total). Central Otago and Gisborne contribute around 5% and 4% respectively to the industry's national GDP.



Table 2: Apple and pear industry – Direct GDP contribution 2023

Economic Impact Measures	Area				
	Hawke's Bay	Gisborne	Nelson/Tasman	Central Otago	Total NZ
Direct value added/GDP (\$m)	\$211.9	\$14.5	\$92.4	\$17.0	\$348.3

The apple and pear industry is a significant contributor to the Hawke’s Bay and Nelson-Tasman economies. For example, the industry ranks third highest out of ANZSIC level 4 industries for its contribution to regional GDP in the Hawke's Bay and second highest in Tasman.

Broader contribution of the industry

Innovation

The apple and pear industry is a major investor in technology, R&D and innovation. Significant investments have been made in developing smarter orchards, including modern tree structures, precision tools for pest and disease monitoring, and innovative picking platforms. Additionally, the sector has advanced high-tech packhouses with automated grading systems and palletisers, improving efficiency in sorting and packaging. The industry also supports world-class breeding programmes, such as through the industry part-owned Prevar¹, which collaborates with Plant & Food Research to develop new apple varieties and enhance breeding efficiency.

These investments have supported productivity growth in the industry, with GDP per employee growing from approximately \$26,350 in 2012 to \$64,500 in 2023. This represents a real increase of 5.7% per year on average over the period, outpacing the 0.8% per year growth in GDP per employee across all industries.²

Skills development and attraction

The industry places a strong emphasis on developing its workforce and attracting new talent. Collaborations with institutions like Massey University, EIT, and Primary ITO have resulted in specialised educational programmes and training initiatives. The industry also supports talent development and retention through programmes like the Emerging Leaders initiative and investments in initiatives to improve working conditions and remove barriers to work, such as accommodation, transportation and flexible working options.

¹ Prevar is owned by a combination of NZ Apples & Pears Inc (55%), Plant & Food Research (29%) and Apples and Pears Australia Ltd (16%)

² Real rate adjusts GDP using the producer price index; national growth in GDP per employee from <https://rep.infometrics.co.nz/new-zealand/productivity/growth>, retrieved 1 August 2024.



Pasifika development

The apple and pear industry attracts and develops the capability of workers from the Pacific through the Recognised Seasonal Employers (RSE) programme, which also has an important economic impact on Pacific economies. Previous research on RSE workers in horticulture has shown that each individual's remitted income supports on average nine other people in the Pacific, including through housing, education, living expenses and investment.

Sustainability

The sector is committed to sustainability and contributing to New Zealand's commitments to address climate change. Efforts include a significant reduction in chemical usage and a major R&D programme to further reduce or eliminate chemicals in orchards and packhouses using targeted and smart technologies. Integrated Fruit Production (IFP) methods have long been adopted, prioritising safe and environmentally friendly production practices. Between 2008 and 2019, there was an estimated 13% reduction in the carbon footprint of New Zealand's export apples across the value chain.

Internationalisation

New Zealand's apple and pear industry has seen significant growth in exports, increasing from around \$347 million in 2012 to over \$892 million in 2023, with the industry's real export growth outstripping export growth nationally. It has consistently been ranked first on international competitiveness amongst apple growing nations, contributing to New Zealand's trade reputation.

The industry has significantly shifted and diversified its export markets, with China and South-East Asia replacing the EU as major export destinations over the last decade, supporting the realisation of the benefits of New Zealand's international trade agreements. This expansion has been supported by the industry's reputation for producing ultra-low residue fruit with low biosecurity risks, and its investment in innovation, technology and new varieties.



Overview of the apple and pear industry

Production profile

This section provides an overview of key outputs of the New Zealand apple and pear industry, as context for the economic impacts of the industry nationally and regionally. It is important to note that **the data covers on-orchard production**, which includes on-orchard activities such as storage and packing, but excludes post-harvest packing and coolstores off-orchard.

As shown in Table 2, total national apple and pear production in 2023 (calendar year) was estimated at 486,450 tonnes, from a total planted area of 11,155 hectares (ha). The total production value of this output, as shown in Table 3 on the following page, was \$805.8 million.

Table 3: Apple and pear industry, key production statistics 2023

Region	Total Ha planted	% of NZ	Total production volume (kgs)	Export production volume (kgs)	Domestic production volume (kgs)	Process production volume (kgs)	Export TCEs
Hawke's Bay	7,317	66%	288,135,611	172,880,178	39,876,944	75,378,489	9,604,454
Gisborne	502	5%	17,566,599	10,944,906	3,488,400	3,133,293	608,050
Nelson-Tasman	2,528	23%	149,228,509	105,185,602	13,375,023	30,667,883	5,843,645
Central Otago	465	4%	18,201,808	14,371,830	595,407	3,234,571	798,435
Rest of NZ	343	3%	13,317,742	9,049,563	465,155	2,614,975	502,754
NZ	11,155	100%	486,450,268	312,432,080	57,800,929	115,029,211	17,357,338

Source: MartinJenkins, from AgFirst (2024), National Pipfruit Crop Estimate Report. 2023 calendar year.

Total national export production for the year was estimated at 312,430 tonnes or 64% of total production, with the balance going to domestic production (fresh fruit) (12%) and processing (24%) (Table 2).



The industry's national export production represented around 17.4 million tray carton equivalents (TCEs) (Table 2), with the total 'free alongside ship' (FAS)³ value of export production estimated at \$769 million in 2023 (Table 3).

In 2023, the Hawke's Bay accounted for 66% of the total New Zealand apple and pear planted area, with Nelson-Tasman accounting for 23%, Gisborne 5%, Central Otago 4%, and the 'rest of the country' with the balance of 3% (Table 2).

Table 4: Apple and pear industry, key production value statistics 2023⁴

Region	Farm Gate Value (\$m)	Total orchard revenue (\$m) ⁵	Total value % of NZ	Free Alongside Ship export revenue (\$m)	Export value % of NZ	Employment
Hawke's Bay	\$298.5	\$490.2	61%	\$467.8	61%	3,150
Gisborne	\$20.5	\$33.6	4%	\$32.1	4%	50
Nelson-Tasman	\$135.2	\$213.7	27%	\$204.2	27%	1,850
Central Otago	\$24.9	\$39.3	5%	\$37.6	5%	85
Rest of NZ	\$18.3	\$29.0	4%	\$27.7	4%	265
NZ	\$497.3	\$805.8	100%	\$769.3	100%	5,400

Source: MartinJenkins, based on farm gate values, total orchard values, FAS export values from Ministry for Primary Industries Pipfruit Monitoring Programme Orchard Models for 2023, and employment counts from Statistics New Zealand's business demography statistics (employment is a headcount of all salary and wage earners in apple and pear businesses (orchards) for the February reference month).

The Hawke's Bay was also estimated to account for 61% of both total orchard revenue and FAS export value, followed by Nelson-Tasman at 27%, Central Otago 5%, Gisborne 4%, and the rest of the country 4% (Table 3).

Export revenue across all the regions represents over 95% of total orchard revenue.

³ Free Alongside Ship value is the value of the good at the port of export, including the purchase price and all charges incurred in getting the good to the carrier at the port of export.

⁴ The MPI Orchard Model includes estimates of revenue and expenses for model orchards in the Hawke's Bay and Nelson-Tasman. To estimate values for other regions, we've assumed:

- Gisborne farm gate and total production values per ha, farm gate export value per ha, and export production (TCE/ha) are the same as the Hawke's Bay.
- Farm gate and total production values per ha, farm gate export values per ha, and export production (TCE/ha) in all other regions are the same as Nelson-Tasman.

⁵ Total orchard revenue includes revenue from fruit packed and sold on the local domestic market, revenue from fruit sold for processing, and export revenue at FAS.



Total industry employment was estimated at 5,400 employees, with the Hawke's Bay contributing 58% of employment, followed by Nelson-Tasman at 34%.

The employment figures in Table 3 are drawn from Statistics New Zealand's business demography statistics. These provide an estimate of the full-time and part-time headcount when businesses were surveyed in February 2023. The figures only capture seasonal workers employed during the month of the survey and, consistent with the focus on on-orchard activities (including any on-orchard storage and packing jobs), the estimates do not include packaging, storage and related employment that is located outside of orchards.

Broader industry employment

To provide the broader picture of employment in the industry (on-orchard and off-orchard), we can use labour coefficients that NZ Apples & Pears has calculated from a labour survey completed in 2021. The coefficients provide estimates for:

- permanent labour on orchard per ha planted, and for packhouse and coolstore positions and head office and corporate positions per 1000 metric tonnes (MT) of production.
- seasonable labour for picking and packing roles (both based on gross MT per person), and for thinning and pruning roles (based on ha per person).

Based on these coefficients, total permanent employment for the apple and pear industry was estimated at just over 3,650 in 2023, with the Hawke's Bay (63%) and Nelson-Tasman (27%) contributing most of this. In addition, in 2023 there was an estimated seasonal workforce of:

- 6,565 pickers
- 4,071 packers
- 6,197 thinners
- 2,425 pruners.

Taking into account only permanent workers, seasonal pickers and seasonal packers, total employment in the broader industry in 2023 was around 12,640 workers nationwide.⁶

⁶ The focus is on these roles because there is likely to be some double counting across the roles (in that some seasonal workers can travel across regions and some can do more than one role).



Economic impact assessment

Input-Output multiplier analysis

An Economic Impact Assessment (EIA) is concerned with measuring the total multiplied economic impacts of an industry (or new activity or project) throughout a particular geographical area.

Input-Output (I-O) multiplier analysis has been used to calculate the direct, indirect, and induced economic impacts of the apple and pear industry. It is a widely used and accepted method for assessing economic impacts.

Underlying logic of multiplier analysis

An I-O analysis captures the dependencies that exist across sectors. The underlying logic of I-O multiplier analysis is that enterprises create flows of expenditure or **direct impacts** that are magnified or 'multiplied' as they flow on to the wider economy. This happens in two ways:

- **indirect impacts** – this incorporates both 'backward linkages' to suppliers and 'forward linkages' to users. Backward linkages refer to apple and pear enterprises purchasing materials and services from supplier firms, who in turn make further purchases from their suppliers, and so forth. Forward linkages occur when businesses purchase the apple and pear industry's output (for example, purchase apples and pears from an orchard) and process this into additional goods and service (for example, into juice).
- **induced impacts** – employees in the enterprises and in firms supplying services are paid wages and the enterprises generate profits, which are then spent on consumption.

The total economic impact is the sum of the direct, indirect, and induced impacts.

The different effects are summarised as multipliers.

Multipliers

National and regional multipliers are used to capture the indirect and induced impacts at a national or regional level. Multipliers are derived from the national I-O tables published by Statistics New Zealand and the regional I-O tables are supplied by Butcher Partners Limited.

The size of the multiplier depends upon the degree of economic self-sufficiency in the area's economy or how deeply embedded an industry is in a region. The more self-sufficient a region or nation is or the more significantly linked an industry is an area, the higher the multiplier is likely to be. Initial expenditure is assigned to the industry where it occurs. Each industry has a different multiplier based on the average pattern of purchases of goods and services, capital formation, profits, wages, and salaries.



Measures of economic activity

I-O multiplier analysis provides calculations of four measures of economic activity – Gross Output, Household Income, Value Added and Employment.

- **Gross Output** is the value of production, which is typically a measure of gross sales revenue or turnover. It is essentially the initial expenditure incurred by the activity.
- **Net Household Income** is disposable household income left after removing taxation, savings, and superannuation.
- **Value Added or Gross Domestic Product (GDP)** is the increase in output generated along the production process or the additional value that a sector adds to intermediate inputs. Value Added is the sum of:
 - compensation of employees (salaries and wages)
 - income from self-employment
 - depreciation
 - profits and
 - indirect taxes less subsidies.
- **Employment** is a measure of the total labour demand associated with the given gross output for one year and is ideally based on FTEs. Employment multipliers are adjusted for inflation. Seasonal or part-time work, which is important in the apple and pear industry, will mean that the total employed in the industry will be much higher than FTEs.

Limitations of I-O multiplier analysis

There are limitations of regional I-O multiplier analysis that should be acknowledged. Key limitations include:

- Unlimited supply – multiplier analysis assumes that there is readily available new labour and other resources to support an increase in output, but economies often face resourcing constraints.
- Fixed prices – It is assumed that an activity will not have an impact on relative prices so, for example, suppliers will not increase prices in response to increased demand or capacity constraints.
- Additionality and displacement – the I-O multiplier analysis assumes that the activity being analysed is new activity and does not displace existing activity.
- Aggregation and accuracy of multipliers – Each industry has its own unique inputs and outputs and thus multipliers. The more aggregated the level of analysis, the less accurate these inputs and outputs become.
- Regions and boundaries – The smaller or less defined a region and its boundaries, the less accurate the multiplier analysis will be. Similarly, the easier it is to move across boundaries, the less accurate the analysis will be.



National economic impacts

As noted earlier, the estimated direct value of national apple and pear production (revenue) in 2023 was **\$805.8 million**. National I-O multipliers were applied to this figure to generate industry linkage effects from the apple and pear industry's purchases from and sales to other sectors (the indirect effects) and from the spending of income earned by those sectors in the rest of the economy (the induced effects). The total production revenue was also used to generate household income and GDP impacts, with the initial direct employment impact based on Statistics New Zealand's business demography data, as discussed earlier.⁷

The national economic impacts generated are provided in Table 4 below. It is important to note again that the data focuses on-orchard production and excludes post-harvest packing and coolstores off-orchard.

Table 5: New Zealand apple and pear industry national economic impacts 2023

Economic Impact Components	Economic Impact Measures			
	Revenue (\$M)	Net Household Income (\$M)	Employment	GDP/Value Added (\$M)
Total Orchard Direct	\$805.8	\$117.3	5,400	\$348.3
Indirect (industry purchases) effects	\$737.9	\$149.2	4,947	\$345.0
Induced (spending) effects	\$414.8	\$73.9	2,473	\$224.7
Total indirect and induced effects	\$1,152.7	\$223.1	7,420	\$569.7
Total Impacts	\$1,958.5	\$340.3	12,820	\$918.1

Source: MartinJenkins calculations

The key results to note from the table above are:

- A **direct Value Added** or **GDP** impact of **\$348 million** and **net household income impact** of **\$117 million**.
- A **Total Revenue Impact** of close to **\$1.96 billion**. This includes the direct revenue generated by the apple and pear industry of around \$806 million and flow-on industry and spending linkage impacts of \$1.15 billion.

⁷ The direct employment figure was effectively over-ridden by the Statistics New Zealand estimate. We used this employment estimate as it provided the closest approximation to FTEs in the industry. Relying on the model to generate the employment estimate from direct output resulted in an employment measure for the industry that was too low.



- A **Total Value Added or GDP** impact of **\$918 million**. This figure represents the direct and flow-on GDP impacts of the industry on the national economy. The total impact comprises the \$348 million of direct GDP contribution from the apple and pear sector, and industry linkages and spending impacts of \$570 million.
- A **Total Employment** impact of 12,820 employees, which includes a direct contribution of 5,400 employees and total linkage impacts of 7,420 employees. As noted, the direct employment contribution was estimated by applying Statistic's New Zealand employment estimates from the Business Demography survey. This is likely to be a conservative figure because it will not include the full FTE contribution of seasonal labour.
- A **Total Net Household Income** impact of around **\$340 million**. This includes a direct contribution of \$117 million and total indirect and induced effects of \$223 million.
- **Indirect effects** represent close to **65%** of the total additional (indirect and induced) revenue, net household income and employment impacts, and just over **60%** of the additional GDP/value added impacts.

The direct GDP contribution of the industry represents around 0.1% of total national GDP, 2.6% of the GDP of the total agricultural sector, and **20% of the GDP of the horticulture and fruit growing sector**.

Table 5 shows the **most closely linked industries** for the national apple and pear industry, based on what is known about suppliers of intermediate goods to and purchasers of goods from the broader horticulture and fruit growing industry. Key supplying industries include agricultural support services (providing around 21.7% of the value of the industry's total production), building cleaning and other support services (including packaging services) (7.3%), polymer and rubber product manufacturing (5.4%), and fertiliser and pesticide manufacturing (3.9%). The table also shows the leading purchasing or 'forward linked' industries for apples and pears, on the assumption that these reflect the broader horticultural industry. These include beverage product manufacturing (close to 6.3% of the value of the industry's products is purchased by beverage product manufacturing), fruit and other food product manufacturing (4.8%), food and beverage services (3.8%), and accommodation (2.1%).

Table 6: Sectors most closely linked to the apple and pear industry in New Zealand

Horticulture and fruit growing top supplying and purchasing sectors (% of value of production)					
Key supplying sectors (% of A&P's inputs)			Key purchasing sectors (% of A&P's outputs)		
#	Sector	%	#	Sector	%
1	Agriculture, forestry & fishing support services	21.7%	1	Beverage product manufacturing	6.3%
2	Building cleaning, pest control and other support services	7.3%	2	Fruit, oil, cereal and other food product manufacturing	4.8%
3	Polymer product and rubber product manufacturing	5.4%	3	Food and beverage services	3.8%



4	Fertiliser and pesticide manufacturing	3.9%	4	Accommodation	2.1%
5	Banking and financing	3.4%	5	Meat and meat product manufacturing	2.0%
	Top 5 supplying sectors	41.6%		Top 5 purchasing sectors	19.0%
	Imports	10.7%		Exports	57.1%

Source: MartinJenkins, from Statistics New Zealand National Accounts Input-Output Tables, Year ended March 2020. The proportion of supplying sectors only includes total use (that is, industry inputs and imports, and excludes household spending and savings, operating surplus, consumption of fixed capital, and taxes).

Note that a sizeable proportion, **57%**, of the value of the output from the horticulture and fruit growing industry is exported.

As the table above is based on inter-industry linkages for the broader horticultural and fruit growing industry, it is only indicative for the apple and pear sector. Data from Statistics New Zealand on the use of products indicates that **a higher proportion, 78%, of the value of apple and pear products is exported**, and that key purchasing sectors are food and beverage services (7% of the value of apple and pear products), accommodation (4%), specialised food retailing (0.8%), and fruit and other food product manufacturing (0.5%).⁸ Product use data is not available at the regional level.

Changes in the national impacts of the industry

Figure 1 shows how the industry's contribution to revenue and GDP has changed over the 2012 to 2023 period, and the significant impact of COVID-19 and Cyclone Gabrielle over 2020 to 2023:

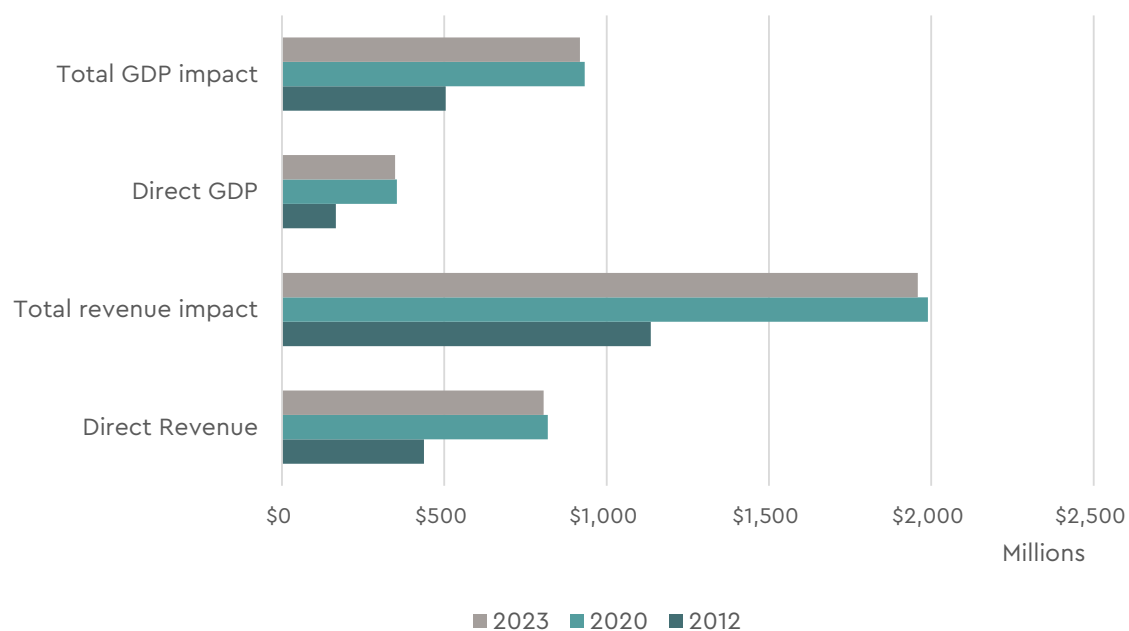
- The industry's direct revenue has grown from \$437 million to \$806 million or by 84% over 2012 to 2023 (not inflation adjusted), or in real terms by 3.0% per year on average.⁹ However, over 2012 to 2020, the industry's direct revenue grew by 8.2% per year on average. Revenue has declined by around 0.5% per year since 2020.
- The industry's direct GDP has grown from \$166 million to \$348 million or by 110% over the full period (not inflation adjusted) and in real terms has increased by 4.2% per annum. However, direct GDP was growing by 9.9% per year on average over 2012 to 2020 but subsequently declined by around 0.5% per year over 2020 to 2023.
- The total GDP impact of the apple and pear industry, including indirect and induced effects, has increased from \$505 million in 2012 to \$918 million in 2023, representing an 82% increase over the period (not inflation adjusted), and in real terms has increased by around 2.9% per year on average. Again, the estimated total GDP impact declined over 2020 to 2023.

⁸ Statistics New Zealand National input-output tables: Year ended March 2020.

⁹ The producer price index was used to adjust for inflation.



Figure 1: Changes in the impacts of the apple and pear industry between 2012 and 2023



Source: MartinJenkins based on Ministry for Primary Industries Pipfruit Monitoring Programme Orchard Model data for 2012, 2020 and 2023, and I-O tables and multipliers for 2012 and 2020.



Regional economic impacts

Hawke's Bay economic impacts

The estimated total direct value of Hawke's Bay apple and pear production (revenue) was **\$490.2 million** in 2023, which represented 61% of New Zealand's overall apple and pear revenue. Regional I-O multipliers were applied to this figure to generate industry linkage effects. The total production revenue was also used to generate household income and GDP impacts, with the initial direct employment impact based on Statistics New Zealand's data.

The regional economic impacts of the apple and pear industry for the Hawke's Bay are provided in Table 6 below.

Table 7: Hawke's Bay apple and pear industry economic impacts 2023

Economic Impact Components	Economic Impact Measures			
	Revenue (\$M)	Net Household Income (\$M)	Employment	GDP/Value Added (\$M)
Total Orchard Direct	\$490.2	\$71.3	3,150	\$211.9
Indirect (industry purchases) effects	\$295.0	\$62.2	2,379	\$138.8
Induced (spending) effects	\$125.8	\$22.6	884	\$73.3
Total indirect and induced effects	\$420.8	\$84.8	3,264	\$212.0
Total Impacts	\$911.0	\$156.1	6,414	\$423.9

Source: MartinJenkins calculations

The key results from the table are:

- A **Total Revenue Impact** of **\$911 million**. This includes the direct orchard revenue of just over \$490 million and flow-on industry and spending linkage impacts of around \$421 million.
- A total **Value Added or GDP** impact of **\$424 million**. This figure represents the direct and flow-on GDP impacts of the industry on the Hawke's Bay's regional economy. This total impact comprises \$212 million of direct GDP contribution from the apple and pear sector, and industry linkages and spending impacts of \$212 million.
- A total **Employment** impact of 6,414 employees. This includes a direct contribution of 3,150 employees and total linkage impacts of 3,264 employees.
- A total **Net Household Income** impact of **\$156 million**, which includes a direct contribution of \$71 million and total indirect and induced effects of close to \$85 million.



- Indirect effects represent between **70-73%** of the additional (indirect and induced) revenue, net household income and employment impacts, and **65%** of the additional GDP/value added impacts.

The apple and pear industry is the **third highest contributor to the region's GDP out of all ANZSIC level four industries**. It contributes 2% of regional GDP, 37% of the region's agricultural GDP, and **77% of the region's horticulture and fruit growing GDP**.

Table 7 shows the **most closely linked industries** for the Hawke's Bay apple and pear industry, based on what is known about suppliers of intermediate goods to and purchasers of goods from the broader horticulture and fruit growing industry. Key supplying industries include agriculture, forestry and fishing support services (providing around 21.7% of the value of the industry's total production in the region), building cleaning and other support services (including packaging services) (6.1%), and fertiliser and pesticide manufacturing (3.4%). The table also shows the leading purchasing or 'forward linked' industries for apples and pears in the Hawke's Bay, on the assumption that these reflect the broader horticultural industry. These include beverage product manufacturing (close to 2.1% of the value of the industry's products is purchased by beverage product manufacturing in the region), fruit and other food product manufacturing (1.5%), and meat and meat product manufacturing (around 1%).

Table 8: Sectors most closely linked to the apple and pear industry in the Hawke's Bay

Horticulture and fruit growing top supplying and purchasing sectors (% of value of production)					
Key supplying sectors (% of A&P's inputs)			Key purchasing sectors (% of A&P's outputs)		
#	Sector	%	#	Sector	%
1	Agriculture, forestry and fishing support services	21.7%	1	Beverage product manufacturing	2.1%
2	Building cleaning, pest control and other support services	6.1%	2	Fruit, oil, cereal and other food product manufacturing	1.5%
3	Fertiliser and pesticide manufacturing	3.4%	3	Meat and meat product manufacturing	1.0%
4	Non-residential property operation	3.4%	4	Horticulture and fruit growing	1.0%
5	Road transport	2.8%	5	Sheep, beef cattle and grain farming	0.5%
Top 5 supplying sectors		37.4%	Top 5 purchasing sectors		6.1%
International and regional imports		29.4%	International and regional exports		89.5%

Source: MartinJenkins, from Butcher Partner input-output tables. The proportion of supplying sectors only includes total use (that is, industry inputs and imports, and excludes household spending and savings, operating surplus, consumption of fixed capital, and taxes).



Note that the vast majority of the value of the horticulture and fruit growing industry's output in the Hawke's Bay is exported outside of the region (around **90%**).

As the table above is based on inter-industry linkages for the broader horticultural and fruit growing industry, it is only indicative for the apple and pear sector in the Hawke's Bay.

Gisborne economic impacts

The estimated total direct value of Gisborne's apple and pear production (revenue) was **\$33.6 million** in 2023, which represented 4% of New Zealand's overall apple and pear revenue. Regional I-O multipliers were applied to this figure to generate industry linkage effects. The total production revenue was also used to generate household income and GDP impacts, with the initial direct employment impact based on Statistics New Zealand's data.

The regional economic impacts of the apple and pear industry for Gisborne are provided in Table 8 below.

Table 9: Gisborne apple and pear industry economic impacts 2023

Economic Impact Components	Economic Impact Measures			
	Revenue (\$M)	Net Household Income (\$M)	Employment	GDP/Value Added (\$M)
Total Orchard Direct	\$33.6	\$4.9	50	\$14.5
Indirect (industry purchases) effects	\$15.1	\$3.3	23	\$7.3
Induced (spending) effects	\$6.1	\$1.1	8	\$3.7
Total indirect and induced effects	\$21.1	\$4.4	32	\$11.0
Total Impacts	\$54.8	\$9.3	82	\$25.5

Source: MartinJenkins calculations

The key results to note from the table above are:

- A **Total Revenue Impact** of close to **\$55 million**. This includes the direct revenue generated by the apple and pear industry of around \$34 million and flow-on industry and spending linkage impacts of \$21 million.
- A total **Value Added or GDP** impact of **\$25.5 million**. This figure represents the direct and flow-on GDP impacts of the industry on Gisborne's regional economy. The total impact comprises \$14.5 million of direct GDP contribution from the apple and pear sector, and industry linkages and spending impacts of \$11 million.
- A total **Employment** impact of **82** employees, which includes a direct contribution of 50 employees and total linkage impacts of an additional 32 employees.



- A total **Net Household Income** impact of over **\$9 million**, which includes a direct contribution of close to \$5 million and total indirect and induced effects of more than \$4 million.
- Indirect effects represent around **71%-76%** of additional (indirect and induced) revenue, household income and employment impacts, and **67%** of additional GDP/value-added impacts.

The apple and pear industry contributes almost 1% of regional GDP in Gisborne, close to 8% of the region's agricultural GDP, and **19% of the region's horticulture and fruit growing GDP**.

Table 9 shows the **most closely linked industries** for the Gisborne apple and pear industry, based on what is known about suppliers of intermediate goods to and purchasers of goods from the broader horticulture and fruit growing industry. Key supplying industries include agriculture and other support services (providing around 21.7% of the value of the industry's total production in Gisborne), building cleaning and other support services (including packaging services) (5.4%), and non-residential property operation (3.4%). The table also shows the leading purchasing or 'forward linked' industries for apples and pears in Gisborne, on the assumption that these reflect the broader horticultural industry. These include fruit and other food product manufacturing (close to 1.4% of the value of the industry's products is purchased by fruit and other food product manufacturing in the region), sheep, beef cattle and grain farming (1%), and horticulture and fruit growing (0.7%).

Table 10: Sectors most closely linked to the apple and pear industry in Gisborne

Horticulture and fruit growing top supplying and purchasing sectors (% of value of production)					
Key supplying sectors (% of A&P's inputs)			Key purchasing sectors (% of A&P's outputs)		
#	Sector	%	#	Sector	%
1	Agriculture, forestry & fishing support services	21.7%	1	Fruit, oil, cereal and other food product manufacturing	1.4%
2	Building cleaning, pest control and other support services	5.4%	2	Sheep, beef cattle and grain farming	1.0%
3	Non-residential property operation	3.4%	3	Horticulture and fruit growing	0.7%
4	Road transport	2.7%	4	Beverage product manufacturing	0.7%
5	Sheep, beef cattle, and grain farming	2.0%	5	Hospitals	0.4%
	Top 5 supplying sectors	35.1%		Top 5 purchasing sectors	4.1%
	International and regional imports	25.6%		International and regional exports	91.4%

Source: MartinJenkins, from Butcher Partner input-output tables. The proportion of supplying sectors only includes total use (that is, industry inputs and imports, and excludes household spending and savings, operating surplus, consumption of fixed capital, and taxes).



Note that **over 91%** of the value of the horticulture and fruit growing industry's output from Gisborne is exported outside of the region.

As the table above is based on inter-industry linkages for the broader horticultural and fruit growing industry, it is only indicative for the apple and pear sector in Gisborne.

Nelson-Tasman economic impacts

The estimated total direct value of Nelson-Tasman's apple and pear production (revenue) was **\$213.7 million** in 2023, which represented 27% of New Zealand's overall apple and pear revenue. Regional I-O multipliers were applied to this figure to generate industry linkage effects. The total production revenue was also used to generate household income and GDP impacts, with the initial direct employment impact based on Statistics New Zealand's data.

The regional economic impacts of the apple and pear industry for the Nelson-Tasman region are provided in Table 10 below.

Table 11: Nelson-Tasman apple and pear industry economic impacts 2023

Economic Impact Components	Economic Impact Measures			
	Revenue (\$M)	Net Household Income (\$M)	Employment	GDP/Value Added (\$M)
Total Orchard Direct	\$213.7	\$31.1	1,850	\$92.4
Indirect (industry purchases) effects	\$93.0	\$20.3	932	\$45.2
Induced (spending) effects	\$48.8	\$8.9	412	\$28.2
Total indirect and induced effects	\$141.9	\$29.2	1,344	\$73.4
Total Impacts	\$355.5	\$60.3	3,194	\$165.8

Source: MartinJenkins calculations

The key results to note from the table are:

- A **Total Revenue** impact of close to **\$356 million**. This includes direct apple and pear revenue of \$214 million and flow-on industry and spending linkage impacts of \$142 million.
- A total **Value Added** or **GDP** impact of **\$166 million**, indicating the direct and flow-on GDP impacts of the apple and pear sector in the Nelson-Tasman region. This impact comprises the more than \$92 million of direct GDP contribution from the apple and pear sector, and industry linkages and spending impacts of over \$73 million.
- A total **Employment** impact of **3,194** employees. This includes a direct contribution of 1,850 employees and total linkage impacts of an additional 1,344 employees.
- A total **Net Household Income** impact of **\$60 million**, which includes a direct contribution of \$31 million and total indirect and induced effects of \$29 million.



- Indirect effects represent **66%-70%** of additional (indirect and induced) revenue, household income and employment impacts, and **62%** of GDP/value added impacts.

The apple and pear industry contributes 3% of regional GDP in Tasman, **the second highest industry contribution out of level 4 ANZSIC industries**. It represents 34% of Tasman's agricultural GDP and **54% of the region's horticulture and fruit growing GDP**.

Table 11 shows the **most closely linked industries** for the Nelson-Tasman apple and pear industry, based on what is known about suppliers of intermediate goods to and purchasers of goods from the broader horticulture and fruit growing industry. Key supplying industries include agricultural and supporting services (providing around 7.8% of the value of the industry's total production in Nelson-Tasman), building cleaning and other support services (including packaging services) (7.3%) and non-residential property operation (3.4%). The table also shows the leading purchasing or 'forward linked' industries for apples and pears in Nelson-Tasman, on the assumption that these reflect the broader horticultural industry. These include beverage product manufacturing (close to 2.4% of the value of the industry's products is purchased by beverage product manufacturing in the region), fruit and other food product manufacturing (1.0%) and horticulture and fruit growing (0.9%).

Table 12: Sectors most closely linked to the apple and pear industry in Nelson-Tasman

Horticulture and fruit growing top supplying and purchasing sectors (% of value of production)					
Key supplying sectors (% of A&P's inputs)			Key purchasing sectors (% of A&P's outputs)		
#	Sector	%	#	Sector	%
1	Agriculture, forestry & fishing support services	7.8%	1	Beverage product manufacturing	2.4%
2	Building cleaning, pest control and other support services	7.3%	2	Fruit, oil, cereal and other food product manufacturing	1.0%
3	Non-residential property operation	3.4%	3	Horticulture and fruit growing	0.9%
4	Road transport	2.9%	4	Seafood processing	0.6%
5	Basic material wholesaling	2.4%	5	Food and beverage services	0.5%
	Top 5 supplying sectors	23.7%		Top 5 purchasing sectors	5.4%
	International and regional imports	47.6%		International and regional exports	89.5%

Source: MartinJenkins, from Butcher Partner input-output tables. The proportion of supplying sectors only includes total use (that is, industry inputs and imports, and excludes household spending and savings, operating surplus, consumption of fixed capital, and taxes).

Around **90%** of the value of the horticulture and fruit growing industry's output from Nelson-Tasman is exported out of the region.



As the table above is based on inter-industry linkages for the broader horticultural and fruit growing industry, it is only indicative for the apple and pear sector in Nelson-Tasman.

Central Otago economic impacts

The estimated direct value of Central Otago's apple and pear production (revenue) was **\$39.3 million** in 2023, which is 5% of New Zealand's overall apple and pear revenue. Regional I-O multipliers were applied to this figure to generate industry linkage effects. The total production revenue was also used to generate household income and GDP impacts, with the initial direct employment impact based on Statistics New Zealand's data. The regional economic impacts for the Central Otago region are provided in Table 12 below.

Table 13: Central Otago's apple and pear industry economic impacts 2023

Economic Impact Components	Economic Impact Measures			
	Revenue (\$M)	Net Household Income (\$M)	Employment	GDP/Value Added (\$M)
Total Orchard Direct	\$39.3	\$5.7	85	\$17.0
Indirect (industry purchases) effects	\$15.6	\$3.4	29	\$7.4
Induced (spending) effects	\$5.5	\$0.9	8	\$3.4
Total indirect and induced effects	\$21.1	\$4.3	37	\$10.8
Total Impacts	\$60.4	\$10.0	122	\$27.8

Source: MartinJenkins calculations

The key results to note from the table are:

- A **Total Revenue** impact of over **\$60 million**. This includes the direct orchard revenue of \$39 million and flow-on industry and spending linkage impacts of \$21 million.
- A total **Value Added or GDP** impact of close to **\$28 million**. This figure represents the direct and flow-on GDP impacts of the industry on Central Otago's regional economy. This total impact comprises \$17 million of direct GDP contribution from the apple and pear sector, and industry linkages and spending impacts of around \$11 million.
- A total **Employment** impact of **122 employees**. This includes a direct contribution of 85 employees and total indirect and induced effects of an additional 37 employees.
- A total **Net Household Income** impact of **\$10 million**, which includes a direct contribution of close to \$6 million and total indirect and induced effects of around \$4 million.
- Indirect effects represent **74%-79%** of additional (indirect and induced) revenue, net household income, and employment impacts, and **69%** of additional GDP/value added impacts.



The apple and pear industry contributes close to 1% of regional GDP in Central Otago, 10% of the region's agricultural GDP, and more than **26% of the region's horticulture and fruit growing GDP**.

Table 13 shows the most **closely linked industries** for the Central Otago apple and pear industry, based on what is known about suppliers of intermediate goods to and purchasers of goods from the broader horticulture and fruit growing industry. Key supplying industries include agriculture and other supporting services (providing 19.1% of the value of the industry's total production in Central Otago), building cleaning and other support services (including packaging services) (4.4%) and non-residential property operation (3.4%). The table also shows the leading purchasing or 'forward linked' industries for apples and pears in Central Otago, on the assumption that these reflect the broader horticultural industry. These include beverage product manufacturing (close to 1.2% of the value of the industry's products is purchased by beverage product manufacturing in the region), horticulture and fruit growing (0.5%) and sheep, beef cattle and grain farming (0.5%).

Table 14: Sectors most closely linked to the apple and pear industry in Central Otago

Horticulture and fruit growing top supplying and purchasing sectors (% of value of production)					
Key supplying sectors (% of A&P's inputs)			Key purchasing sectors (% of A&P's outputs)		
#	Sector	%	#	Sector	%
1	Agriculture, forestry & fishing support services	19.1%	1	Beverage product manufacturing	1.2%
2	Building cleaning, pest control and other support services	4.4%	2	Horticulture and fruit growing	0.5%
3	Non-residential property operation	3.4%	3	Sheep, beef cattle and grain farming	0.5%
4	Road transport	2.5%	4	Accommodation	0.3%
5	Basic material wholesaling	2.2%	5	Food and beverage services	0.3%
	Top 5 supplying sectors	31.7%		Top 5 purchasing sectors	2.7%
	International and regional imports	48.7%		International and regional exports	94.7%

Source: MartinJenkins, from Butcher Partner input-output tables. Only Includes industry sector and import/export contributions. The proportion of supplying sectors only includes total use (that is, industry inputs and imports, and excludes household spending and savings, operating surplus, consumption of fixed capital, and taxes).

Close to **95%** of the value of the horticulture and fruit industry's output from the Central Otago region is exported outside of the region.

As the table above is based on inter-industry linkages for the broader horticultural and fruit growing industry, it is only indicative for the apple and pear sector in Central Otago.



Broader contribution of the apple and pear industry

Innovation

The apple and pear sector is a significant investor in technology, R&D and innovation. This includes investment to develop:¹⁰

- **Smarter orchards**, through the use of modern tree structures (for example, smaller trees, 2D tree systems, and enabling new technology such as crop scanning and platform harvesting); smart tools to provide precision information to better monitor and control pest and disease risks and to ensure consistent quality of product; and innovative picking platforms that make picking easier and faster.
- **High tech packhouses**, through automated grading systems (high speed scanners that photograph every apple more than 200 times to check quality), and automated palletisers to stack boxed apples.
- **World class breeding**, for example through the part industry-owned Prevar, a private joint venture company established in 2004, which works in collaboration with Plant & Food Research to deliver new apple varieties, and to test and develop novel approaches to improve breeding efficiency. Prevar has commercially licensed 17 varieties, has 36 license agreements, and more than 170 trademark registrations worldwide.¹¹

For example, over 2015 to 2020, the sector invested:¹²

- \$280 million in Orchard 2D or 'Robot-ready' growing systems, which will be nearly twice as productive as traditional growing systems.
- \$178.3 million in post-harvest/packhouse technology and automation, which has increased TCE per hour by 39% over five years.
- \$10.2 million in platforms for picking, which will enable a wider range of people to more easily undertake picking and thinning.

¹⁰ NZ Apples & Pears, "Technology and Innovation", <https://info.applesandpears.nz/our-industry/technology-and-innovation/>, retrieved 1 August 2024.

¹¹ Prevar, "About us", <https://prevar.co.nz/index.php/story/>, retrieved 1 August 2024.

¹² Gus Charteris Consulting, National Apples & Pears and Hawke's Bay Horticulture Industry Transformation Plan, 2021, <https://www.treasury.govt.nz/sites/default/files/2024-05/pc-ing-is-dr-147-nz-apples-and-pears-incorporated-horticulture-new-zealand-incorporated-attachment-1.pdf>, retrieved 1 August 2024.



The sector is also co-investing around \$7.4 million, matched by government, in the Smart and Sustainable partnership over seven years, which is seeking to develop effective options to manage pests and diseases while maintaining low or no residues. The partnership involves several CRIs, research organisations and universities. The research programme aims to reduce or eliminate chemicals in orchards and packhouses using targeted and smart technologies.¹³

The investment in R&D and innovation is showing dividends in terms of increased productivity. For example, over 2012 to 2023, estimated GDP per employee in the industry grew from around \$26,350 to \$64,500. This represented **a real increase of 5.7% per year** on average, higher than estimated GDP per employee growth across all industries (0.8% per annum).¹⁴

Skills development and attraction

The industry is also investing in developing the capability of its workforce and training for talent coming into the sector. For example, at the national level, the industry has worked with:¹⁵

- Massey University to develop the Bachelor of Horticulture Science and to link industry internships to graduate options from Massey and Lincoln Universities.
- Eastern Institute of Technology (EIT) and Primary ITO to design a Diploma in Horticulture Production (Post-harvest) for developing management skills in post-harvest operations.
- Primary ITO to design and deliver a supervisor training programme (provided to more than 200 people in 2021).

New Zealand Apples and Pears, in conjunction with other horticultural sector bodies, has also delivered an Emerging Leaders programme to support team leaders and supervisors in seven regions with support from AGMARDT and the New Zealand Fruitgrowers' Charitable Trust.¹⁶

Growers, packers and exporters have also invested in a range of initiatives to improve working conditions and to remove barriers to work. This has included the provision of accommodation and work with providers to create new accommodation solutions; providing transport from accommodation to orchards/packhouses; and providing flexible working options (for example shifts to fit in with school hours).¹⁷

¹³ NZ Apples & Pears, "Smart and Sustainable – A pathway for the future", <https://www.applesandpears.nz/LinkClick.aspx?fileticket=oDFzAynUnPY%3D&tabid=492&portalid=0&mid=1970>, retrieved 1 August 2024; Minister for Agriculture, Media release "Spray-free target for New Zealand apples and pears to boost export growth", 22 April, <https://www.beehive.govt.nz/release/spray-free-target-new-zealand-apples-and-pears-boost-export-growth>, retrieved 1 August 2024.

¹⁴ See <https://rep.infometrics.co.nz/new-zealand/productivity/growth> for the national estimates.

¹⁵ Gus Charteris Consulting, National Apples & Pears and Hawke's Bay Horticulture Industry Transformation Plan, 2021, <https://www.treasury.govt.nz/sites/default/files/2024-05/pc-ing-is-dr-147-nz-apples-and-pears-incorporated-horticulture-new-zealand-incorporated-attachment-1.pdf>, retrieved 1 August 2024.

¹⁶ NZ Apples & Pears, Annual Report, 2023, https://info.applesandpears.nz/media/nmymt0lz/nzap_annual-report_2023_fa_web.pdf, retrieved 1 August 2024.

¹⁷ Gus Charteris Consulting, National Apples & Pears and Hawke's Bay Horticulture Industry Transformation Plan, 2021, <https://www.treasury.govt.nz/sites/default/files/2024-05/pc-ing-is-dr-147-nz-apples-and-pears-incorporated-horticulture-new-zealand-incorporated-attachment-1.pdf>



The industry has also supported the development of a range of regionally-based talent initiatives. For example, in the Hawke's Bay, these have included:¹⁸

- Tu Te Wana – this programme provides horticulture training and employment opportunities to young people not currently engaged in education or employment. It teaches a combination of soft skills and horticultural skills. Pastoral care is also provided, such as transport and support into employment when the programme ends. Students are able to gain credits towards the New Zealand Certificate in Primary Industry Skills (Level 2) qualification.
- He Huarahi Hou Pilot – this pilot was designed to assist and transition young Māori sole parents into flexible seasonal work. It involved a partnership between the Ministry of Social Development, Māori Wardens, and apple company T&G. It offered flexible work hours for solo parents, as well as transport to and from work where needed. Māori wardens provided pastoral care, such as helping the parents' children to get to and from school.
- Pathways to Permanent – this programme, involving a partnership with the Ministry of Social Development, aims to upskill and grow the permanent workforce in the horticultural sector in the region. It offers a tailored personal development programme over 20 weeks covering the foundation skills that employees need to be confident and productive at work, with the aim that successful candidates will be offered permanent employment.

Supporting Pasifika development

The apple and pear industry attracts and develops the capability of workers from the Pacific through the RSE programme, bringing in workers from 11 Pacific Island nations. A survey identified that the RSE scheme supports participants' skills development in budgeting, horticulture, leadership, English and driving.¹⁹

In addition, the money these workers send back home as remittances has an important economic impact on Pacific economies. Previous research on RSE workers in horticulture has shown that workers remitted over 40 percent of their take home income, and each individual's remitted income supported on average nine other people.²⁰ Remittance earnings provide workers and their families with a regular, reliable source of income and are used to support housing, education, living expenses, investment and business opportunities.²¹

¹⁸ Gus Charteris Consulting, National Apples & Pears and Hawke's Bay Horticulture Industry Transformation Plan, 2021, <https://www.treasury.govt.nz/sites/default/files/2024-05/pc-inq-is-dr-147-nz-apples-and-pears-incorporated-horticulture-new-zealand-incorporated-attachment-1.pdf>, retrieved 1 August 2024.

¹⁹ Ministry of Business, Innovation & Employment, The Remittance Pilot Project, 2015, <https://www.immigration.govt.nz/documents/statistics/remittance-pilot-project-report.pdf>, retrieved 1 August 2024.

²⁰ As above.

²¹ As above and Bedford, C., Bedford, R. and Nunns, H, RSE Impact Study: Pacific stream report, 2020, <https://www.immigration.govt.nz/documents/statistics/rse-impact-study-pacific-stream-report.pdf>, retrieved 1 August 2024.



Sustainability

The apple and pear industry is contributing to New Zealand's commitments to address climate change. In the ten years to 2023, the industry used 70% less chemicals²² and, as noted earlier, it is also investing in R&D to further reduce or eliminate chemicals through smart technologies.

Every apple and pear grower adopts Integrated Fruit Production (IFP), which gives priority to production methods that are safe for human health and the environment. This includes integrated pest management approaches where priority is given to biological control and the use of pesticides only when pest populations exceed predetermined levels; disease management using monitoring and prediction tools so that agrichemicals are applied only where there is a justifiable need; resistance management, including adopting biological and cultural methods of pest control where possible and managing use of agrichemicals; and broader approaches to protect the environment through soil and water management.

A study estimated the extent to which key parts of the apple and pear industry value chain had reduced their carbon footprint over 2008 to 2019. The study estimated that the industry had achieved:²³

- A 19% reduction in the carbon footprint of orchards-packhouses-coolstores, due to increases in productivity and pack-out rates.
- A 21% drop in the shipping footprint of apples due to the changing mix of destination ports.
- An overall 13% reduction in the carbon footprint of New Zealand's export apples along the value chain of orchard, packhouse, coolstore and shipping.

All apple and pear growers are also GlobalG.A.P. registered, which is an internationally recognised standard that certifies that food has been produced sustainably and is consistently safe.

Internationalisation

The total value of the apple and pear industry's exports has increased from around \$347 million in 2012 to over \$892 million in 2023, an increase of 157% (not adjusted for inflation).²⁴ This represents **real growth of 6.1% per year**, compared to real growth in the value of New Zealand's exports of 1.4% per year over the same period.²⁵ Over the period, the industry's contribution to the value of New Zealand's exports has grown from 0.8% to 1.3%.

²² NZ Apples & Pears, "Sustainability", <https://info.applesandpears.nz/our-industry/sustainability/>, retrieved 1 August 2024.

²³ McLaren, S., Clothier, B., Barber, A., McNally, S., Bullen, L., Mazzetto, A., and Ledgard, S., Updating the carbon footprints for selected New Zealand agricultural products – an update for apples, kiwifruit and wine, 2021, <https://www.mpi.govt.nz/dmsdocument/51079-Updating-the-carbon-footprint-for-selected-New-Zealand-agricultural-products-an-update-for-apples-kiwifruit-and-wine>, retrieved 1 August 2024.

²⁴ Statistics New Zealand export data.

²⁵ Real rates determined by adjusting export values using the producers price index.



Through its growing export role, the industry contributes to the reputation and branding of New Zealand as an innovative and sustainable producer of primary and food products, and also supports the realisation of the benefits of New Zealand's international trade agreements.

The industry has significantly shifted and diversified its export markets over the last decade. In 2013, 37% of the value of exports went to the EU, and China represented only 2% of the value of exports. In the same year, South-East Asia and Taiwan took 21% of the value of exports.²⁶ By 2023, the EU represented only 6% of the value of exports and China was the destination for 21% of exports. South-East Asia and Taiwan took 35% of the value of exports.²⁷ Diversification has been supported by the industry's advantages in having ultra-low residue fruit, low biosecurity risks, and new licensed varieties.

When last assessed in 2018, New Zealand was ranked first out of 33 apple growing countries in an annual survey of international competitiveness, based on 23 criteria. This was the fourth year New Zealand had attained this ranking. Criteria included production efficiency (including changes in production, new varieties, planting density, average yield per hectare); industry infrastructure and inputs (including availability of storage, modern packing facilities, land, water, labour, capital, and the efficiency of distribution); and financial and market factors (including percent of production exported and average export price). The study indicated that New Zealand's investment in innovation, technology and new varieties provided a competitive edge.²⁸

²⁶ Ministry for Primary Industries, Situation and outlook for primary industries 2013, <https://www.mpi.govt.nz/dmsdocument/873-Situation-and-Outlook-for-Primary-Industries-SOPI-2013>, retrieved 1 August 2024.

²⁷ Ministry for Primary Industries, Situation and outlook for primary industries, December 2023, <https://www.mpi.govt.nz/dmsdocument/60526-Situation-and-Outlook-for-Primary-Industries-SOPI-December-2023>, retrieved 1 August 2024.

²⁸ Belrose Inc, World Apple Review 2018 Edition – The Driver for Quality, <http://www.assomela.it/document/belrose/World-Apple-Review-2018.pdf>, retrieved 1 August 2024; NZ Apples & Pears, Media release, 23 May 2018, <https://www.scoop.co.nz/stories/BU1805/S00699/nz-apple-industry-leads-the-world-four-years-running.htm>, retrieved 1 August 2024.



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