NZIER
NEW ZEALAND INSTITUTE OF ECONOMIC RESEARCH

The food and fibre workforce

Data on its size and composition

NZIER and Ministry for Primary Industries (MPI)

June 2022

About NZIER

NZIER is a specialist consulting firm that uses applied economic research and analysis to provide a wide range of strategic advice.

We undertake and make freely available economic research aimed at promoting a better understanding of New Zealand's important economic challenges.

Our long-established Quarterly Survey of Business Opinion and Quarterly Predictions are available to members of NZIER.

We pride ourselves on our reputation for independence and delivering quality analysis in the right form and at the right time. We ensure quality through teamwork on individual projects, critical review at internal seminars, and peer review.

NZIER was established in 1958.

Authorship

This paper was prepared collaboratively by Chris Nixon and Bill Kaye-Blake from NZIER and Danny Young, Mark Hampshire, Richard Lynch and Maryanne Aynsley from MPI.

The assistance of the Primary Sector Workforce Data and Forecasting Working Group is gratefully acknowledged.

How to cite this document:

NZIER & MPI 2022. The food and fibre workforce, data on its size and composition. A report for Ministry Primary Industries and the Primary Sector Workforce Data and Forecasting Working Group.

Registered office: Level 13, Public Trust Tower, 22–28 Willeston St | PO Box 3479, Wellington 6140
Auckland office: Ground Floor, 70 Shortland St, Auckland
Tel 0800 220 090 or +64 4 472 1880 | econ@nzier.org.nz | www.nzier.org.nz

Disclaimer

These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) which is carefully managed by Stats NZ. For more information about the IDI please visit

https://www.stats.govt.nz/integrated-data/

The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes and is not related to the data's ability to support Inland Revenue's core operational requirements.

Key points

The report draws together a range of information sources to provide a rich and nuanced view of the food and fibre sectors workforce.

The three components of this report are:

- The definition of the food and fibre sectors
- The count of people working in the sectors on average and over a year
- An estimate of the roles and skills levels of people working in each sector.

The food and fibre sectors have been defined by applying a value chain approach. Our framework for the food and fibre sectors divides the sectors into:

- Arable
- Dairy
- Forestry and Wood Processing
- Horticulture (including Viticulture and Winemaking)
- Pork, Poultry, Bees and Other
- Red Meat and Wool
- Seafood
- Cross-Sector activities.

Under each of these sectors, we group the associated Australian and New Zealand Standard Industrial Classification (ANZSIC06) class into *Core Production and Core Processing/Manufacturing*, *Strongly Connected*, *Relevant and Other*.

The workforce count has been derived using the Stats NZ Integrated Data Infrastructure (IDI) to give an annual average, maximum and minimum number for each ANZSIC06 class in the sectors. The monthly counts have also been presented graphically to give a visual representation of the relationship between the annual average, maximum and minimum counts. For some there is a stable workforce over a year, while for others there is a large difference between the minimum and the maximum workforce count.

The information on roles and skills has been collated from in depth interviews with industry experts and by drawing on publicly available sources for the forestry and wood processing and seafood sectors. There are many different roles in the food and fibre sectors varying from entry level to highly specialised. While there has been broad engagement with the sectors, there is more information available on some sectors than others. The source of information has varied from models of workforce demand based on production variables through to expert opinion of sector participants.

This information on the workforce count and composition will be used as the baseline for the 2032 food and fibre workforce forecasts, being produced by NZIER as part of MPI's Primary Sector Workforce Programme.

Foreword by working group

We are very pleased to present the *Food and Fibre Workforce Report - Data on its size and composition*. The report is part of our commitment to growing our knowledge base and contributes to the knowledge outcome in the *Food and Fibre Skills Action Plan 2019–2022* and the *Forestry and Wood Processing Workforce Action Plan 2020–2024*.

This report combines our industry knowledge of the food and fibre workforce with extensive analysis of official statistics to assist in developing a rich understanding of the workforce.

In undertaking this work we first focused on how we are defining the food and fibre sectors. While based on standard industry codes, we categorised the workforce both in terms of sectors and clearly defined segments of the value chain.

MPI also reviewed how they count people who are employed in the sectors. In part this was driven by the need to be able to do monthly counts to better understand how the workforce changes due to the seasonal nature of the food and fibre sectors and how this often drives large variations in demand for workers.

Finally, we combined this information kindly provided by many people across the sectors, on roles and skill levels about the workforce. This highlights the diversity of roles within the food and fibre sectors, as well as how the workforce varies between sectors and also between different parts of the value chain.

While the figures presented within the report are different to early reports, such as the *Food and Fibre Workforce: Snapshot,* we consider this analysis is a step forward as it allows a much richer and more nuanced picture to emerge.

We are confident that people will find this comprehensive data extremely useful. It is already forming the basis for some forecasting work about future needs.

Workforce Data and Forecasting Working Group

Contents

Appendices

Tables

1 Why this work?

The food and fibre sectors are a key part of the economy in New Zealand and produce a large amount of economic value. The workforce is fundamental to that production.

The Ministry for Primary Industries (MPI), in conjunction with the Primary Sector Workforce Dataset and Forecasting Working Group wants to understand the food and fibre workforce in detail. The Primary Sector Workforce Data and Forecasting Project is part of MPI's Primary Sector Workforce Programme.

The project is intended to develop and maintain for the food and fibre sectors a publicly accessible pan-sector and sector-specific skills and employment dataset and to develop workforce demand forecasts. The key motivations for the work are:

- To understand the labour needs of the sectors and provide them support to fill those needs.
- To investigate how the labour needs are changing and the drivers of change.
- To prepare for changes in the workforce and the required training.
- Ultimately, to support economic growth in the sectors and a trained, productive workforce.

This report presents the work done to define the boundaries of the food and fibre sectors and to establish a baseline of the numbers, roles and skills of the people who make up the workforce.

The project involved close collaboration between NZIER and MPI staff both on the conceptual and analytical issues and with developing the data. NZIER led the work with industry representatives which informed the role and skill level estimates and MPI led the work on the workforce counts. As the report explains, the team compiled data from different datasets from Stats NZ and extensive interviews with industry representatives. We also consulted documents from industry groups and strategy initiatives. The project received guidance from the Primary Sector Workforce Dataset and Forecasting Working Group. The result is a synthesis of many perspectives that address the question, *what is the food and fibre workforce?*

2 How to use this report

This report has 3 key sections.

What are the food and fibre sectors – describes:

- the considerations applied in determining the boundaries used to define and identify the food and fibre sectors; and
- how ANZSIC06 Class codes are utilised to form the framework that has been applied to categorise the workforce into both sectors and clearly defined segments of the value chain.

Who works in the food and fibre sectors – covers the methods used to:

- capture how the data has been sourced;
- create workforce counts; and
- classify the roles and skill levels into three distinct categories.

Food and Fibre sectors overview/detailed sectoral analysis - provides statistics and analysis of:

- average workforce counts, including maximum and minimum ranges;
- monthly workforce counts over the tax year ending March 2019; and
- details by each sector of the roles and skill levels within the workforce.

This report draws on a range of data sources to obtain a comprehensive as possible understanding of the food and fibre workforce. Each data source has its strengths and we have drawn on these. We have used the data from the research using the IDI as the basis for the workforce counts as it provides data on a consistent basis that can be readily updated as new data becomes available. We have used the data from the interviews as the basis to determine the breakdown of the skills levels within the workforce. However, in doing so we have reported the complete information from the interviews as it provides a rich source of information of the different roles within food and fibre businesses.

3 What are the food and fibre sectors?

3.1 Producing a count of the workforce has conceptual and technical issues

One issue is determining the boundaries of the *food and fibre sectors*. It is more than the *primary sectors*, which includes economic activities that produce raw materials from natural resources. These are industries like farming, fishing and forestry. Instead, the food and fibre sectors also take in activities that support the primary sectors (upstream industries) and process, distribute and sell products made from raw materials (downstream activities).

The food and fibre sectors have product-based, commodity-based, premium product-based or supply-chain-focused concepts of themselves. The wine industry, for example, understands that it relies on producing grapes in favourable locations, processing them into wine and selling the resulting premium product to local and overseas consumers.

To enable effective communication and analysis, it is essential to define and identify what industries are included in the food and fibre sectors. It is also important to clearly identify sub-groupings within the workforce, whether by sector (e.g. dairy or seafood) or by position within the value chain (e.g. production vs processing or industries providing services to producers and processes).

The definition of the food and fibre sectors needs to recognise the diversity of businesses involved while also providing a framework that can be easily applied to collect, organise and analyse information.

3.2 Using ANZSIC06 class codes to define the sectors

The key tool we have used is the Australian and New Zealand Standard Industrial Classification (ANZSIC06) captured at the geographic unit level of an enterprise. This classification covers the entire economy, dividing it into smaller and more detailed groups. At the top level of the classification are the large groupings called *Divisions*. They include *Agriculture, Forestry and Fishing* (Division A) and *Manufacturing* (Division C). From there, the structure disaggregates the economy into *Subdivisions*, *Groups* and *Classes*. The class level is the most detailed and divides the economy into 503 activities. Each class has a code with a name and associated description. For example, *Vegetable Growing (Under Cover)* covers vegetable production in greenhouses and similar structures and has the code A012200. It is part of *Mushroom and Vegetable Growing* (Group 012) in *Agriculture* (Subdivision 01).

We defined the Food and Fibre Sectors in part by reviewing all the classes and deciding which ones to include in the sector. With this approach, we compared the description of each class with our concept of the Food and Fibre Sectors as a whole.

In organising ANZSIC06 Class codes into our framework, we had two main considerations:

- Which classes or activities are important to the continued success of the Food and Fibre Sectors and its industries?
- The degree of importance and influence the Food and Fibre Sectors have or needs to have over those activities.

For example, veterinary, boat building and legal services are all important to the food and fibre sector, but to various degrees:

- Veterinary services are critically important to the Food and Fibre Sectors (even though they are equally important to all New Zealanders, especially pet owners). The sector is one of the main users of veterinary services, and the two industries mutually depend on each other. Furthermore, the Food and Fibre Sectors takes an active interest in the veterinary profession, and this will continue. Therefore, we have included 100 percent of the veterinary workforce in the food and fibre sector.
- Boat building and repair services are important to the seafood sector. Even though a large part of the activity in this code relates to other marine organisations and recreational uses, the Food and Fibre Sectors need to be actively involved to ensure its needs are met. No one else will focus on having an adequate workforce for maintaining the commercial fishing fleet. Therefore, we have included some people within this industry, but not all.
- Legal services are also important to the food and fibre sector. However, the Food and Fibre Sectors can likely rely on the legal profession to ensure that it can support the food and fibre sectors. We have, therefore, not included the legal professional as part of the food and fibre sector.

The process involved some judgment. We discussed our reasoning and decisions with the project's Working Group. While some decisions were simple: *Sheep-Beef Cattle Farming* (A014400) is clearly in the food and fibre sector, while *Call Centre Operation* (N729400) is not; some decisions required wider discussion. For example, *Polymer film and sheet packaging material manufacturing* (C191100) was eventually excluded because it contains much more than food and fibre product packaging.

The virtue of ANZSIC06 is that it provides a pre-existing framework and organises official data provided by Stats NZ. It links together the macroeconomy and the microeconomy. Each individual business entity[1] is assigned to a class based on its predominant activity, and the classification provides a picture of the whole economy.

Using ANZSIC06 codes to categorise businesses is convenient because:

- Businesses will already be classified under this framework in government administrative datasets. We can access these datasets through the Integrated Data Infrastructure (IDI) managed by Stats NZ.[2]
- These datasets enable a consistent approach to monitoring activity over time, including investigating historical data at a very large scale. The datasets also provide linked data about the people in these businesses.
- Developing a wholly bespoke classification system, and classifying businesses against it, is not likely to be feasible given the size of the food and fibre sector.

Using ANZSIC06, we have a consistent, transparent, replicable approach to analysing the food and fibre sector.

1 The term business entity is used in its widest sense to include any organisation undertaking productive activities, including companies, non-profit organisations, government departments and enterprises.

2 This is a large research database, comprised of administrative data from a range of government agencies.

3.3 Our framework for the Food and Fibre Sectors

Our framework for the food and fibre sectors divides the sectors into:

- Arable
- Dairy
- Forestry and Wood Processing
- Horticulture (including Viticulture and Winemaking)
- Pork, Poultry, Bees and Other
- Red Meat and Wool
- Seafood
- Cross-Sector activities.

Under each of these sectors, we group the ANZSIC06 class codes into *Core Production and Core Processing/Manufacturing*, *Strongly Connected*, *Relevant and Other*.

The full categorisation of ANZSIC06 Classes to food and fibre sectors is provided in appendix B**.**

3.3.1 Core activities

Core activities refer to ANZSIC06 Classes that are involved in:

- **Core Production** – Primary production activities that produce or capture the initial material for the food and fibre sectors
- **Core Processing/Manufacturing** – First-stage or initial processing or manufacturing that results in a minimum saleable product, such as meat processing or dairy manufacturing.

We count one hundred percent of the people associated with these industries as part of the food and fibre workforce.

3.3.2 Strongly Connected

Strongly Connected Classes include business entities that are:

- dependent on the Core, such as *Fertiliser Manufacturing* (C183100)
- inter-dependent with the Core, such as *Veterinary Services* (M697000)
- immediately downstream of Core activities, such as second stage processing, e.g. *Bread Manufacturing - Factory based* (C117100).

We count one hundred percent of the people associated with these industries as part of the food and fibre workforce.

3.3.3 Relevant

Relevant ANZSIC06 Classes contain business entities that:

- support primary production and initial processing, such as *Shipbuilding and Repair Services* (C239100)
- add additional value to primary production by being part of the value chain, such as *Wooden Furniture and Upholstered Seat Manufacturing* (C251100).

Businesses in these Classes are important for deriving more value from the production associated with the food and fibre sectors. However, they are also involved in non-food and fibre activities or depend heavily on other sectors' inputs. As a result, we determined to assign 15 percent of the people associated with these industries to the food and fibre workforce.

The rationale for 15 percent

Relevant industries are important for the food and fibre sectors either as suppliers of inputs or as users of outputs. These industries, however, are not dependent on the food and fibre sectors. A large part of their economic activity is connected to other parts of the economy. In reviewing these industries, the level of connection with food and fibre as well as the variation by region and over time was considered. For example, *Cement and Lime Manufacturing* (C203100) could have strong links to food and fibre in Southland but very little in Auckland city.

We have decided to apply a single blanket assumption about the food and fibre components of the Relevant ANZSIC06 Classes as a simplifying assumption. This could be an area for more analysis if the workforce of Relevant industries is deemed an important consideration.

The simplifying assumption is based on the overall contribution of food and fibre to the New Zealand economy. While there are a range of estimates of the overall contribution of the Food and Fibre Sectors to the New Zealand economy (depending on the time period of the analysis or the definition or boundary for the sectors), this analysis is based on the assumption that 15 percent of their economic activity and workforce can be considered part of the food and fibre sectors.

3.3.4 Other

Labour Supply Services (7212) includes businesses that supply labour across the whole economy to a range of industries. They are particularly important to horticultural and meat processing industries. They are included in cross sector and only a portion (15 percent) of the workforce is included.

3.4 An alternative approach to defining food and fibre sectors was explored

We explored using a common macroeconomic tool, the inter-industry transactions table of the New Zealand economy, which is produced by Stats NZ on an occasional basis to define the food and fibre sector. The table tracks flows of economic transactions through the economy, showing how each industry contributes to and depends on all the others. We thought this table could be a good basis for allocating workforce numbers to the food and fibre sector.

Without more detailed bespoke analysis, we considered that this approach would likely understate the size of the food and fibre workforce. We analysed how each primary industry (e.g. horticulture) transacted with the rest of the economy, buying inputs and selling outputs to other industries. We based the analysis on the fraction of transaction value with primary industries. As a result, secondary or tertiary industries that are fully part of the Food and Fibre Sectors but also use inputs from other industries (metal, accounting services, etc.) were not counted in full. This approach, while useful for other kinds of economic analysis, was not appropriate here.

A more minor issue was that the classification system used (the New Zealand Standard Industrial Output Categories) is different from ANZSIC06 and has been revised between the previous inter-industry transactions table and the current one. Lack of consistency over time and lack of consistency with other datasets also limit its usefulness.

In comparison with this approach the ANZSIC06 approach is better suited to our requirements.

4 Who works in the food and fibre sectors?

4.1 There are many ways to count workers

The number of people in the workforce depends on what we decide to count:

- The most expansive approach is the number of individuals who work in the sectors at any time during the year for any length of time. This approach includes full-year, full-time workers as well as casual workers who pick fruit for a week.
- Many industries have times of peak labour demand, which are times of the year when these biology-based industries have a time-sensitive process. Examples are harvesting fruit, raising calves and processing hoki. These labour demand peaks can be counted by looking at monthly numbers.
- Individuals may have several jobs in a sector or different sectors throughout a year. They may, for example, do pruning in the winter and harvesting in the summer or they may work planting trees in winter and meat processing in summer. We can count individual people or the jobs they do in a workforce count.

There are merits to each of these approaches, and different questions will benefit from different methods. For example, 'jobs' could be a useful measure for understanding recruitment pressures on individuals and businesses, different skills needs, and the different and overlapping skillsets possessed by the people who work in the sector. In contrast, counts of anyone participating during a specified period can help understand the high-level seasonal patterns and peak labour needs of the sector.

We have used two methods to obtain workforce counts:

- Interviews with people in the sectors to obtain their estimates of workforce counts as well as job skill profiles, and
- Bespoke analysis, based on ANZSIC06 Class codes, of the Integrated Data Infrastructure (IDI) maintained by Stats NZ.

The main issue with consolidating the data from these sources is that they tend to be counting different things. ANZSIC06 data, for example, could be a count of people during a discrete period (such as a month) or averaged across a longer period. We analyse IDI data to produce a count of all individuals during a time period, and industry data may be estimates or counts of positions rather than workers.

Nevertheless, we did find that the counts from different sources were broadly aligned. Importantly, this suggests that government-collected data can be reconciled with how industry thinks about itself, enabling useful analysis of other, linked, data.

4.2 The approach taken to create the workforce count

The workforce baseline count comes from research using the Integrated Data Infrastructure (IDI) maintained by Statistics New Zealand. The IDI is a large research database which holds microdata about people and households. The data comes from government agencies, Statistics New Zealand surveys, and non-government organisations.

Tax data enables us to identify both employees and self-employed participating in the food and fibre sectors, using the ANZSIC06 Class codes of businesses they are associated with. Monthly employment income data enables us to count the number of employees within

each ANZSIC06 Class for each month, while self-employed are determined on an annual basis using full-year tax data and extrapolated across the entire tax year.

To determine a monthly workforce count, the number of different individuals within each grouping level is counted. Individuals are only counted once within each grouping level, even if they are associated with multiple businesses within that same level. We have grouped and counted people, for each month, by the following levels:

- ANZSIC06 Class code;
- Designation;
- Sector; and
- All Food and Fibre Sectors.

Where a person is present within two different levels of the same grouping (for example, two different ANZSIC06 Class codes) they would be counted against each level.[3]

The ANZSIC06 class code of the business is used to link self-employed people to an ANZSIC06 class code. For employees, the ANZSIC06 class code associated with a geographic unit is used instead.

These monthly counts have also been used to produce a 12-month average.

The time period used for the analysis is the 12-month period from April 2018 to March 2019 (the 2019 tax year). This is pre-COVID and provides a baseline year for the 2032 workforce forecasts which are being developed as part of MPI's Primary Sector Workforce Programme.

4.3 Estimating roles and skills in the sectors

This project is focused on the workforce and therefore is interested in the types of positions or roles and the skills involved. There is no consistency across the industries. Some have only a few roles and skill levels, while others are differentiated and structured. It is also difficult to standardise the descriptions across the industries. Many industries have some kind of 'labourer' as the lowest-paid, entry-level position. However, all labour requires some kind of skills, and skilled people can outperform unskilled people at the same task. Classifying roles into 'skilled labour' and 'unskilled labour' tends to misrepresent what is required for those roles, as well as the skills and compensation involved.

We have chosen to classify the workforce similarly across all the industries in the food and fibre sectors. We have found the following classification feasible and informative across the industries: Managed roles, Semi-autonomous roles, and Management roles.

[3] One implication of this is that each grouping level may be less than the sum of lower levels. For example, a person could be associated with the ANZSIC06 Class codes *Kiwifruit Growing* and *Apple and Pear Growing* during a single month and would be counted in both. In contrast, as both these ANZSIC06 Class codes are within Horticulture Core Production, the person would be counted as associated with Horticulture Core Production only once for that month.

5 Food and Fibre Sectors overview

5.1 Food and Fibre workforce count

Around half the food and fibre workforce is in Core Production and a quarter is in Core Processing/Manufacturing (1st stage processing). Combined the core workforce makes up nearly 75% of the food and fibre sectors workforce. A fifth of the workforce is in Strongly Connected which includes second stage processing, businesses that are dependent on the core such as Fertiliser Manufacturing and businesses that are inter-dependent with the core such as Veterinarians.

Table 1 Food and Fibre workforce count by sector and designation

Tax year ending March 2019

Sector	Core Production	Core Processing	Strongly Connected	Relevant*	Other*	Total
Arable	4,517	1,933	15,625	289	n/a	**22,380**
Dairy	38,533	12,967	1,400	n/a	n/a	**52,842**
Forestry and Wood Processing	12,800	11,200	17,300	171	n/a	**41,729**
Horticulture	35,358	25,733	4,017	244	n/a	**64,969**
Pork, Poultry, Bees and Other	9,675	3,683	12,725	n/a	n/a	**26,050**
Red Meat and Wool	47,233	23,850	5,025	371	n/a	**76,413**
Seafood	6,075	4,808	1,225	500	n/a	**12,392**
Cross Sector	26,275	n/a	10,450	20,826	6,181	**63,724**
Indicative %	**50%**	**23%**	**19%**	**6%**	**2%**	**356,682**

Source: MPI using Stats NZ Integrated Data Infrastructure (IDI)

* Relevant and Other reflect 15% of the underling counts, which is the amount considered attributable to the food and fibre workforce

Note: Table row counts will not sum to row totals which are aggregated totals reflecting unique individuals at the sector level. The grand total is a unique count of individuals in the entire food and fibre sector.

5.2 Workforce count over a year

Seasonality can drive large fluctuations in the workforce with industries having peaks in production or processing or both. The following table provides the average, maximum and minimum figures for the Core Production and Core Processing/Manufacturing workforces for each sector. Greater variation in workforce over a year can be seen at the ANZSIC06 class code levels and these are presented in the following sector sections.

Table 2 Core Production and Core Processing workforce over a year

Tax year ending March 2019

Sector	Designation	Average	Max	Min
Arable	Core Production	4,517	4,700	4,300
	Core Processing	1,933	2,000	1,800
Dairy	Core Production	38,533	40,300	35,800
	Core Processing	12,967	13,300	12,600
Forestry and Wood Processing	Core Production	12,800	13,100	12,500
	Core Processing	11,200	11,300	11,100
Horticulture	Core Production	35,358	41,200	29,600
	Core Processing	25,733	33,900	22,200
Pork, Poultry, Bees and Other	Core Production	9,675	10,000	9,300
	Core Processing	3,683	3,900	3,500
Red Meat and Wool	Core Production	47,233	49,100	45,700
	Core Processing	23,850	26,400	20,100
Seafood	Core Production	6,075	6,300	5,900
	Core Processing	4,808	5,000	4,600
Cross Sector	Core Production	26,275	31,500	23,100
	Core Processing	n/a	n/a	n/a

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

5.3 Roles and skill levels in workforce

The roles and skill levels of the workforce that have been summarised in the table below are of a qualitative nature having been obtained by aggregating the results gathered from subject matter experts in the industries that responded to interview requests. The three skill levels of managers, semi-autonomous & managed have been used to classify the identified roles into a grouping that loosely reflects highly skilled, skilled and semi-skilled nature of the tasks performed within different business operations. These will vary across some business especially smaller ones where often one has to be “a jack of all trades”.

Table 3 Skill levels by sector

Sector	Managers	Semi-autonomous	Managed
Arable	27%	27%	47%
Dairy	24%	36%	40%
Forestry and Wood Processing	22%	29%	49%
Horticulture	25%	35%	41%
Pork, Poultry, Bees and Other	29%	41%	29%
Red Meat and Wool	38%	36%	26%
Seafood	10%	22%	68%
Cross-sector	14%	42%	44%
Indicative % (Total)	**25%**	**35%**	**40%**

Source: Industry interviews/surveys

Each sector below has a section on the roles and skill levels of the workforce grouped by tables that reflect industry and value chain analysis, where interviews have taken place. From the results, generally there are a greater proportion of “managed” workers in the core processing/manufacturing area than other parts of the value chain. Whereas, the core production part of the value chain tends to have larger proportions in the “managers” & “semi-autonomous” areas where there are many smaller business operations at play.

6 Arable

The arable sector includes grain and seed production, along with a diverse range of downstream industries such as flour milling, bread, bakery, cake and beer manufacturing. It also includes grain storage and wholesaling.

Note, how the industry views the value chain does not align neatly with the Standard Industry classification. We considered it important and helpful to collect as much information as possible as it provides a richer picture of the sector. This does mean, however, that care is needed in interpreting the results. For example, the New Zealand Grain and Seed Association provided an estimate of the number of people working within research. These people would most likely be captured in ANZSIC06 M691000 Scientific research services, and the figure reported in Table 14 only reflects arable research and development roles.

6.1 Arable workforce count

Table 4 Aggregate arable workforce count

Tax year ending March 2019

	Average	Max	Min
Core Production	4,517	4,700	4,300
Core Processing	1,933	2,000	1,800
Strongly Connected	15,625	15,900	15,400
Relevant*	289		
Total	**22,380**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant reflects 15% of the underling count, which is the amount considered attributable to the food and fibre workforce

Note: Average column designation components will not sum to the column total which is an aggregated total reflecting unique individuals at the sector level.

Table 5 Arable workforce count by ANZSIC06 Class code

Tax year ending March 2019

Designation	ANZSIC06 Class code	ANZSIC06 Class code description	Average	Max	Min
Core Production	A014900	Other Grain Growing	1,233	1,300	1,100
	A015900	Other Crop Growing n.e.c.	3,292	3,400	3,100
Core Production Total			**4,517**	**4,700**	**4,300**
Core Processing/ Mfg	C116100	Grain Mill Product Manufacturing	338	350	320
	C119200	Prepared Animal and Bird Feed Mfg	1,592	1,700	1,500
Core Processing/ Mfg Total			**1,933**	**2,000**	**1,800**
Strongly Connected	C116200	Cereal, Pasta and Baking Mix Mfg	681	710	660
	C117100	Bread Manufacturing (Factory-based)	2,492	2,500	2,400
	C117200	Cake and Pastry Manufacturing (Factory-based)	1,917	2,000	1,800
	C117300	Biscuit Manufacturing (Factory-based)	1,092	1,100	1,000
	C117400	Bakery Product Manufacturing (Non-factory-based)	6,792	6,900	6,700
	C118100	Sugar Manufacturing	192	200	180
	C121200	Beer Manufacturing	1,733	1,900	1,600
	C121300	Spirit Manufacturing	486	500	470
	F331200	Cereal Grain Wholesaling	244	270	230
	I530100	Grain Storage Services	33	45	25
Strongly Connected Total			**15,625**	**15,900**	**15,400**
Relevant	C118200	Confectionery Manufacturing	289		
Relevant Total			**289**		
Arable Total			**22,380**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant reflects 15% of the underling count, which is the amount considered attributable to the food and fibre workforce

Note: Table column counts by ANZSIC06 industry categories will not sum to column sub-totals which are aggregated totals reflecting unique individuals at the designation level of each sector. Also, the designation level sub-total columns will not sum to the sector total which is a unique count of individuals at the sector level.

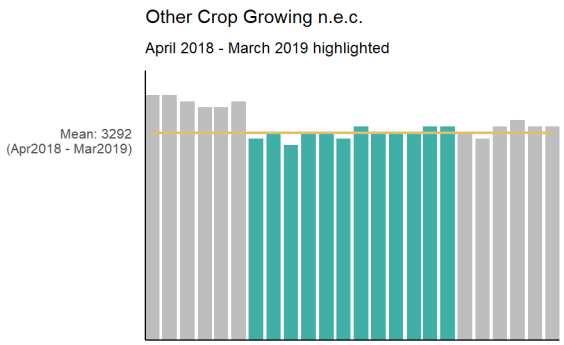
6.2 Arable workforce over a year

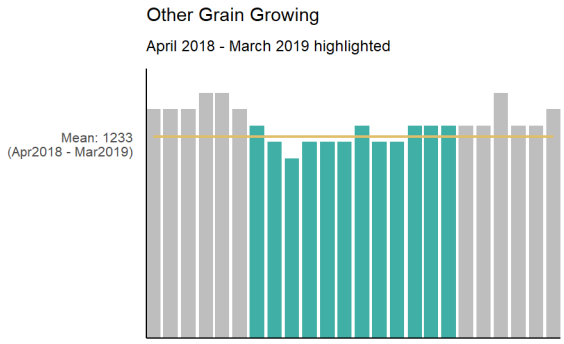
The following summaries provide a visual overview of the relationship between the average workforce count and the maximum and minimum workforce counts at an ANZSIC06 class code level over a year. The gold line represents the annual average figure for the tax year ending March 2019 and the green bars represent monthly counts of the tax year ending March 2019.

Arable Core Production

Other Crop Growing n.e.c. (A015900)

Average: 3,292





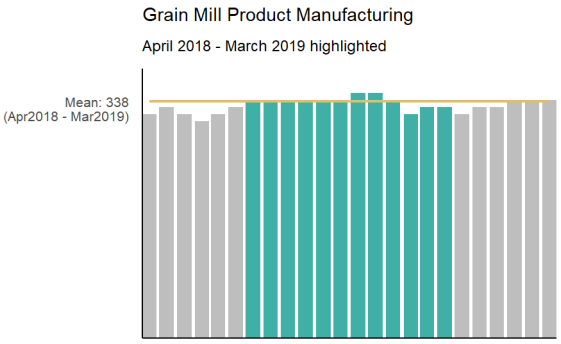
Other Grain Growing (A014900)

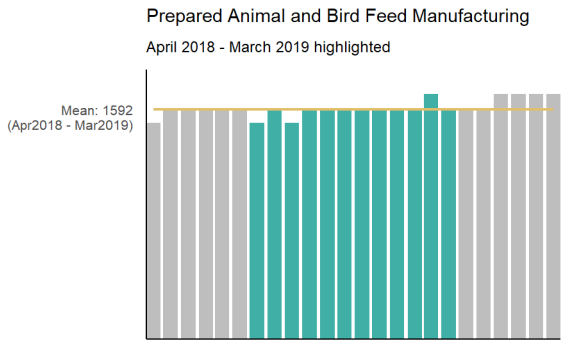
Average: 1,233

Arable Core Processing/Manufacturing

Grain Mill Product Manufacturing (C116100)

Average: 338





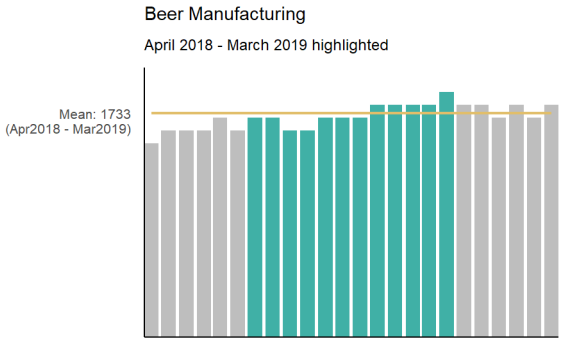
Prepared Animal and Bird Feed Manufacturing (C119200)

Average: 1,592

Arable Strongly Connected

Bakery Product Manufacturing (Non-factory-based) (C117400)

Average: 6,792



Beer Manufacturing (C121200)

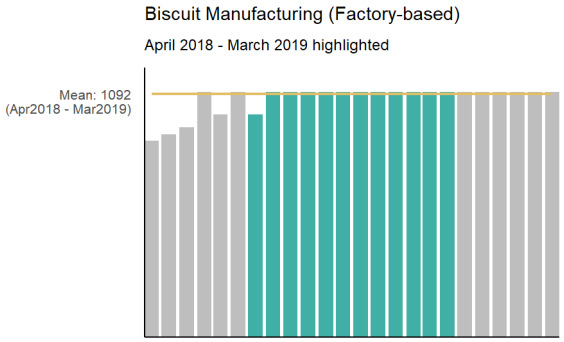
Average: 1,733

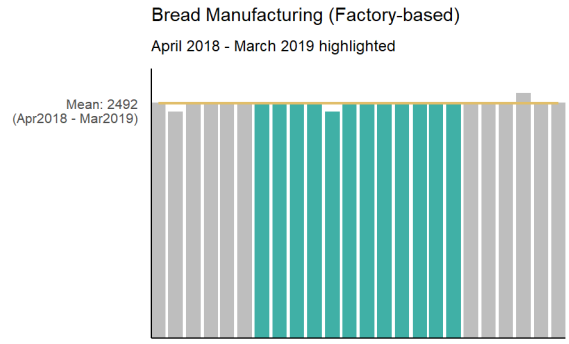
Max: 1,900 (Mar)

Min: 1,600 (Jun/Jul)

Biscuit Manufacturing (Factory-based) (C117300)

Average: 1,092



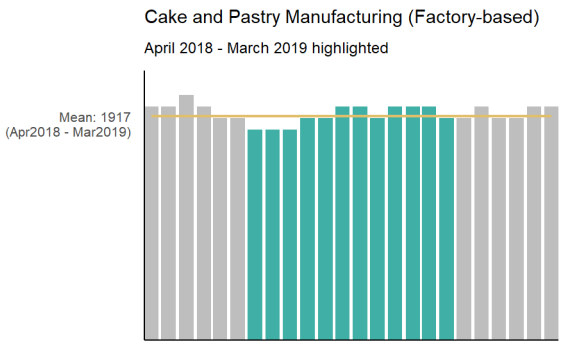


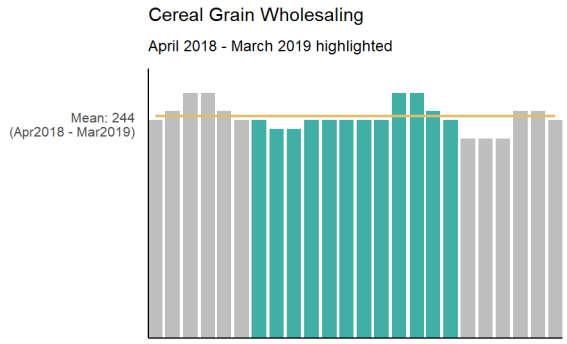
Bread Manufacturing (Factory-based) (C117100)

Average: 2,492

Cake and Pastry Manufacturing (Factory-based) (C117200)

Average: 1,917





Cereal Grain Wholesaling (F331200)

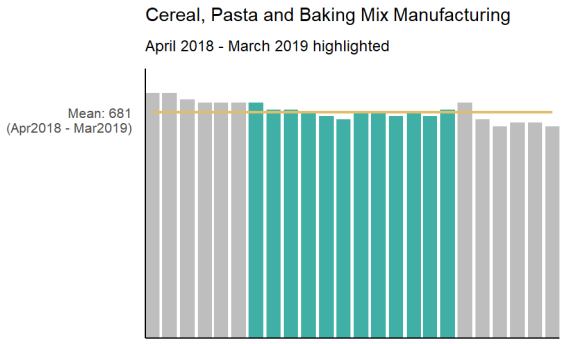
Average: 244

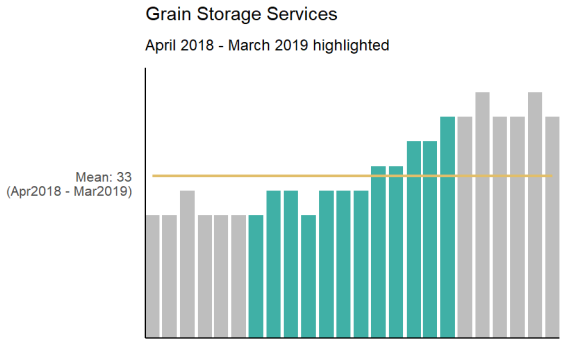
Max: 270 (Jan, Dec)

Min: 230 (May/Jun)

Cereal, Pasta and Baking Mix Manufacturing (C116200)

Average: 681



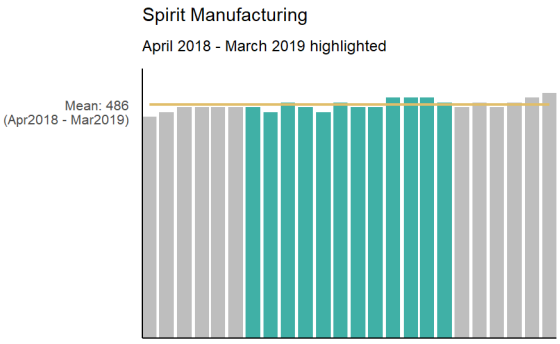


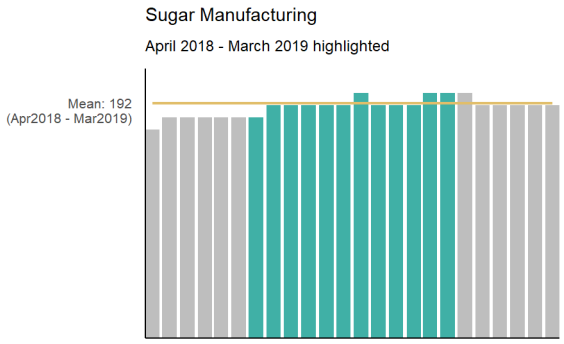
Grain Storage Services (I530100)

Average: 33

Spirit Manufacturing (C121300)

Average: 486





Sugar Manufacturing (C118100)

Average: 192

6.3 Arable roles and skill levels

Information on the arable sector was obtained from interviews with industry representatives from the NZ Grain & Seed Association, Foundation for Arable Research (FAR), Federated Farmers and Business & Economic Research Limited (BERL) numbers.

Table 6 Arable aggregate role and skill levels

Industry	Skill Composition		
	Managers	Semi-autonomous	Managed
Core Production			
Arable Farming	**56%**	**35%**	**9%**
Core Processing/Manufacturing			
Feed Mills	**10%**	**11%**	**79%**
Processing, Storage & Distribution	**10%**	**20%**	**70%**
Strongly Connected			
Seed Marketing	**30%**	**30%**	**40%**
Grain Trading	**20%**	**20%**	**60%**
Arable - Cross Sector			
Supporting Services	**7%**	**80%**	**13%**
Research and Development	**5%**	**80%**	**15%**
Seed Production Advice	**20%**	**80%**	

Source: Industry interviews/surveys

6.3.1 Arable Core Production

Arable farming (associated ANZSIC06 Class codes A014900, A015900)

There is limited information on the breakdown of skills within arable farming, although the roles are easily defined. There are also issues around categorisation, for example, FAR advises that approximately 800 of their levy payers are dairy farmers growing 30/40 hectares of maize. Federated Farmers, FAR and Beef + Lamb estimate that there are around 2,400 to 2,800 arable farms.

The owner/manager model has a major impact on the workforce, with 56 percent of roles classified as managers/owners. Typically, these farms also have at least one permanent worker who is semi-autonomous and part-year workers who are managed.

Table 7 Arable farming role and skill estimates

2018, Based on BERL numbers

Role	Managers	Semi-autonomous	Managed
Skill composition	**56%**	**35%**	**9%**
Managers/Owners	2,679		
Farm Assistance/Experienced Hand		1,673	
Part year			418

Note: Part-year roles are split 80% full-time and 20% part-time.

Providers: Various BERL, FAR, and Federated Farmers
Data source used by BERL: Statistics New Zealand

Regional production estimates

Most seed production occurs in Canterbury, and 75 percent of grain and arable production also occurs in Canterbury. Other areas where arable crops are grown are Gisborne, Waikato, Manawatu–Whanganui, and Southern Hawke's Bay–Wairarapa.

Table 8 Estimates of arable farming activity by growing region

2018, Based on BERL numbers

Region	Estimate
Waikato/Bay of Plenty	5%
Manawatu	5%
Southern Hawke's Bay-Wairarapa	3%
Gisborne	3%
Canterbury	78%
Otago	3%
Southland	3%

Source: Various BERL, FAR, and Federated Farmers

Supplementary data sources: https://www.landcareresearch.co.nz/uploads/public/Publications/Ecosystem-services-in-New-Zealand/1_8_Millner.pdf

6.3.2 Arable Core Processing/Manufacturing

Poultry feed mills (associated ANZSIC06 Class code C119200)

Feed mills have traditionally been associated with the poultry and pig industry. As the dairy industry has grown, feed mills have also supplied the dairy industry.

Feed mills produce a variety of blended products for their markets, producing around 1.1 million tonnes of product per year. Typically, these companies, while smaller than many other corporate entities, follow a standard corporate structure, with a small number of managers and semi-autonomous workers. The managed workforce is approximately 80 percent, and the managers and semi-autonomous skill categories are relatively evenly split.

The Poultry Industry Association did not have information on part year employees.

Table 9 Feed mills: roles and skill level estimates

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition	**10%**	**11%**	**79%**
General Managers	10		
Plant Managers	10		
Head of Transport	10		
Nutrition Specialists	10		
Head of Warehousing	10		
Laboratory	10		
Maintenance and operations	15		
Production Department	20		
Finance		20	
Marketing		30	
HR		20	
Production engineers		10	
Quality Control		20	
Administration		10	
Foreperson			100
Warehouse			25
Electrical Workers			50
Dispatch			100
Store Person			100
Drivers			200
Loaders			100
Maintenance			50
Storage			50
Cleaners			20

Provider: Estimates provided by Poultry Industry Association New Zealand (PIANZ)

6.3.3 Arable Strongly Connected

Seed marketing

BERL (2018)[4] estimates the seed market's size to be around $300 million. Seeds are a global business, and most seeds are exported mainly to companies in the United States, who distribute these seeds around the world, including back to New Zealand.

The industry estimates that there are around 50 companies in seed marketing with an average of about ten employees. The estimated role and skill levels are provided in the table below.

[4] http://www.uwg.co.nz/content/documents/2019%20September%206%20AFIC%20Arable%20Production%20Final.pdf

Table 10 Seed marketing role and skill level estimates

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition	**30%**	**30%**	**40%**
Manager	50		
Sales Manager	50		
Export Documentation	50		
Wholesale		50	
Finance		50	
Brokers		50	
Assistants			200

Provider: Estimates from the NZ Grain and Seed Association.

Grain trading and contracting (associated ANZSIC06 Class code F331200)

Grain trading is mainly a domestic concern, although a small amount is exported. The industry estimate is that there are eight companies with an average employee count of five employees. Splits between roles and skills have also been estimated. Most filled jobs are managed (60 percent).

Table 11 Grain trading roles and skill level estimates

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition	**20%**	**20%**	**60%**
Grain Traders	8		
Buyers / Sellers		8	
Finance Administration			24

Provider: Estimates from the NZ Grain and Seed Association.

Processing, storage, and distribution (associated ANZSIC06 Class codes C116100, I530100)

Processing, storage, and distribution are a vital part of the arable industry infrastructure. Industry suggests that the infrastructure available with these companies influences the size of the arable industry in any particular region.

The industry estimate that approximately 40 companies are operating in this part of the arable industry with an average of 10 employees each. The roles and skills estimates are presented in the table below.

Table 12 Processing, storage, and distribution roles and skill level estimates

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition	**10%**	**20%**	**70%**
Manager/Operations	40		
Warehouse		20	
Compliance		20	
Processing		40	
Administration			40
Dispatch			40
Store person			40
Drivers			40
Loaders			40
Seed Treaters			40
Finance			40

Provider: Estimates from the NZ Grain and Seed Association.

6.3.4 Arable Cross Sector

Arable Supporting services

Support services comprise the inputs that allow the industry to function. They include providing the spray services, laboratories, specialist packaging and machinery required to operate on- and off-farm businesses.

The industry estimate that around 40 companies are operating with an average of 15 employees each. Estimates of splits between roles and skills have also been provided. The number of specialist jobs is reflected in the large number of filled jobs in the semi-autonomous category (80 percent).

Table 13 Arable Supporting services role and skill level estimates

2021

Rows	Managers	Semi - autonomous	Managed
Skills composition	**7%**	**80%**	**13%**
Researchers	40		
Forecasters		80	
Processers		80	
Storepersons			80
Laboratory Technicians		80	
Chemists		80	
Production		80	
Marketing		80	

Provider: Estimates from the NZ Grain and Seed Association.

Research and development (associated ANZSIC06 Class code M691000)

Research and development comprise the research into and the development of new varieties of different arable crops. The industry estimates there are approximately 10 companies with an average of 20 employees, with the role and skill splits provided in the table below. The largest group is in the semi-autonomous category (80 percent).

Table 14 Arable Research and development roles and skill level estimates

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition	**5%**	**80%**	**15%**
Research Manager	10		
Plant Breeders		40	
Intellectual Property Rights Specialists		20	
Legal		10	
Administration		40	
Operations		40	
Field Manager		10	
Glasshouse operations			30

Provider: Estimates from the NZ Grain and Seed Association.

Seed production advice and care

In many cases, off-farm businesses provide farmers with crop care, development, and protection services. This is particularly so where farmers have been contracted to grow a specific crop by another entity.

The industry estimates that there are around 40 companies with an average of around five employees providing these services. The estimated split between roles and skills are provided below. The semi-autonomous workforce category represents 80 percent of the workforce.

Table 15 Seed production advice: role and skill level estimates

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition	**20%**	**80%**	
Agronomists	40		
Field Reps		40	
Breeders		40	
Advisors		40	
Nutritionists		40	

Provider: Estimates from the NZ Grain and Seed Association.

7 Dairy

The dairy sector includes dairy farming, dairy processing, along with cheese, ice cream and other dairy product manufacturing and wholesaling

7.1 Dairy workforce count

Table 16 Aggregate Dairy workforce count

Tax year ending March 2019

Designation	Average	Max	Min
Core Production	38,533	40,300	35,800
Core Processing	12,967	13,300	12,600
Strongly Connected	1,400	1,500	1,300
Total	**52,842**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

Note: Average column designation components will not sum to the column total which is an aggregated total reflecting unique individuals at the sector level.

Table 17 Dairy workforce count by ANZSIC06 Class code

Tax year ending March 2019

Designation	ANZSIC06 Class code	ANZSIC06 Class code description	Average	Max	Min
Core Production	A016000	Dairy Cattle Farming	38,533	40,300	35,800
Core Production Total			**38,533**	**40,300**	**35,800**
Core Processing/ Mfg	C113100	Milk and Cream Processing	1,367	1,400	1,300
	C113200	Ice Cream Manufacturing	615	660	560
	C113300	Cheese and Other Dairy Product Mfg	11,025	11,300	10,700
Core Processing/ Mfg Total			**12,967**	**13,300**	**12,600**
Strongly Connected	F360300	Dairy Produce Wholesaling	1,400	1,500	1,300
Strongly Connected Total			**1,400**	**1,500**	**1,300**
Dairy Total			**52,842**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

Note: Table column counts by ANZSIC06 industry categories will not sum to column sub-totals which are aggregated totals reflecting unique individuals at the designation level of each sector. Also, the designation level sub-total columns will not sum to the sector total which is a unique count of individuals at the sector level.

7.2 Dairy workforce over a year

The following summaries provide a visual overview of the relationship between the average workforce count and the maximum and minimum workforce counts at an ANZSIC06 class code level over a year. The gold line represents the annual average figure for the tax year ending March 2019 and the green bars represent monthly counts of the tax year ending March 2019.

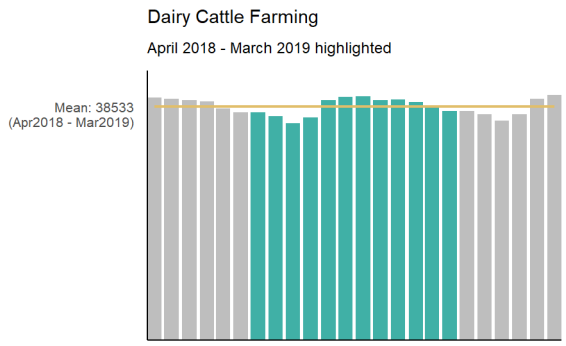
Dairy Core Production

Dairy Cattle Farming (A016000)

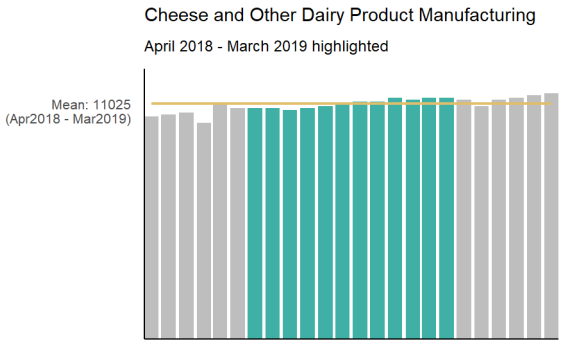
Average: 38,533

Max: 40,300 (Oct)

Min: 35,800 (Jun)



Dairy Core Processing/Manufacturing



Cheese and Other Dairy Product Manufacturing (C113300)

Average: 11,025

Max: 11,300 (Feb/Mar, Dec)

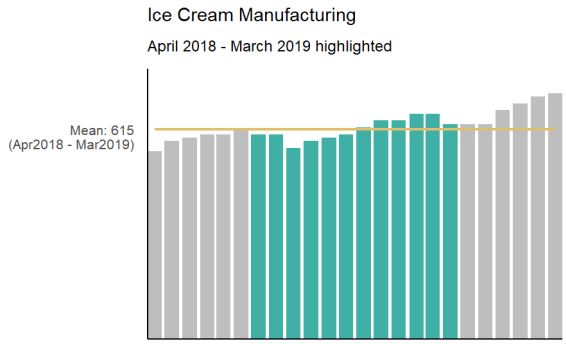
Min: 10,700 (Jun)

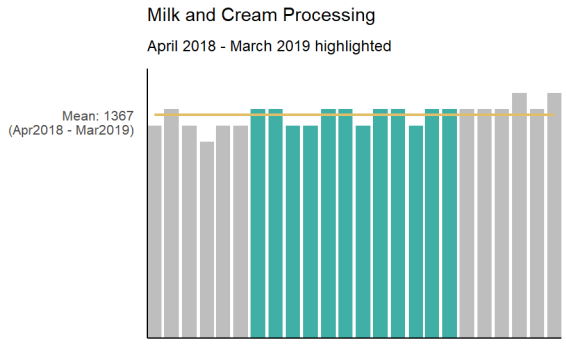
Ice Cream Manufacturing (C113200)

Average: 615

Max: 660 (Jan/Feb)

Min: 560 (Jun)





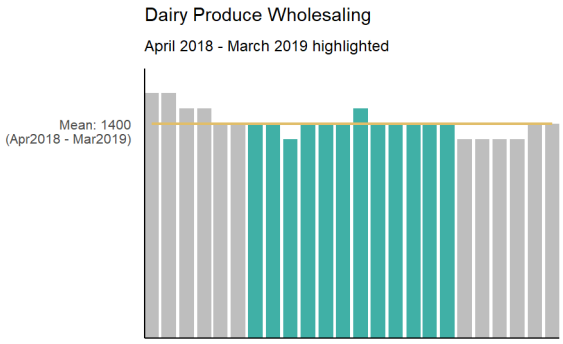
Milk and Cream Processing (C113100)

Average: 1,367

Dairy Strongly Connected

Dairy Produce Wholesaling (F360300)

Average: 1,400



7.3 Dairy roles and skill levels

Table 18 Dairy aggregate role and skill levels

Industry	Skill Composition		
	Managers	Semi-autonomous	Managed
Core Production			
Dairy Cattle Farming	**34%**	**37%**	**29%**
Core Processing/Manufacturing			
Dairy Processing	**9%**	**34%**	**57%**

Source: Industry interviews/surveys

7.3.1 Dairy Core Production (associated ANZSIC06 Class code A016000)

Based on interviews the dairy farming workforce is characterised by:

- Predominant model of owner/ operator
- full-year workers and managers
- supplemented by part-year workers employed over calving.

The workforce numbers in the table below are based on modelling undertaken by Scarlatti that estimates workforce for different farm sizes and cow numbers.

Table 19 Dairy farming role and skill level estimates

2021, March years

Roles	Managers	Semi-autonomous	Managed
Skill composition	**34%**	**37%**	**29%**
Strategic	12,447		
Herd Managers		5,446	
Farm Managers		5,365	
Assistant Managers		2,695	
Farm Assistants			10,871
Part year			3,645

Provider: Dairy New Zealand and Scarlatti
Data sources: IDI and Dairy NZ interviews

Regional breakdown

The regional breakdown is set out in the following table.

Table 20 Dairy farming workforce: Regional breakdown

2021

Region	Percent
Northland	8.8%
Waikato	29.7%
Bay of Plenty	6.0%
Taranaki	10.9%
Lower North Island	9.9%
West Coast	4.9%
Canterbury	14.9%
Otago–Southland	14.9%

Source: Dairy New Zealand and Scarlatti

7.3.2 Dairy Core Processing/Manufacturing

Dairy Processing (associated ANZSIC06 Class codes C113100, C113200, C113300)
Dairy processing includes bovine, goat, and sheep milk processing. The vast majority of activity is in bovine milk processing, but other processing is growing. In the future, this category could also represent plant-based milk processors.

Based on interviews the characteristics of the industry are:

- An annualised hour system operates where staff are given a set number of hours to work in a year. This allows for flexibility in working hours when the seasonal flush is on in the spring and other times of the year when cows are dried off (the winter).
- The number of part-year employees is limited in most operations to about 5 percent.
- Roles tend to be full-time rather than part-time.

The workforce figures, roles and skill levels are estimated by Dairy Workers Union. They observed that the skill levels are increasing as dairy processing equipment becomes more sophisticated which is reflected in the proportion of semi-autonomous workers.

Table 21 Dairy Processing role and skills estimates

2021, March years

Roles	Managers	Semi-autonomous	Managed
Skill Composition	**9%**	**34%**	**57%**
Managers	1,600		
Administration		54	
Product Groupings		960	4,974
Canning		44	266
Stores		102	202
Chemistry		78	114
Control Room		34	
Cool Stores		102	154
Transport & Dispatch		570	2,240
Engineering		90	
Environment		148	
Laboratory		592	
Packing & Production		848	1,794
Quality		2,400	324
Miscellaneous		170	4
Energy Production			82
Part year			800

Provider: Dairy Workers Union, Fonterra, and NZIER estimates

Data source: Base data provided by Dairy Workers Union

8 Forestry and Wood Processing

Forestry includes silviculture and harvesting, along with sawmilling, wood product manufacturing, pulp and paper production, furniture making and, timber wholesaling.

8.1 Forestry and Wood Processing workforce count

Table 22 Forestry and Wood Processing aggregate workforce count

Tax year ending March 2019

	Average	Max	Min
Core Production	12,800	13,100	12,500
Core Processing	11,200	11,300	11,100
Strongly Connected	17,300	17,500	17,200
Relevant*	171		
Total	**41,729**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant reflects 15% of the underling count, which is the amount considered attributable to the food and fibre workforce

Note: Average column designation components will not sum to the column total which is an aggregated total reflecting unique individuals at the sector level.

Table 23 Forestry and Wood Processing workforce count by ANZSIC06 Class code

Tax year ending March 2019

Designation	ANZSIC06 Class code	ANZSIC06 Class code description	Average	Max	Min
Core Production	A030100	Forestry	4,633	4,700	4,500
	A030200	Logging	4,583	4,700	4,500
	A051000	Forestry Support Services	3,550	3,900	3,300
Core Production Total			**12,800**	**13,100**	**12,500**
Core Processing/ Mfg	C141100	Log Sawmilling	5,450	5,500	5,400
	C141200	Wood Chipping	51	60	40
	C141300	Timber Resawing and Dressing	1,783	1,800	1,700
	C149300	Veneer and Plywood Manufacturing	1,133	1,200	1,100
	C149400	Reconstituted Wood Product Manufacturing	814	820	800
	C151000	Pulp, Paper and Paperboard Manufacturing	1,958	2,000	1,900
Core Processing/ Mfg Total			**11,200**	**11,300**	**11,100**
Strongly Connected	C149200	Wooden Structural Fittings and Components Mfg	6,725	6,800	6,600
	C149900	Other Wood Product Manufacturing n.e.c.	2,167	2,300	2,100
	C152100	Corrugated Paperboard and P/board Container Mfg	1,850	1,900	1,800
	C152200	Paper Bag and Sack Manufacturing	171	180	170
	C251100	Wooden Furniture and Upholstered Seat Mfg	5,108	5,200	5,000
	F333100	Timber Wholesaling	1,267	1,300	1,200
Strongly Connected Total			**17,300**	**17,500**	**17,200**
Relevant	C149100	Prefabricated Wooden Building Manufacturing	62		
	C152300	Paper Stationery Manufacturing	23		
	C152400	Sanitary Paper Product Manufacturing	44		
	C152900	Other Converted Paper Product Manufacturing	42		
Relevant Total			**171**		
Forestry and Wood Processing Total			**41,729**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant reflects 15% of the underling count, which is the amount considered attributable to the food and fibre workforce

Note: Table column counts by ANZSIC06 industry categories will not sum to column sub-totals which are aggregated totals reflecting unique individuals at the designation level of each sector. Also, the designation level sub-total columns will not sum to the sector total which is a unique count of individuals at the sector level.

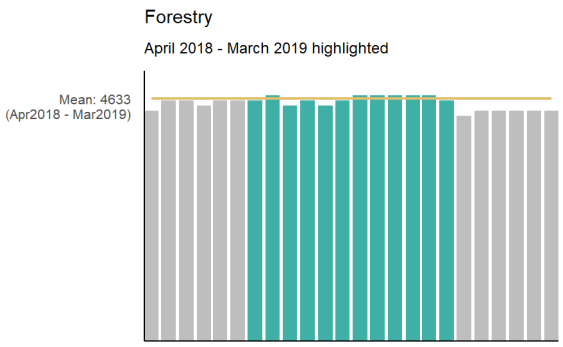
8.2 Forestry and Wood Processing workforce over a year

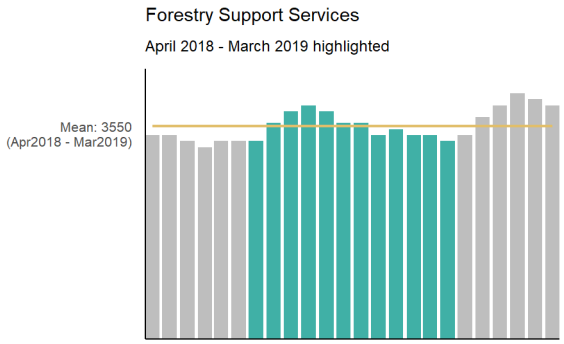
The following summaries provide a visual overview of the relationship between the average workforce count and the maximum and minimum workforce counts at an ANZSIC06 class code level over a year. The gold line represents the annual average figure for the tax year ending March 2019 and the green bars represent monthly counts of the tax year ending March 2019.

Forestry and Wood Processing Core Production

Forestry (A030100)

Average: 4,633





Forestry Support Services (A051000)

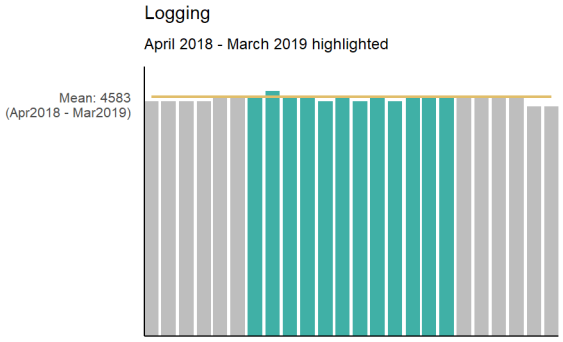
Average: 3,550

Max: 3,900 (Jul)

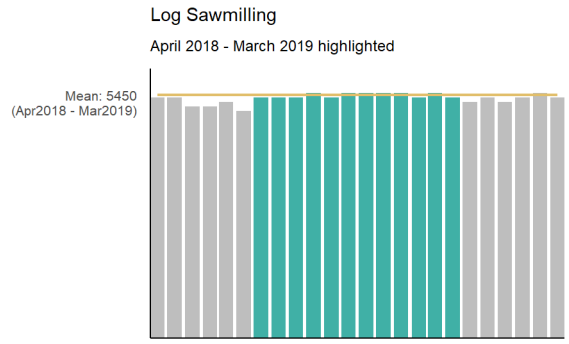
Min: 3,300 (Mar/Apr)

Logging (A030200)

Average: 4,583



Forestry and Wood Processing Core Processing/Manufacturing

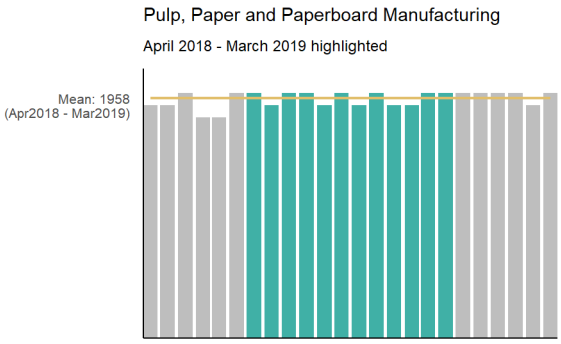


Log Sawmilling (C141100)

Average: 5,450

Pulp, Paper and Paperboard Manufacturing (C151000)

Average: 1,958

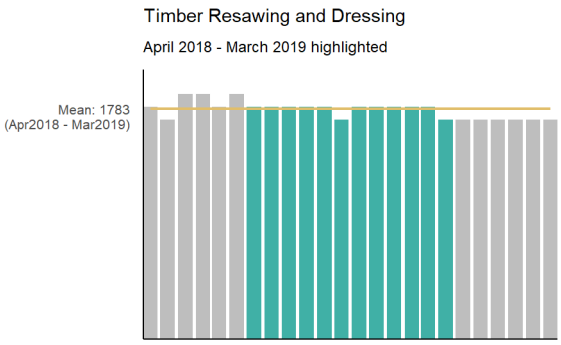


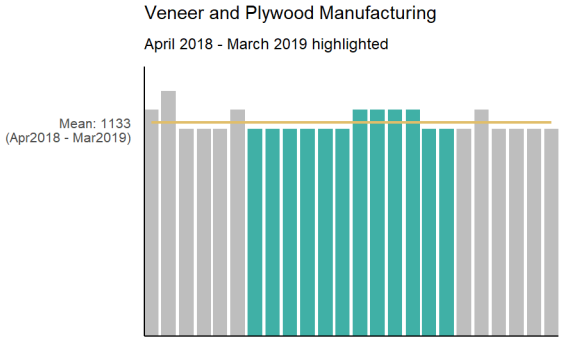
Reconstituted Wood Product Manufacturing (C149400)

Average: 814

Timber Resawing and Dressing (C141300)

Average: 1,783



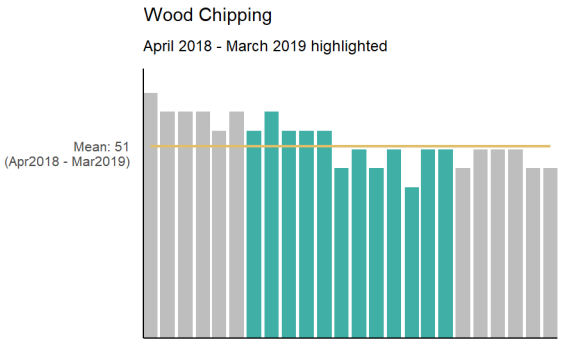


Veneer and Plywood Manufacturing (C149300)

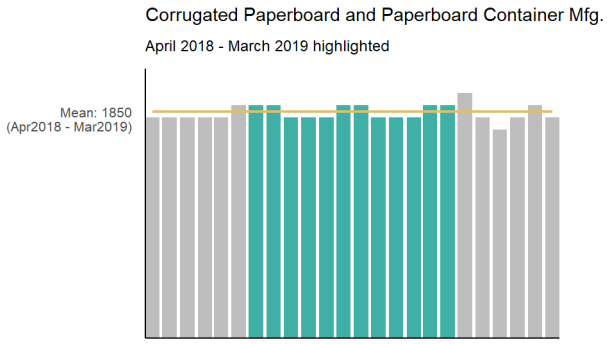
Average: 1,133

Wood Chipping (C141200)

Average: 51



Forestry and Wood Processing Strongly Connected

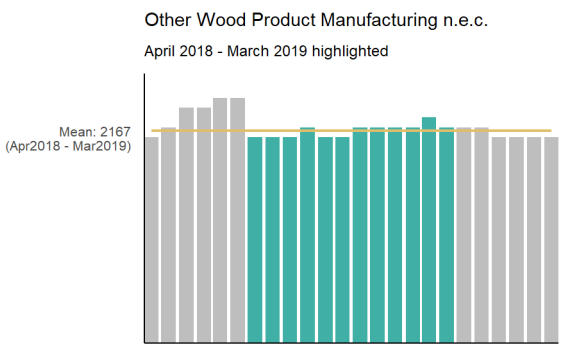


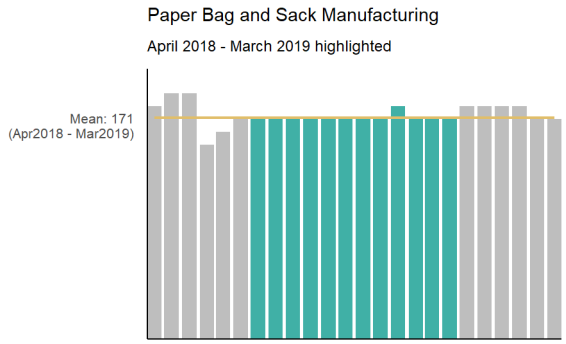
Corrugated Paperboard and Paperboard Container Manufacturing (C152100)

Average: 1,850

Other Wood Product Manufacturing n.e.c. (C149900)

Average: 2,167



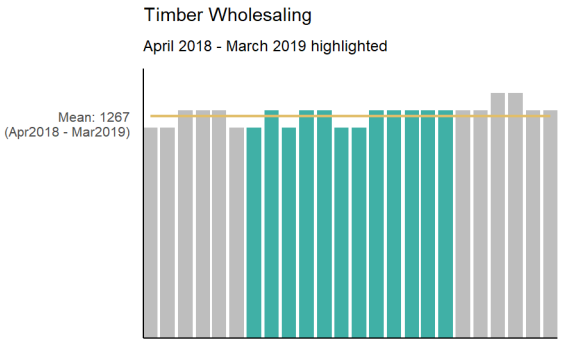


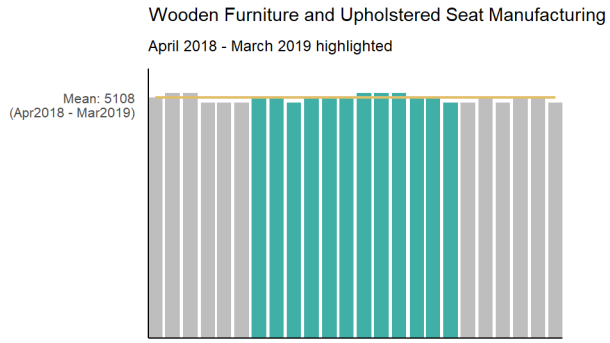
Paper Bag and Sack Manufacturing (C152200)

Average: 171

Timber Wholesaling (F333100)

Average: 1,267



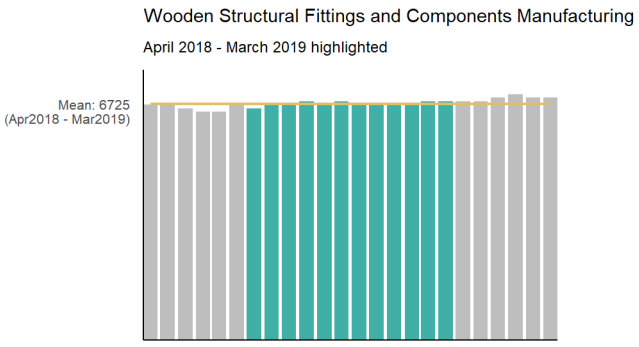


Wooden Furniture and Upholstered Seat Manufacturing (C251100)

Average: 5,108

Wooden Structural Fittings and Components Manufacturing (C149200)

Average: 6,725



8.3 Forestry and Wood Processing roles and skill level information

The information on roles and skill levels in Forestry and wood processing is based on the July 2021 Forestry and wood processing labour force survey report prepared by NZIER for Ministry of Primary Industries[5]. This report was based on survey results to get skill level proportions which in turn were grossed up to national industry employment count numbers obtained from the Stats NZ Integrated Data infrastructure (IDI). The following skill definitions were used:

- Semi-skilled is defined as having a New Zealand Qualification Authority (NZQA) Level 2–3 qualification or equivalent experience.
- Skilled is defined as having an NZQA Level 4–5 qualification or equivalent experience.
- Manager is defined as having an NZQA Level 6+ qualification or equivalent experience.

For the purposes of this report, and for consistency with the other sectors, we have classified semi-skilled as managed and skilled as semi-autonomous.

Table 24 Forestry and Wood Processing aggregate role and skill levels

Industry	Skill Composition		
	Managers	Semi-autonomous	Managed
Core Production			
Forestry Production	**20%**	**35%**	**45%**
Core Processing/Manufacturing			
Sawmilling, Timber Resawing & Dressing and Wood Chipping	**5%**	**51%**	**44%**
Pulp, Paper & Fibre	**28%**	**56%**	**16%**
Wood Processing	**20%**	**36%**	**44%**

Source: Industry interviews/surveys

8.3.1 Forestry Core Production

Forestry Production (associated ANZSIC06 Class codes A030100, A030200, A051000)
The breakdown of forestry workers includes managers (many are small wood lot owners), nursery workers, and other support services. These are set out in the following table. The bulk of the workforce are managed silviculture workers.

[5] Report available 48667-2021-Forestry-and-wood-processing-labour-force-survey (mpi.govt.nz)

Table 25 Forestry Production workforce skill and role estimates

Year ending March 2019

Roles	Managers	Semi-autonomous	Managed
Skill composition	**20%**	**35%**	**45%**
Forestry Managers	1,500		
Nursery			
Nursery Crew			149
Skilled Nursery Crew		51	
Nursery Manager/Owner	37		
Other forestry support			
Silviculture Manual			2,371
Silviculture Machine Operator		159	
Mensuration Technician		18	
Inventory Crew Manager	13		
Harvesting			
Harvesting manual			643
Machine operator		34	
Driver/machine operator		147	
Engineering machine operator/crew manager		80	
Harvesting machine operator/crew manager		1,612	
Infield management		340	
Harvesting management	155		
Operations management	4		
Quality controller			643
Dispatch manager		4	
Roading machine operator		139	
Forest roading engineer	17		
Technical/support		71	
Trainers and qualified support staff		311	
Part- year			300

Provider: NZIER

Data sources: NZIER survey and Statistics New Zealand

8.3.2 Forestry Core Processing/Manufacturing

Log Sawmilling, Wood Chipping and Timber Resawing & Dressing (associated ANZSIC06 Class codes C141100, C141200 & C141300)

Log Sawmilling is defined as “manufacturing rough sawn timber, and boards”.

In the Log Sawmilling industry, firms tend to have either a small or large workforce.

Skill levels follow a similar pattern to other Forestry and wood processing industries. The bulk of the workforce is in Sawmill Manual employee roles. Sawmill Machine Operators, Sawmill Technical staff and Sawmill Managers make up the remainder of the workforce.

Table 26 Log Sawmilling, Timber Resawing & Dressing role and skill level estimates

Year ending March 2019

Roles	Managers	Semi-autonomous	Managed
Skill composition	**5%**	**51%**	**44%**
Sawmilling			
Sawmill Manual			2,444
Sawmill Machine Operator		1,901	
Sawmill Technical		861	
Sawmill Manager	295		
Timber Resawing & Dressing			
Manual			709
Machine operator		553	
Technical		251	
Manager	86		
Wood Chipping			
Wood Chip Operator		40	

Provider: NZIER
Data sources: NZIER survey and Statistics New Zealand

Pulp, Paper and Paperboard Manufacturing (associated ANZSIC06 Class code C151000)

Pulp, Paper and Paperboard Manufacturing is defined as "mainly engaged in manufacturing wood pulp (chemical or mechanical), paper or paperboard. It includes the manufacture of bulk paper from any fibre (including used paper) and the production of pulp from used paper" (ANZSIC06 Class code definition).

The structure of the Pulp, Paper and Paperboard Manufacturing industry is oriented toward large-scale production. The smaller companies tend to produce low volume, short run products and occupy specialist niches.

Most Pulp, Paper and Fibre Manual workers have some degree of autonomy given the experience required to operate the equipment.

One issue is the high number of managers reported by the NZIER survey. One industry expert suggested there is possibly some "job title inflation" occurring. In response to that comment and taking advice from the industry, we have increased the number of Pulp, Paper and Fibre Machine Operators and decreased the number of Pulp, Paper and Fibre Managers to better reflect the worker-management structure. We did this by:

- Setting the number of Pulp, Paper and Fibre Managers at 28 percent. This is in line with a typical pulp and paper plant.
- Increasing the number of Pulp, Paper and Fibre Machine Operators (semi-autonomous) to 56 percent.

Table 27 Pulp, Paper and Fibre workforce role and skill level estimates

Year ending March 2019

Roles	Managers	Semi-autonomous	Managed
Skill composition	**28%**	**56%**	**16%**
Pulp, Paper and Fibre Manual			327
Pulp, Paper and Fibre Machine Operator		1,170	
Pulp, Paper and Fibre Manager	582		

Provider: NZIER

Data sources: NZIER survey and Statistics New Zealand

Wood Processing

Matching ANZSIC06 Class codes to employee role specifications is difficult in wood processing.

Reasons for this are:

- Misspecification of company activities. For example, a number of the companies were classified under the ANZSIC06 Class code Log Sawmilling despite them being involved in solid wood processing, remanufacturing and sometimes wood panelling operations.
- Arbitrary specification of activities into a catch-all ANZSIC06 Class code. For example, Other Wood Product Manufacturing is a popular code choice for those involved in solid wood processing, remanufacturing and wood panelling.

The result was that grouping skill levels and roles was difficult. The following are the estimates of the numbers in each role and skill level.

Table 28 Solid Wood Processing, Wood Panels and Remanufacturing role and skill estimates

Year ending March 2019

Roles	Managers	Semi-autonomous	Managed
Skill composition	**20%**	**36%**	**44%**
Wood Processing Machine Operator		682	
Wood Processing Technical		64	
Wood Processing Manager	422		
Manual Processing			900

Notes (1) Numbers rounded

Provider: NZIER

Data sources: NZIER survey and Statistics New Zealand

9 Horticulture

The horticulture industry is a diverse sector including, apples, wine, kiwifruit, vegetables, nursery (plants/seedlings/fruit trees), floriculture, mushrooms, berry fruit, stone fruit, citrus fruits, olives and nuts.

9.1 Horticulture workforce count

Table 29 Aggregate horticulture workforce count

Tax year ending March 2019

	Average	Max	Min
Core Production	35,358	41,200	29,600
Core Processing	25,733	33,900	22,200
Strongly Connected	4,017	4,400	3,600
Relevant*	244		
Total	**64,969**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant reflects 15% of the underling count, which is the amount considered attributable to the food and fibre workforce

Note: Average column designation components will not sum to the column total which is an aggregated total reflecting unique individuals at the sector level.

Table 30 Horticulture workforce count by ANZSIC06 Class code

Tax year ending March 2019

Designation	ANZSIC06 code	ANZSIC06_code_desc	Average	Max	Min
Core Production	A011100	Nursery Production (Under Cover)	1,425	1,800	1,200
	A011200	Nursery Production (Outdoors)	2,142	2,300	2,000
	A011300	Turf Growing	48	55	45
	A011400	Floriculture Production (Under Cover)	975	1,100	910
	A011500	Floriculture Production (Outdoors)	175	220	150
	A012100	Mushroom Growing	745	780	700
	A012200	Vegetable Growing (Under Cover)	1,583	1,700	1,400
	A012300	Vegetable Growing (Outdoors)	5,050	5,600	4,400
	A013100	Grape Growing	4,058	4,700	3,500
	A013200	Kiwifruit Growing	4,825	5,300	4,400
	A013300	Berry Fruit Growing	1,828	4,000	760
	A013400	Apple and Pear Growing	5,892	8,800	3,400
	A013500	Stone Fruit Growing	1,306	3,200	770
	~~A013600~~	~~Citrus Fruit Growing~~	~~557~~	~~630~~	~~500~~
	A013700	Olive Growing	378	390	360
	A013900	Other Fruit and Tree Nut Growing	2,058	2,200	2,000
	OIERSE	Other Industry Employing RSE	2,700	3,300	1,200
Core Production Total			**35,358**	**41,200**	**29,600**
Core Processing/ Mfg	C114000	Fruit and Vegetable Processing	4,175	4,600	3,900
	C121400	Wine and Other Alcoholic Beverage Mfg	4,092	5,100	3,600
	I530900	Other Warehousing and Storage Services	6,817	7,200	6,500
	N732000	Packaging Services	10,708	18,400	7,100
Core Processing/ Mfg Total			**25,733**	**33,900**	**22,200**
Strongly Connected	C119100	Potato Crisps and Corn Chips Mfg	344	350	340
	F360500	Fruit and Vegetable Wholesaling	3,867	4,100	3,600
Strongly Connected Total			**4,017**	**4,400**	**3,600**
Relevant	C121100	Soft Drink, Cordial and Syrup Mfg	244		
Relevant Total			**244**		
Horticulture Total			**64,969**		

Designation	ANZSIC06 Class code	ANZSIC06 Class code description	Average	Max	Min
Core Production	A011100	Nursery Production (Under Cover)	1,425	1,800	1,200
	A011200	Nursery Production (Outdoors)	2,142	2,300	2,000
	A011300	Turf Growing	48	55	45
	A011400	Floriculture Production (Under Cover)	975	1,100	910
	A011500	Floriculture Production (Outdoors)	175	220	150
	A012100	Mushroom Growing	745	780	700
	A012200	Vegetable Growing (Under Cover)	1,583	1,700	1,400
	A012300	Vegetable Growing (Outdoors)	5,050	5,600	4,400
	A013100	Grape Growing	4,058	4,700	3,500
	A013200	Kiwifruit Growing	4,825	5,300	4,400
	A013300	Berry Fruit Growing	1,828	4,000	760
	A013400	Apple and Pear Growing	5,892	8,800	3,400
	A013500	Stone Fruit Growing	1,306	3,200	770
	A013600	Citrus Fruit Growing	557	630	500
	A013700	Olive Growing	378	390	360
	A013900	Other Fruit and Tree Nut Growing	2,058	2,200	2,000
	OIERSE	RSE found in other ANZSIC06 codes	2,700	3,300	1,200
Core Production Total			**35,358**	**41,200**	**29,600**
Core Processing/ Mfg	C114000	Fruit and Vegetable Processing	4,175	4,600	3,900
	C121400	Wine and Other Alcoholic Beverage Mfg	4,092	5,100	3,600
	I530900	Other Warehousing and Storage Services	6,817	7,200	6,500
	N732000	Packaging Services	10,708	18,400	7,100
Core Processing/ Mfg Total			**25,733**	**33,900**	**22,200**
Strongly Connected	C119100	Potato Crisps and Corn Chips Mfg	344	350	340
	F360500	Fruit and Vegetable Wholesaling	3,867	4,100	3,600
Strongly Connected Total			**4,017**	**4,400**	**3,600**
Relevant	C121100	Soft Drink, Cordial and Syrup Mfg	244		
Relevant Total			**244**		
Horticulture Total			**64,969**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant reflects 15% of the underling count, which is the amount considered attributable to the food and fibre workforce

Note: Table column counts by ANZSIC06 industry categories will not sum to column sub-totals which are aggregated totals reflecting unique individuals at the designation level of each sector. Also, the designation level sub-total columns will not sum to the sector total which is a unique count of individuals at the sector level.

Note 2: Grape Growing A013100 is a Stats NZ naming term used as part of their ANZSIC code descriptions, however throughout this document the equivalent reference used for this industry is Viticulture.

Note 3: For Turf growing A011300, Hort NZ suggest the figures appear to be lower than expected as around 100 apprentices each year are trained up. This is most likely due to the way a business is classified. Many in this line of work may be in N731300 "Gardening Services" (covers Lawn care & Landscaping services) or R911300 "Sports and Physical Recreation Venues, Grounds and Facilities Operation" (covers Greenkeepers) both of which fall outside of the Food & Fibre definitions

Note 4: The Kiwifruit, Apple & Pears and Viticulture and Winemaking workforces are considerably larger than depicted here as they also draw on people in "RSE found in Other ANZSIC06 Codes", "Other Warehousing and Storage Services" (Coolstores), "Packaging Services" (Packhouses) and the Cross Sector industries of "Other Agriculture & Fishing Support Services" (includes Fruit Picking) and "Labour Supply Services".

9.2 Horticulture workforce count over a year

Horticulture and Viticulture and Winemaking comprise a range of different crops, each with their own unique characteristics. Crops are found in regions that are suited to their individual requirements with a resulting strong spatial element to the location of this industry. Individual crops tend to be concentrated into specific regions with suitable features, such as climatic and soil requirements.

The timing of workforce demand varies between crops, as does the requirements for cultivation. For many, harvest and packing or processing activities will drive the timing of the peak labour demand, but other seasonal work can require large labour input too. Different skills are required for different seasonal tasks, so the composition of the workforce can change over the year.

With different crops experiencing peaks at different times, the high-level picture of the workforce can give a misleading impression of stability by aggregating a series of seasonal peaks for different crops. As in many cases there is a strong association of certain crops with certain regions, the change in the workforce is also spatial, with demand for people and skills moving between regions.

Many other industries within the food and fibre sectors also follow seasonal patterns. What makes horticulture slightly different is the magnitude of the seasonal workforce changes.

Contractors provide a 'hidden' workforce

In some horticulture industries, seasonal workers may not be directly engaged by a business but by specialist providers. There are clear commercial benefits for this kind of arrangement, where a large number of growing operations each require a large or specialist workforce (potentially with specialist equipment) for a short duration. Contractors can in effect aggregate this demand and provide services across the industry.

From an analysis perspective, this poses a problem as the horticultural contractors may be found in ANZSIC06 Classes that also encompass a range of other activities that are not part of horticulture. Two ANZSIC06 classes have been identified as potentially including labour contractors: Other Agriculture and Fishing Support Services and Labour Supply Services.

Other Agriculture and Fishing Support Services includes a range of Food and Fibre Sector related support services, and notably includes the business of fruit picking. As it also includes a range of other Food and Fibre Sector activity, we have not included this this ANZSIC06 class code within the horticulture sector (it is considered to be Cross Sector). However, we encourage readers to have regard to it when interpreting the workforce.

Labour Supply Services is an ANZSIC06 class code that captures the business of "supplying their own employees to client's businesses on a fee or contract basis". This is not limited to businesses within the food and fibre sectors. Consequently, we have not been able to specifically identify groups of people within this ANZSIC06 Class code but have included a fixed proportion (15%) of the people when determining the overall size of the food and fibre sectors. We encourage readers to have regard to the possibility of some of the workforce coming from this ANZSIC06 class code when interpreting the workforce.

Visual summaries

The following visual summaries provide an overview of the relationship between the average workforce count and the maximum and minimum workforce counts at an ANZSIC06 class code level over a year. The gold line represents the annual average figure for the tax year ending March 2019 and the green bars represent monthly counts of the tax year ending March 2019.

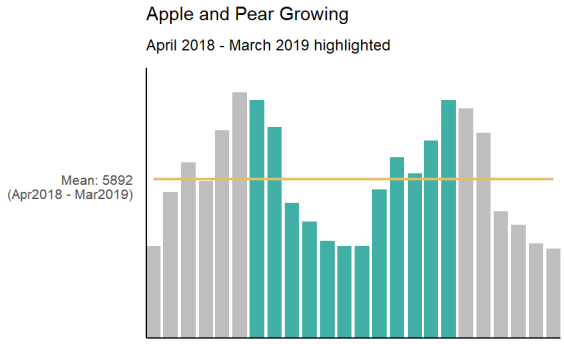
Horticulture Core Production

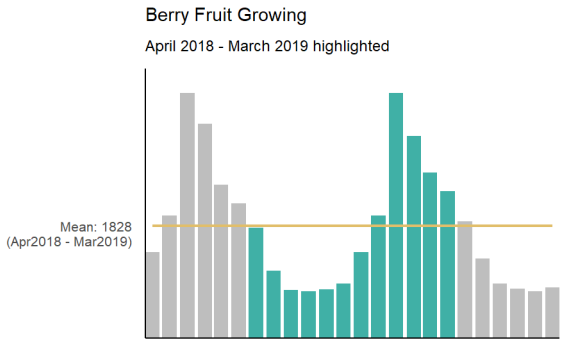
Apple and Pear Growing (A013400)

Average: 5,892

Max: 8,800 (Mar/Apr)

Min: 3,400 (Sep/Oct)





Berry Fruit Growing (A013300)

Average: 1,828

Max: 4,000 (Dec)

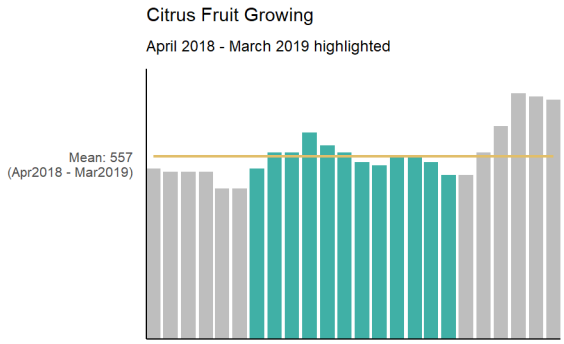
Min: 760 (Jul)

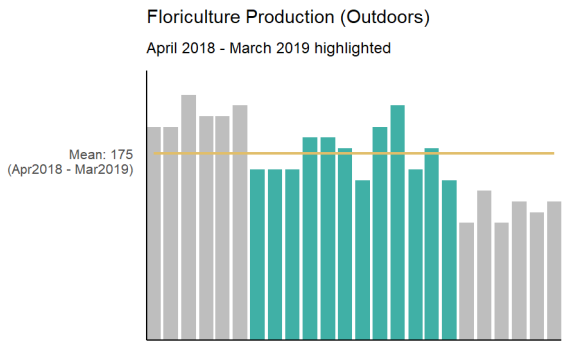
Citrus Fruit Growing (A013600)

Average: 557

Max: 630 (Jul)

Min: 500 (Mar)





Floriculture Production (Outdoors) (A011500)

Average: 175

Max: 220 (Dec)

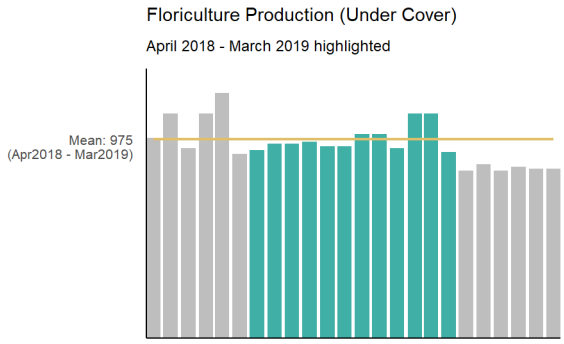
Min: 150 (Mar, Oct)

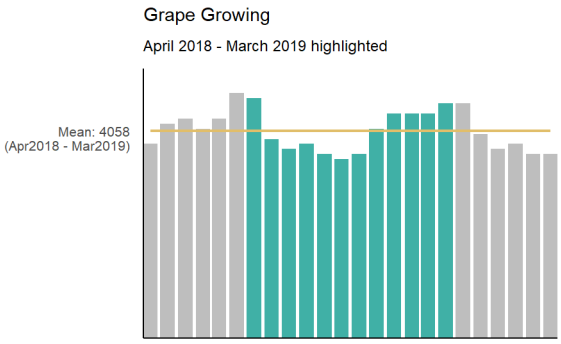
Floriculture Production (Under Cover) (A011400)

Average: 975

Max: 1,100 (Jan/Feb)

Min: 910 (Mar)





Grape Growing (A013100)

Average: 4,058

Max: 4,700 (Apr)

Min: 3,500 (Sep)

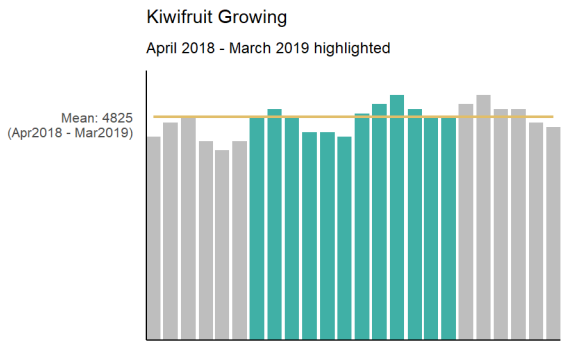
Note: Grape Growing A013100 is a Stats NZ naming term used as part of their ANZSIC06 code descriptions, however throughout this document the equivalent reference used for this industry is Viticulture.

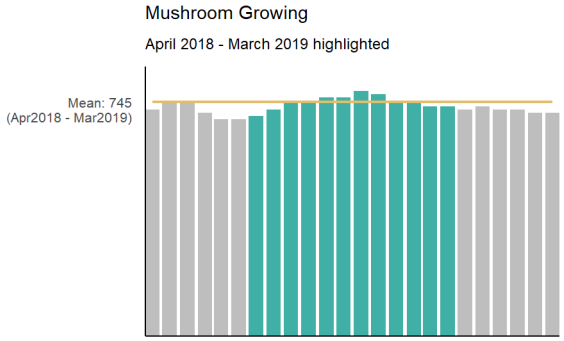
Kiwifruit Growing (A013200)

Average: 4,825

Max: 5,300 (Dec)

Min: 4,400 (Sep)





Mushroom Growing (A012100)

Average: 745

Max: 780 (Oct)

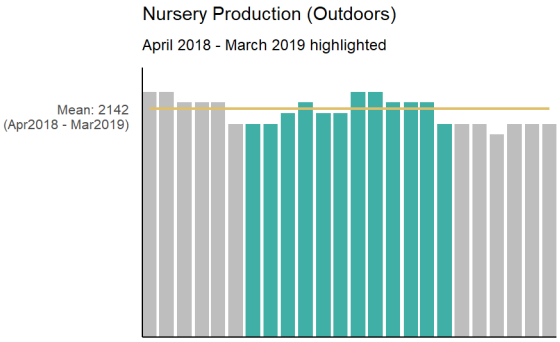
Min: 700 (Apr)

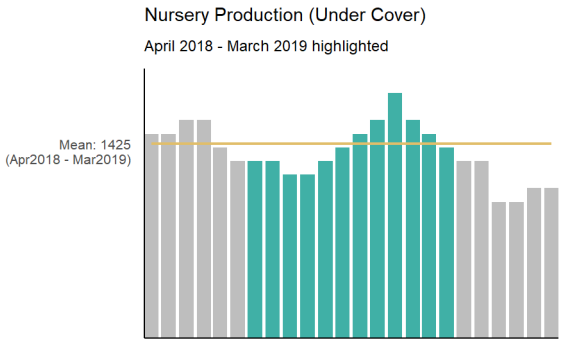
Nursery Production (Outdoors) (A011200)

Average: 2,142

Max: 2,300 (Oct/Nov)

Min: 2,000 (Mar-May)





Nursery Production (Under Cover) (A011100)

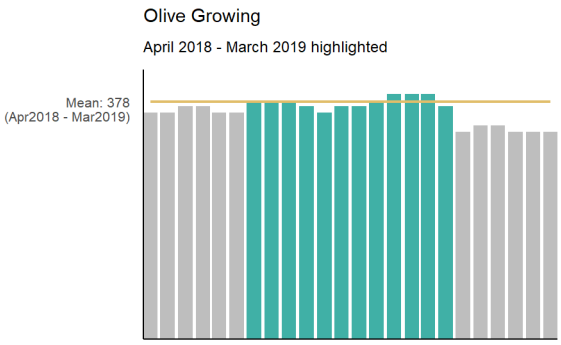
Average: 1,425

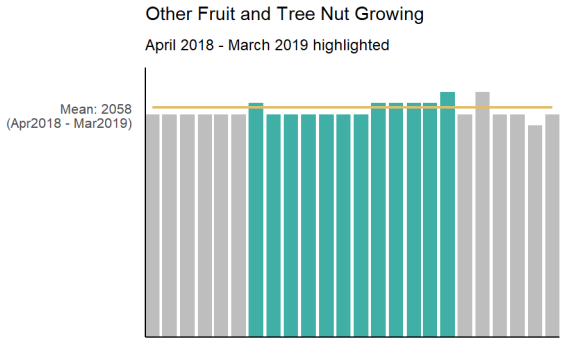
Max: 1,800 (Dec)

Min: 1,200 (Jun/Jul)

Olive Growing (A013700)

Average: 378





Other Fruit and Tree Nut Growing (A013900)

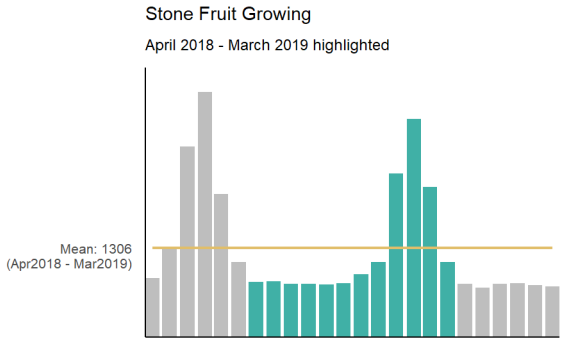
Average: 2,058

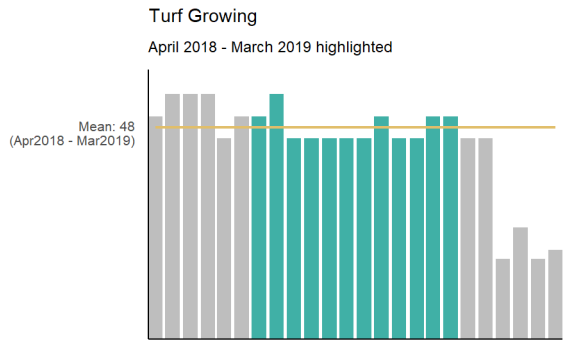
Stone Fruit Growing (A013500)

Average: 1,306

Max: 3,200 (Jan)

Min: 770 (Aug)





Turf Growing (A011300)

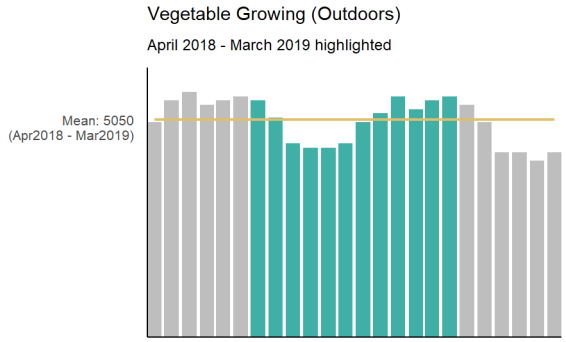
Average: 48

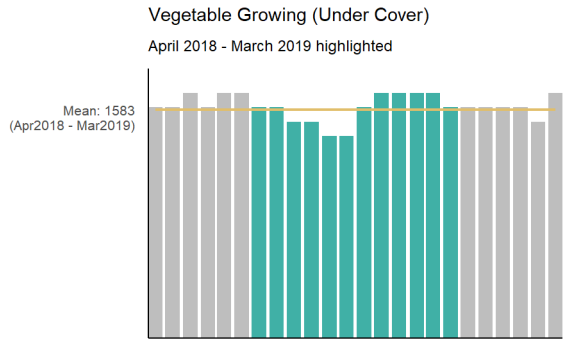
Vegetable Growing (Outdoors) (A012300)

Average: 5,050

Max: 5,600 (Mar and Dec)

Min: 4,400 (Jul/Aug)





Vegetable Growing (Under Cover) (A012200)

Average: 1,583

Max: 1,700 (Nov- Feb)

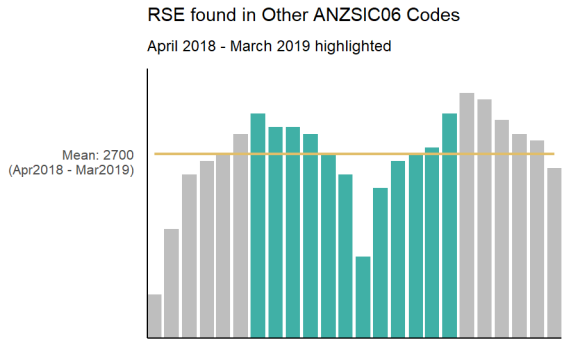
Min: 1,400 (Aug/Sep)

RSE found in Other ANZSIC06 Codes

Average: 2,700

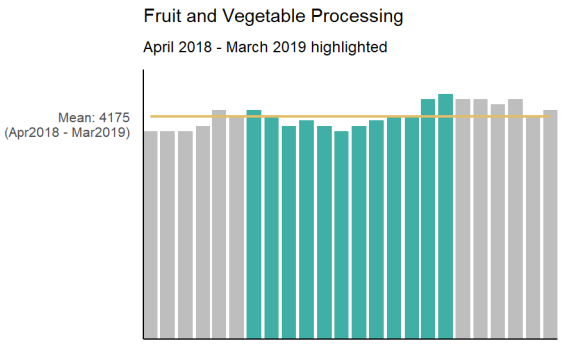
Maximum: 3,300 (Mar/Apr)

Minimum: 1,200 (Oct)



RSE visa holders are an important part of the horticulture workforce. The people come from a range of Asia-Pacific countries and carry out a range of seasonal tasks within horticulture and viticulture. This category aggregates people in ANZSIC06 class codes other than Horticulture and is intended to ensure the people are attributed to Horticulture.

The seasonal pattern, with peaks in March/April, and the lowest number in October, is consistent with the overall annual trend in RSE numbers that can be observed in visa figures.



Fruit and Vegetable Processing (C114000)

Average: 4,175

Max: 4,600 (Mar)

Min: 3,900 (Sep)

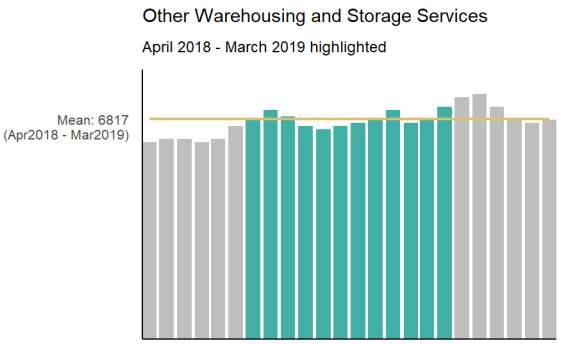
Other Warehousing and Storage Services (I530900)

Average: 6,817

Max: 7,200 (Mar)

Min: 6,500 (Aug)

This ANZSIC06 class code includes both primary and non-primary sector activities. The seasonal pattern, although not pronounced, is similar to what might be expected for much of horticulture.



Packaging Services (N732000)

Average: 10,708

Max: 18,400 (May)

Min: 7,100 (Dec)

This ANZSIC06 Class code contains both primary and non-primary sector activities.

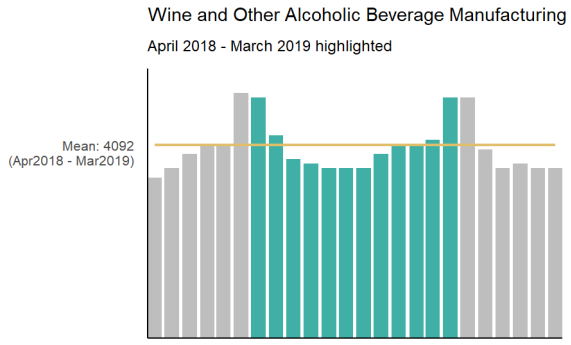
The large seasonal peaks over March – June coincide with harvest for a number of crops. Kiwifruit in particular is known to employ a large packhouse workforce.

Wine and Other Alcoholic Beverage Manufacturing (C121400)

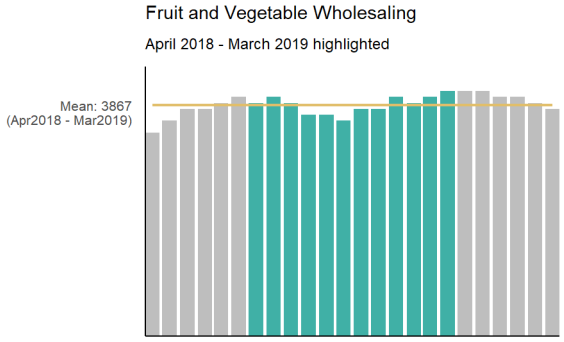
Average: 4,092

Max: 5,100 (Mar/Apr)

Min: 3,600 (Aug-Oct)



Horticulture Strongly Connected



Fruit and Vegetable Wholesaling (F360500)

Average: 3,867

Max: 4,100 (Mar)

Min: 3,600 (Sep)

Potato Crisps and Corn Chips Manufacturing (C119100)

Average: 344

Due to the small size of the industry in New Zealand, data from prior to 2019 is an incomplete data series for this industry.

9.3 Horticulture roles and skill level estimates

Information on the horticulture sector was obtained from interviews with industry representatives for the following:

- Apples and pears
- Avocados
- Viticulture and winemaking
- Kiwifruit
- Summerfruit
- Vegetables

In this section the information is presented on a crop basis.

Table 31 Horticulture aggregate role and skill level estimates

Industry	Skill Composition		
	Managers	Semi-autonomous	Managed
Core Production			
Apples & Pears - Permanent	**27%**	**26%**	**47%**
Apples & Pears - Part year			**100%**
Avocado	**80%**	**10%**	**10%**
Kiwifruit - Permanent	**8%**	**7%**	**85%**
Kiwifruit - Part year/self employed			**100%**
Summerfruit - Permanent	**50%**	**50%**	
Summerfruit - Part year		**5%**	**95%**
Vegetables (Uncovered crops) -Permanent	**21%**	**20%**	**59%**
Vegetables (Uncovered crops) - Part year			**100%**
Vegetables (Covered Crops)	**11%**	**7%**	**82%**
Core Processing/Manufacturing			
Apples & Pears - Permanent	**23%**	**77%**	
Apples & Pears - Part year			**100%**
Kiwifruit - Permanent	**55%**	**30%**	**15%**
Kiwifruit - Business Support Packhouse	**19%**	**47%**	**34%**
Kiwifruit - Part year			**100%**
Wine Bottling	**10%**	**20%**	**70%**
Core Production and Core Processing/Manufacturing (Combined)			
Viticulture & Winemaking	**18%**	**40%**	**42%**

Source: Industry interviews/surveys

9.3.1 Apples and Pears

Apples and Pears – Core Production (associated ANZSIC06 Class code A013400)

The workforce breakdown has been estimated with the help of the New Zealand Apples and Pears calculator and interviewing New Zealand Apples and Pears staff.

The calculator has well defined skill levels attached to each job type and skill level. It should be noted that these workforce numbers are an estimate generated by the calculator rather than a count of actual workforce and are likely to reflect the maximum number of people needed.

The breakdown in skills shows a large managed workforce divided into contract picking, thinning, and pruning. These are part-year jobs making up nearly 91 percent of the filled jobs. The permanent workforce is much smaller. The permanent workforce comprises managed workers (47 percent), with other jobs evenly split between managers and semi-autonomous workers. The high number of managers is due to the owner-operator structure of most orchards.

A feature of the industry is that significant numbers of contract workers who work in orchards also work in post-harvest, providing them with year-round jobs.

Table 32 Apple and Pears orchard production role and skill level estimates

Base year 2019, Based on 10,467 hectares

Roles	Managers	Semi-autonomous	Managed
Skill composition	**27%**	**26%**	**47%**
Permanent Roles			
Group Orchard Manager/Orchard Manager	439		
Operations Manager	21		
Technical Manager	21		
Assistant Manager		126	
Foreperson		335	
Orchard Worker			837
Skill Composition (Part year)			**100%**
Part year			
Contracting Workers (picking)			10,467
Contracting Workers (thinning)			7,536
Contracting Workers (pruning)			2,093

Provider: New Zealand Apples and Pears.
Data source New Zealand Apples and Pears calculator

Regional estimates based on plantings

Apples are mainly grown in the Hawke's Bay region. Along with the Nelson region, they provide the bulk of the apples and pears grown.

Table 33 Regional production of apples and pears

Base Year 2019. Based on 10,467 hectares

Region	Production	Workforce
Hawke's Bay	66%	1,174
Nelson	25%	445
Central Otago	4%	71
Gisborne	2%	36
Rest of NZ	3%	53

Source: New Zealand Apples and Pears. Estimates

Apples and Pears – Core Processing/Manufacturing **(associated ANZSIC06 Class code N732000)**

The post-harvest workforce breakdown has been estimated with the help of the New Zealand Apples and Pears calculator and interviewing New Zealand Apples and Pears staff. The calculator has well defined skill levels attached to each job type.

The full-year workforce is made up of semi-autonomous workers and managers. Part-year, managed roles make up the rest of the workforce and represent approximately 87 percent of the workforce.

Table 34 Apple and Pears post-harvest role and skill level estimates

2019, Based on 1.5 million bins

Roles	Managers	Semi-autonomous	Managed
Skill composition	**23%**	**77%**	
Permanent Roles			
General Manager	19		
Inventory Manager	19		
HR Manager	19		
Post-harvest Manager	19		
Finance Manager	19		
IT Manager	19		
Systems Manager	19		
Chief Engineer	19		
Packhouse Manager	19		
Coolstore Manager	19		
Quality Manager	19		
Engineers		19	
Shift Manager		39	
Yard Supervisor		39	
Coolstore Supervisor		39	
Technician		78	
Packaging Supervisor		39	
Packing Supervisor		78	
Export Dispatch		117	
Quality Officer		78	
Lab Technician		78	
Admin		78	

Skill Composition Packhouse	**100%**
Packhouse roles (part year)	
Forklifts (Packhouse)	195
Machine Operators	273
Forklifts (Coolstore)	273
QC's	312
Carton Makers	156
Packers	2,027
Stackers	312
Graders	390
Extra Graders	2,000

Provider: New Zealand Apples and Pears.

Data source New Zealand Apples and Pears calculator

9.3.2 Avocados (associated ANZSIC06 Class code A013900)

Avocados are part of ANZSIC06 Class code A013900 – other fruit and tree nut growing. This category includes growing tree nuts, tropical fruit, subtropical fruit, and other fruit not otherwise categorised.

Avocados New Zealand advised that the average size of an avocado orchard is 3.7 hectares, and approximately 1,300 of the 1,800 orchards are less than 4 hectares. There are also some very large orchards, particularly in Northland, of over 100 hectares.

Avocado orchards require a stable workforce. The industry commented that "*the [avocado] tree is the coolstore*".[6] On average, each tree is harvested twice a year. Picking:

- for the domestic market occurs all year round
- for the export market, occurs between the end of July and January.

This means that pickers can be employed for much longer periods to the point where combined with other jobs, they can become full year workers for orchards providing for the domestic market.

Table 35 Avocado Production role and skill level estimates

2020

Roles	Managers	Semi-autonomous	Managed
Skill composition	**80%**	**10%**	**10%**
Owner/manager	1,800		
Permanent Workers		219	219
Part year workers			3,000
Packhouse			
Technical Expertise			
Exporting			

Provider(s): Avocados New Zealand
Data sources: Avocados NZ interview

[6] Avocado industry interviewee.

9.3.3 Viticulture and Winemaking (associated ANZSIC06 Class codes A013100, C121400)

Viticulture and Winemaking are closely linked industries. Viticulture is defined as vineyards that are mainly engaged in growing table or wine grapes. Winemaking and viticulture are part of ANZSIC Class Codes that also includes cider, wine vinegar, or other alcoholic beverages (excluding beer and spirits).

The strong growth of the New Zealand wine industry over the past 30 years has meant that there are a large number of different business models being used in the industry. This makes it difficult to characterise an "average" workforce for a small, medium, and large winery. While we have an understanding of the approximate total numbers of workers, estimating the roles and skill levels accurately is difficult.

New Zealand Wine estimate that there were 717 wineries and 694 growers in 2020 (our base year). Approximately 48% of grapes grown are produced by contracted growers. The bulk of the wineries are small (87%),[7] approximately 10% are medium-sized, and the remainder are large wineries. The industry comment that production from small wineries has remained at 15% of total production for the last twenty years.

Most of the permanent workforce can be classified in either managed or semi-autonomous categories. The large number of smaller wineries/contract grape growers increases the number of managers. But as the industry says, "*these are managers that sweep the floors*"[8] also. They perform a wide range of activities.

We have been able to gather estimates from a limited sample of part year workers within the industry. These estimates should be treated with caution and are illustrative. The large number of part-year workers is dictated by the grape-growing cycle. There are discrete peaks in different parts of the year:

- A summer peak in November/December. Workers are involved in bud, flower, and vine control (estimated part-year workforce at approximately 2,800)
- Peak wine production occurs between March and April (estimated part-year workforce at 2,900 per month). Note that most vineyards outside Marlborough will undertake hand picking at harvest. Harvest also commences in February and goes through to April
- A winter peak between May and September. Workers are involved in winter pruning[9] and vine maintenance (estimated part-year average workforce at 4,300 per month).

The peak seasonal task is winter pruning, which relies on a seasonal workforce including skilled RSE workers. The industry also requires a substantial additional seasonal workforce for cellar hand roles, hospitality, winemaking and other activities over the January to May period.

[7] Small wineries have annual sales of under 200,000 litres, medium sized wineries have annual sales of between 200,000 and 2,000,000 litres and large wineries have annual sales of over 2,000,000 litres.

[8] Interview with New Zealand Wine.

[9] The winter pruning varies by region because of the scale, for Marlborough winter pruning starts in April through to September and other regions start in June through to August.

Table 36 Viticulture and Winemaking: role and skill level estimates

2020

Roles	Managers	Semi-autonomous	Managed
Skill Composition	**18%**	**40%**	**42%**
Permanent roles			
Management (these include)	756		
GM			
Finance			
General Admin (these include)	176	1,232	853
Administration			
Planning			
HR			
Technical			
Marketing/Sales			
Hospitality			
Packaging			
PR			
Production (these include)	328	1,568	2,087
Distribution			
Viticulture/Purchasing			
Logistics/bottling/transport			
Quality control/Lab			
Wine Cellar			
Winemaking			
Part year (managed roles)			
Summer Staff			2,800
Wine production			1,300
Winter pruning & maintenance			4,300

Note that NZIER has had difficulty in providing an exact number of workers in the industry. We have examined two sources of data.

The first is data sourced from the **Integrated Data Infrastructure** (IDI), which has used tax records to link employees and self-employed people to businesses, and thereby identify the industry and region the people work within. This analysis relies on the ANZSIC06 industry classification system to attribute businesses to industries. One limitation with this in certain industries, including wine and viticulture, is that where the workforce comes from contractor businesses, these businesses may be categorised under other ANZSIC06 codes, resulting in an apparent lower-than-expected workforce count. (For wine and viticulture, it is believed a number of these will be found under A052900 “Other Agriculture and Fishing Support Services”. This category is not limited to wine and viticulture workers and may include people working in other Food and Fibre Sectors). A second limitation is that contractors by their nature are mobile, so regional attribution may be less reliable an indication of where they work.

The second is data sourced from **Survey results** from Marlborough which have also been used to calculate the total New Zealand wine and viticulture workforce. These are estimates. Permanent staff numbers estimated by New Zealand Wine (initial estimates only)

Provider: New Zealand Wine and NZIER
Data sources: New Zealand Wine surveys and NZIER estimates

Regional production of wine (by hectares)

Marlborough dominates New Zealand wine production and continues to expand. Hawke's Bay is a distant second with other significant regions being Central Otago, North Canterbury, Nelson, Wairarapa, and Gisborne.

Table 37 Regional Production of wine (hectares)

Region	Percent
Northland	0.2%
Auckland	1%
Waikato/Bay of Plenty	0.05%
Gisborne	3%
Hawke's Bay	12%
Wairarapa	3%
Marlborough	70%
Nelson	3%
Canterbury	4%
Otago	5%

Source: New Zealand Wine Annual Report 2021

Wineries follow different strategies when it comes to packaging (bottling). Some bottle their wine in New Zealand, others focus on exporting unpackaged wine, while others pursue a dual strategy doing both.

What business packaging strategy they follow depends on a mixture of supply and demand side factors that are specific to the wine company. Reasons for the use of unpackaged wine exports include:

- Taking advantage of surges in demand
- Further developing relationships in market with suppliers
- Cost advantages
- Sustainability reasons
- Reduce risks (particularly with earthquake damage to wine vats in Marlborough several years ago)

For those that do decide to bottle in New Zealand there are services available. Services include transportation of unpackaged wine, laboratory assistance for export certification, packaging, distribution and logistics, and supply chain management.

The breakdown of the New Zealand based wine bottling workforce shows many managed workers with most holding fulltime positions (70 percent). Semi-autonomous workers make up 20 percent of the workforce and managers 10 percent. This resembles a straight-forward manufacturing process with well-known technologies being used.

Table 38 Wine bottling roles and skill level estimates

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition	**10%**	**20%**	**70%**
Mangers	90		
Management Support		180	
Workers			630
Part year			100

Provider(s): Wineworks

Data sources: Wineworks interview

Regional wine bottling estimates

Transport costs meant that wine bottling developed where wine was produced. Main sites are Marlborough, Hawkes' Bay and Auckland. It should be noted that some large exporters arrange for their bottling requirements to be carried out offshore.

Table 39 Regional distribution of wine bottling manufacturing

2021

Region	Percent
Marlborough	40%
Auckland	30%
Hawkes' Bay	20%
Central Otago	10%

Provider(s): Wineworks

Data sources: Wineworks interview

9.3.4 Kiwifruit

Kiwifruit – Core Production (associated ANZSIC06 Class code A013200)

The on-orchard harvest workforce breakdown has been estimated with the help of Scarlatti modelling and interviewing kiwifruit entities. It can be defined as those engaged in growing kiwifruit.

The modelling has well-defined skill levels attached to each job type and shows what an orchard needs in terms of a workforce. Note this is a modelled number, not actual staff numbers active at that time.

The breakdown of the workforce illustrated a large number of managed workers. These are typically part year workers (although they may have post-harvest jobs). Part year filled roles represent approximately 76 percent of filled jobs and are mainly managed. The permanent workforce is much smaller, and the bulk of the permanent workers are managed (85 percent). The rest are evenly split between semi-autonomous and permanent roles. There is also a large group of self-employed permanent positions making up 5 percent of filled roles in the industry. Permanent self-employed are involved in managing orchard maintenance workers on-orchard.

Table 40 Kiwifruit on orchard role and skill level estimates

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition	**8%**	**7%**	**85%**
Permanent			
Orchard Managers	341		
Business Support		313	
Orchard Maintenance			869
Machine Operator			447
Orchard Worker			2,472
Skill Composition (Part year)			**100%**
Self Employed			1,156
Part year			17,600

Provider: Scarlatti Orchard Model 2021, communication with Scarlatti and NZKGI.

Regional estimates based on plantings

Kiwifruit are mainly grown in the Bay of Plenty. Other regions do grow kiwifruit, but the growing area is relatively small.

Table 41 Regional production of kiwifruit

Base Year 2019. Based on 10,467 hectares

Region	Percent
Northland	3.1%
Auckland	3.8%
Waikato	4.3%
Bay of Plenty	81.5%
Hawkes Bay	1.5%
Southern NI	0.7%
Poverty Bay	2.2%
Nelson	2.9%

Source: Zespri

Kiwifruit – Core Processing/Manufacturing **(associated ANZSIC06 Class code N732000)**

The post-harvest workforce breakdown has been estimated with the help of Scarlatti modelling and interviewing kiwifruit entities.

The modelling has skill levels attached to each job type. The workforce numbers are generated by the model and are not actual staff numbers.

A high proportion of the workers are managed part-year and are approximately 88 percent of total roles. The packhouse also has more manager level roles than semi-autonomous roles, with manager level roles associated with specialist responsibilities in the packhouse.

Table 42 Kiwifruit Core Processing/Manufacturing role and skill level estimates (packhouse)

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition	**55%**	**30%**	**15%**
Supervisors	151		
EDI Supervisor/Team Leader	23		
Line Manager	91		
Coolstore Manager	32		
Grower Liaison Manager	31		
Grader Supervisor/Team Leader	31		
EDI Manager	27		
Operations/Site Manager	25		
Quality Manager	24		
Auditor	23		
Production Manager	22		
Grower Support/Harvest Coordination	21		
Inventory Manager	21		
Quality Supervisor	21		
Mechanical Engineer	21		
Lab Manager	16		
Packaging Manager	14		
Supply Manager	13		
Technical Manager	12		
Lab Supervisor	12		
Chief Engineer/Maintenance	12		
Electrical Engineer	10		
Grounds Supervisor	10		
EDI Admin/Data		55	
Assistant Quality Manager		47	
Grower Liaison Rep		46	
EAN Team Member		34	
Maintenance		27	
Quality Controller		100	
Logistics/Shipping/Loadout Team Leader		17	
Forklift Supervisor		17	
Lab Technician		16	
Logistics/Shipping/Loadout Team Member			35
Forklift Operator			105
Cleaner			19
Truck Driver			17
Skill Composition (Part year)			**100%**
Part year (between 11,000 and 13,000)			12,000

Provider: Scarlatti Orchard Model 2021. Communication with Scarlatti and NZKGI
Data from Zespri and interviews

We have also split out the business support from post-harvest operations to illustrate the roles required in aspects of post-harvest operations. The business support roles are in the Table below. The largest group is the semi-autonomous group, which is almost half of all business support functions, these workers are all employed within the packhouse.

Table 43 Kiwifruit business support role and skill level estimates

2021

Roles	Manager	Semi-autonomous	Managed
Skill composition	**19%**	**47%**	**34%**
Information Technology Manager	13		
HSE/Compliance Manager	10		
HR Manager	10		
RSE Manager	9		
Commercial Manager	9		
Payroll Manager	9		
Communications Manager	9		
Admin/Information Systems Team Member		28	
HR Advisor/HR Coordinator/Recruitment		27	
Information Technology Developer		23	
Financial Controller/Company Accountant		19	
Accounts Administrator		18	
RSE Administration/Pastoral Care		16	
Business Analyst (Grower Payments)		13	
Sustainability Coordinator		13	
Communications Coordinator		13	
Helpdesk			22
Receptionist			13
Admin Support (HR & H&S)			44
Administration			44

Provider: Scarlatti

Data from Zespri and interviews

9.3.5 Summerfruit – Core Production (associated ANZSIC06 Class code A013500)

Summerfruit consists of orchards growing apricots, cherries, nectarines, peaches and plums. It does not include post-harvest operations such as packing. However, the industry tends to see these activities as one operation.

The summerfruit industry consists of 2,290 hectares. We have based our calculations on a 20-hectare orchard to illustrate the workforce requirements. On that orchard, it is likely that more than one summerfruit is grown (although not always, particularly in the case of cherries). Some orchards have packhouses, while others will band together with other growers.

Some orchards are isolated and almost independent of other parts of the industry. For these orchards, labour is met from local sources only.

For example, using a 20-hectare "average" orchard calculator, showed:

- There are few permanent jobs. An owner-operator and a permanent worker, and an office worker or unpaid spouse is needed to do the books for at least 10 hours a week (approximately 230 permanent jobs for all three roles).
- The seasonal peak occurs in January when the workforce swells to over 4,000. Picking cherries is the main seasonal activity. Contracted pickers include supervisors who work closely with the manager/owner.
- Packhouse operations, pruning and thinning occur between January and April.
- Some orchards also include apple blocks where the climate and geographical location are favourable. The technology used on orchard and in the packhouse in these operations is transferable between apples and summerfruit.

Regions that grow summerfruit are:

- Central Otago (between 60% and 65% of the crop)
- Hawke's Bay (25%)
- Other regions are Auckland, Gisborne, Marlborough and the Nelson\Tasman region.

Table 44 Summerfruit on orchard role and skill level estimates

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition full year (permanent) orchard workers	**50%**	**50%**	
Full year workers			
Manager/Owner	115		
Permanent Orchard Workers		115	
Skill composition (part year)		**5%**	**95%**
Part year			
Thinning Supervisor		115	
Picking Supervisor		115	
Thinners			1,145
Pickers			2,290
Packing Staff			458
Truck Driver/Forklift Operator			115

Provider: Summerfruit New Zealand

Data from Summerfruit New Zealand interviews

9.3.6 Vegetables uncovered crops (associated ANZSIC06 Class code A012300)

Uncovered vegetables are classified under ANZSIC06 Class code A012300. They consist of a large number of industries that are focused on domestic and export activities. Some vegetable industries are a mixture of both, but the bulk of the produce is destined for the domestic market. Included are asparagus, beans, brassicas, carrots, potatoes, pumpkin, and a large number of other vegetables. Some vegetables are grown as covered and uncovered crops such as tomatoes and lettuce.

Table 45 Vegetable - uncovered crops roles and skill level estimates

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition	**21%**	**20%**	**59%**
Managers	1,125		
Supervisors		1,067	
Workers			3,200
Skill composition (Part year)			**100%**
Part year			1,600

Provider: Horticulture New Zealand

Data from Horticulture New Zealand interviews

9.3.7 Vegetables - covered crops (associated ANZSIC06 Class code AO12100)

Covered crop production is associated with ANZSIC06 Class code A012100. The role and skill level estimates for covered crops production and processing roles are based on a range of interviews. These include tomatoes, capsicums, chillies, lettuce, cucumbers, and variety of other vegetables, flowers, and table grapes.

Table 46 Vegetable - covered crops role and skill level estimates
2019

Roles	Managers	Semi-autonomous	Managed
Skill composition	**11%**	**7%**	**82%**
GM/Owner Manager	200		
Production Managers	88		
Operations Manager	13		
Grower Managers	50		
Packhouse Manager	13		
Quality Manager	13	25	
Repairs & Maintenance		50	
Salespeople		20	
HR		13	
Finance, Analytics, and Admin		13	
Glasshouse Manager		25	
Grading Team Lead		25	
Prepack Team Lead		25	
Dispatch Team Lead		25	
Quality Controllers		25	
Packhouse Workers			400
Glasshouse Workers			2,400

Provider: Tomatoes NZ and Covered Crop growers
Data source: Grower interviews and NZIER estimates using Statistic NZ data

10 Pork, Poultry, Bees and Other

Pork, Poultry, Bees and Other is made up of a diverse range of activities including pig farming; poultry farming and processing; beekeeping; horse farming; hunting and trapping; other livestock farming, such as alpacas, not classified elsewhere.

10.1 Pork, Poultry, Bees and Other workforce count

Table 47 Aggregate Pork, Poultry, Bees and Other workforce count

Tax year ending March 2019

	Average	Max	Min
Core Production	9,675	10,000	9,300
Core Processing	3,683	3,900	3,500
Strongly Connected	12,725	13,100	12,400
Total	**26,050**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

Note: Average column designation components will not sum to the column total which is an aggregated total reflecting unique individuals at the sector level.

Table 48 Pork, Poultry, Bees and Other workforce count by ANZSIC06 Class code

Tax year ending March 2019

Designation	ANZSIC06 Class code	ANZSIC06 Class code description	Average	Max	Min
Core Production	A017100	Poultry Farming (Meat)	1,500	1,600	1,400
	A017200	Poultry Farming (Eggs)	1,233	1,300	1,200
	A019100	Horse Farming	2,333	2,500	2,200
	A019200	Pig Farming	542	560	520
	A019300	Beekeeping	2,517	2,800	2,200
	A019900	Other Livestock Farming n.e.c.	1,258	1,300	1,200
	A042000	Hunting and Trapping	291	300	280
Core Production Total			**9,675**	**10,000**	**9,300**
Core Processing/ Mfg	C111200	Poultry Processing	3,683	3,900	3,500
Core Processing/ Mfg Total			**3,683**	**3,900**	**3,500**
Strongly Connected	C119900	Other Food Products Manufacturing n.e.c.	7,950	8,100	7,700
	F331900	Other Agricultural Product Wholesaling	4,750	5,000	4,500
Strongly Connected Total			**12,725**	**13,100**	**12,400**
Pork, Poultry, Bees and Other Total			**26,050**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

Note: Table column counts by ANZSIC06 industry categories will not sum to column sub-totals which are aggregated totals reflecting unique individuals at the designation level of each sector. Also, the designation level sub-total columns will not sum to the sector total which is a unique count of individuals at the sector level.

10.2 Pork, Poultry, Bees and Other workforce over a year

The following summaries provide a visual overview of the relationship between the average workforce count and the maximum and minimum workforce counts at an ANZSIC06 class code level over a year. The gold line represents the annual average figure for the tax year ending March 2019 and the green bars represent monthly counts of the tax year ending March 2019.

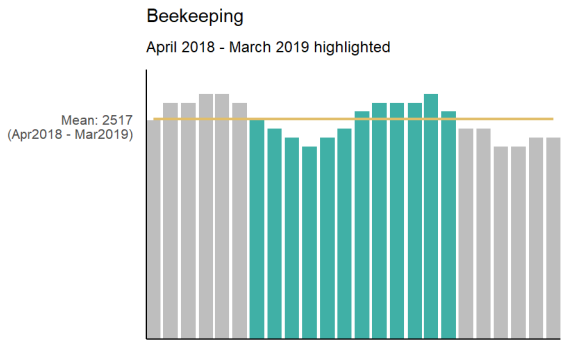
Pork, Poultry, Bees and Other Core Production

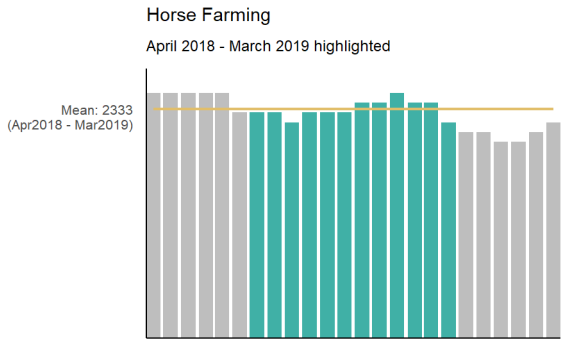
Beekeeping (A019300)

Average: 2,517

Max: 2,800 (Feb)

Min: 2,200 (Jul)





Horse Farming (A019100)

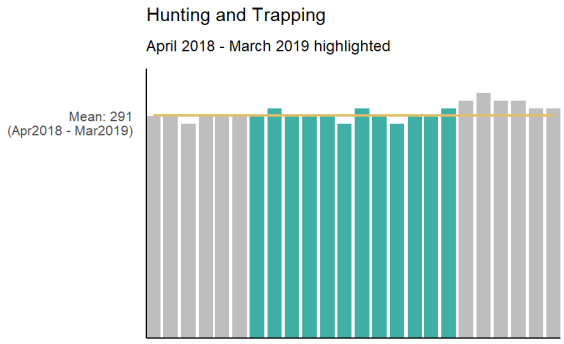
Average: 2,333

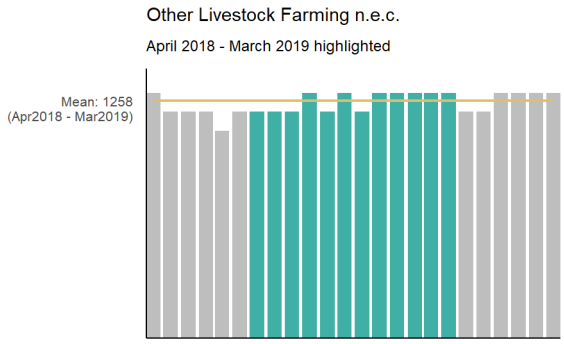
Max: 2,500 (Dec)

Min: 2,200 (Mar/Jun)

Hunting and Trapping (A042000)

Average: 291



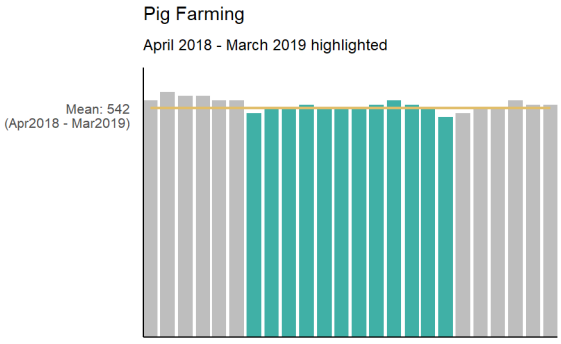


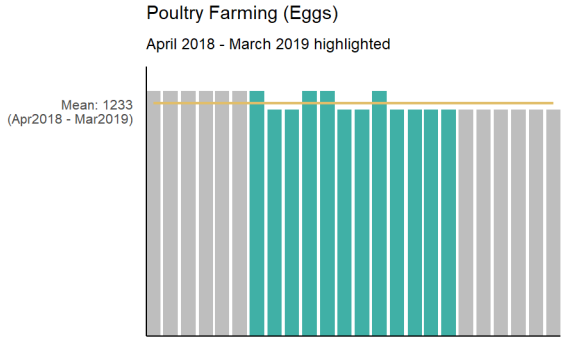
Other Livestock Farming n.e.c. (A019900)

Average: 1,258

Pig Farming (A019200)

Average: 542



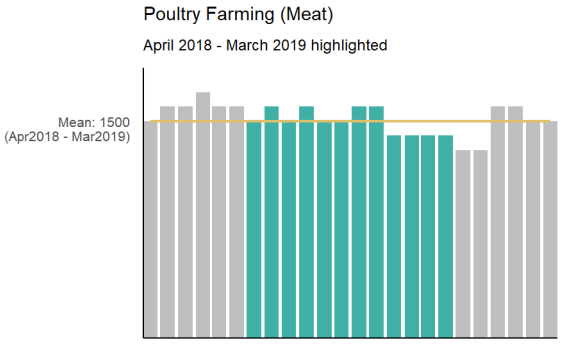


Poultry Farming (Eggs) (A017200)

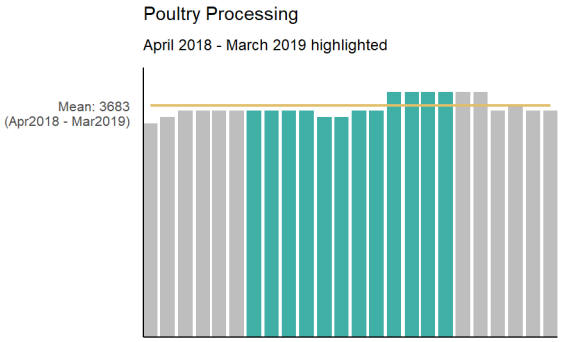
Average: 1,233

Poultry Farming (Meat) (A017100)

Average: 1,500



Pork, Poultry, Bees and Other Core Processing/Manufacturing



Poultry Processing (C111200)

Average: 3,683

Max: 3,900 (Dec-Mar)

Min: 3,500 (Aug/Sep)

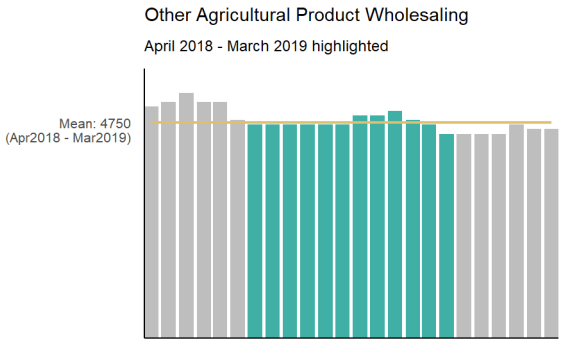
Pork, Poultry, Bees and Other Strongly Connected

Other Agricultural Product Wholesaling (F331900)

Average: 4,750

Max: 5,000 (Dec)

Min: 4,500 (Mar)



Other Food Products Manufacturing n.e.c. (C119900)

Average: 7,950

10.3 Pork, Poultry, Bees and Other roles and skill level estimates

Information on roles and skill levels have been obtained from interviews with the Poultry Industry Association on poultry production and processing roles and Apiculture Association on beekeeping (production) and Pure New Zealand Honey on honey processing roles.

Table 49 Pork, Poultry, Bees and Other aggregate role and skill level estimates

Industry	Skill Composition		
	Managers	Semi-autonomous	Managed
Core Production			
Poultry Meat	**33%**		**67%**
Beekeeping	**51%**	**36%**	**13%**
Core Processing/Manufacturing			
Poultry Meat Processing	**1%**	**5%**	**94%**
Honey Processing	**20%**	**56%**	**24%**
Core Production and Core Processing/Manufacturing (Combined)			
Poultry Eggs Production and Processing	**18%**	**12%**	**70%**

Source: Industry interviews/surveys
Note these figures are based on Poultry and Apiculture only

10.3.1 Poultry

Poultry Core Production - Meat (associated ANZSIC06 Class code A017100)

The Poultry Industry Association advised that most poultry meat farms are within an hour's drive from the processer. Processors provide the livestock, and farmers fund the infrastructure and land required. Farmers must adhere to strict company policies concerning light, heating, and animal health and welfare.

These farms are capital intensive and typically have a manager/owner and two workers looking after 250,000 chickens. The owner/manager model is reflected in the percentage of managers (33 percent).

Table 50 Poultry (Meat) Production role and skill level estimates

2021

Roles	Manager	Semi-autonomous	Managed
Skill composition	**33%**		**67%**
Farm Manager	140		
Farm Workers			280

Provider: Estimates from Poultry Industry Association New Zealand (PIANZ).

Poultry Meat – Core Processing/Manufacturing (associated ANZSIC06 Class code C111200)

The Poultry Industry Association estimates the poultry meat processing workforce to be approximately 5,800. The table below sets out approximate skills and roles. Most workers are managed (93 percent). There are many specialist jobs given the importance of hygiene protocols and other specialist operations. This is reflected in the semi-autonomous skill category (5 percent).

Table 51 Poultry (Meat) processing role and skill level estimates

2021, Comparable with 2019

Roles	Manager	Semi-autonomous	Managed
Skill Composition	**1%**	**5%**	**94%**
GM	8		
Finance	10		
HR	8		
Legal	6		
Marketing	8		
Health/Lab	10	50	
Operations	8		
Sales	10		
Production	8		
IT	10	40	
Production Engineers		40	
Foreperson		100	
Maintenance		40	40
Production Worker			2,200
Record Keeping			150
Chicken Products (cuts)			1,000
Packaging			800
Stores			800
Logistics		20	450

Source: Estimates from Poultry Industry Association New Zealand (PIANZ).

Poultry – Eggs Production and Processing (associated ANZSIC06 Class code C111200)

The Poultry Industry Association advised that there are approximately 160 farms in the egg-laying business. Although, 20 farmers produce about 85 percent of the eggs.

Many of the smaller farms are staffed by an owner and a people working part-time hours, such as 9am–3pm. On these smaller farms, workers undertake a number of roles. The large farmers have a number of workers (approximately 200 hundred per site) spread across several sites.

Managed workers represent approximately 70 percent of the workforce.

Table 52 Poultry Egg Production and Processing: role and skill level estimates

2021

Roles	Manager	Semi-autonomous	Managed
Skill Composition	**18%**	**12%**	**70%**
General Manager/Owner	160		
GM Transport	20		
Processing and Packing	20		
GM Marketing	20		
HR	20		
Veterinarians		20	
Feed Nutrition		20	
Administration		20	
Finance	20		
Production Manager	20		
Engineer	20		
Production Engineers		40	
Foreperson		60	
Production Worker			400
Packaging			200
Stores			200
Transport			140
Farm Manager		40	0
Poultry Workers			200
Part year			280

Source: Poultry Industry Association New Zealand (PIANZ)

10.3.2 Bees

Beekeeping - Core Production (associated ANZSIC06 Class code A019300)

Estimates of the workforce were provided by Apiculture New Zealand and are set out below. The owner/operator model is common, and this is reflected in the large number of managers (49 percent). There is also a high proportion of semi-autonomous workers given the independent nature of work (34 percent).

Part-year people are mainly employed in the February–March period for honey extraction duties.

Table 53 Apiculture role and skill level estimates

2021, Comparable with 2019

Role	Managers	Semi-autonomous	Managed
Skill Composition	**51%**	**36%**	**13%**
Management	1,208		
Senior Staff		834	
Management			
Support Staff			310
Part-year			200

Provider: Apiculture New Zealand

Honey - Core Processing/Manufacturing (within ANZSIC06 Class code C119900)

We were advised that there is limited information about companies that process honey. A respondent provided a tentative estimate of 100 companies. There are a lot of very small companies involved in honey production, not all of them well known even within the industry.

The following table is an estimate from an industry participant. Many businesses are very small, so the number of managers involved is high (20 percent). Semi-autonomous workers make up the majority of the workforce (56 percent).

Table 54 Honey Processing role and skill level estimates

2021,

Role	Managers	Semi-autonomous	Managed
Skill composition	**20%**	**56%**	**24%**
Management	100		
Senior Staff		280	
Workers			120

Source: Pure New Zealand Honey expert opinion

11 Red Meat and Wool

The Red Meat and Wool sector includes sheep, beef and deer farming, meat (includes beef, sheep and venison) processing and wholesaling, shearing, scouring, wool and hide processing, and textile manufacturing.

11.1 Red Meat and Wool workforce count

Table 55 Red Meat and Wool aggregate workforce count

Tax year ending March 2019

	Average	Max	Min
Core Production	47,233	49,100	45,700
Core Processing	23,850	26,400	20,100
Strongly Connected	5,025	5,300	4,900
Relevant*	371		
Total	**76,413**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant reflects 15% of the underling count, which is the amount considered attributable to the food and fibre workforce

Note: Average column designation components will not sum to the column total which is an aggregated total reflecting unique individuals at the sector level.

Table 56 Red Meat and Wool workforce count by ANZSIC06 Class code

Tax year ending March 2019

Designation	ANZSIC06 Class code	ANZSIC06 Class code description	Average	Max	Min
Core Production	A014100	Sheep Farming (Specialised)	9,600	10,100	9,300
	A014200	Beef Cattle Farming (Specialised)	17,133	17,500	16,800
	A014400	Sheep-Beef Cattle Farming	15,208	16,200	14,600
	A014500	Grain-Sheep and Grain-Beef Cattle Farming	1,217	1,300	1,100
	A018000	Deer Farming	1,492	1,500	1,400
	A052200	Shearing Services	3,800	4,700	3,200
Core Production Total			**47,233**	**49,100**	**45,700**
Core Processing/ Mfg	C111100	Meat Processing	21,542	24,000	17,800
	C131100	Wool Scouring	108	120	100
	C131200	Natural Fibre Textile Manufacturing	747	770	720
	C132000	Leather Tanning, Fur Dressing and Leather Product Mfg	1,450	1,500	1,400
Core Processing/ Mfg Total			**23,850**	**26,400**	**20,100**
Strongly Connected	C111300	Cured Meat and Smallgoods Mfg	2,117	2,200	2,000
	C133100	Textile Floor Covering Manufacturing	724	740	700
	F331100	Wool Wholesaling	392	410	380
	F360200	Meat, Poultry and Smallgoods Wholesaling	1,808	2,000	1,700
Strongly Connected Total			**5,025**	**5,300**	**4,900**
Relevant	C133300	Cut and Sewn Textile Product Mfg	371		
Relevant Total			**371**		
Red Meat and Wool Total			**76,413**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant reflects 15% of the underling count, which is the amount considered attributable to the food and fibre workforce

Note: Table column counts by ANZSIC06 industry categories will not sum to column sub-totals which are aggregated totals reflecting unique individuals at the designation level of each sector. Also, the designation level sub-total columns will not sum to the sector total which is a unique count of individuals at the sector level.

11.2 Red Meat and Wool workforce over a year

The following summaries provide a visual overview of the relationship between the average workforce count and the maximum and minimum workforce counts at an ANZSIC06 class code level over a year. The gold line represents the annual average figure for the tax year ending March 2019 and the green bars represent monthly counts of the tax year ending March 2019.

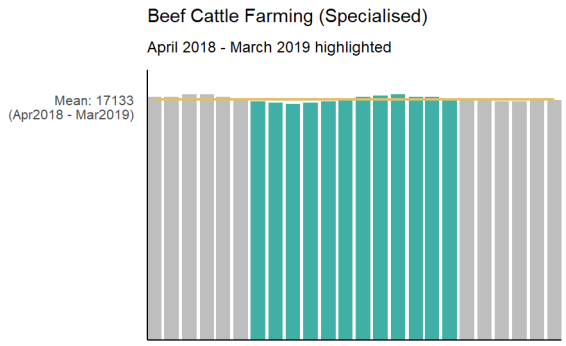
Red Meat and Wool Core Production

Beef Cattle Farming (Specialised) (A014200)

Average: 17,133

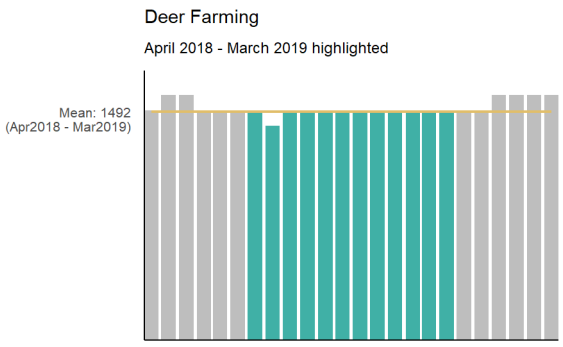
Max: 17,500 (Dec)

Min: 16,800 (Jun)



Beef Cattle Feedlots (Specialised) (A014300)

There were too few individuals and/or businesses in this ANZSIC06 class code for analysis using IDI data.



Deer Farming (A018000)

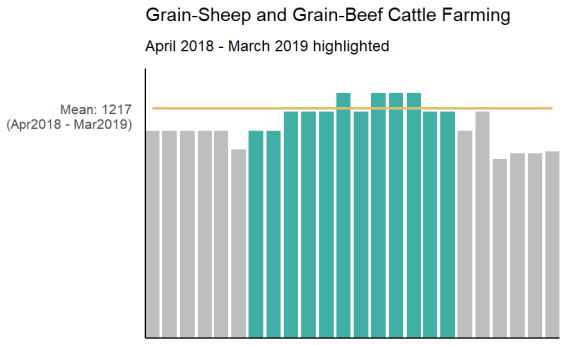
Average: 1,492

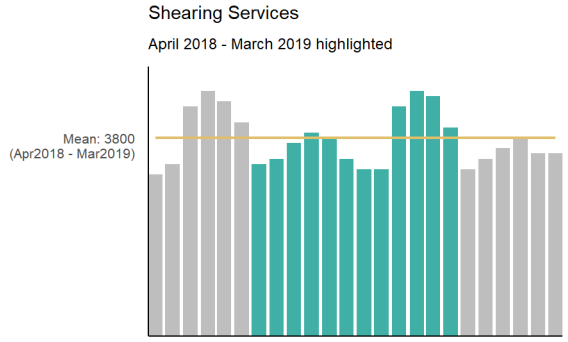
Grain-Sheep and Grain-Beef Cattle Farming (A014500)

Average: 1,217

Max: 1,300 (Sep, Dec-Jan)

Min: 1,100 (Apr/May)





Shearing Services (A052200)

Average: 3,800

Max: 4,700 (Jan)

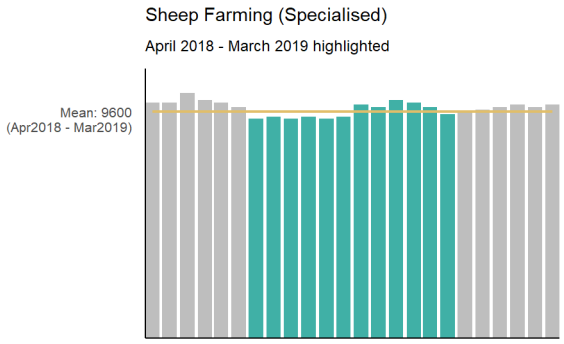
Min: 3,200 (Oct/Nov)

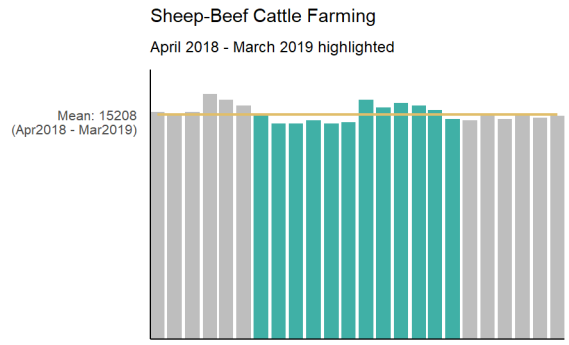
Sheep Farming (Specialised) (A014100)

Average: 9,600

Max: 10,100 (Dec)

Min: 9,300 (Apr, Jun, Aug)





Sheep-Beef Cattle Farming (A014400)

Average: 15,208

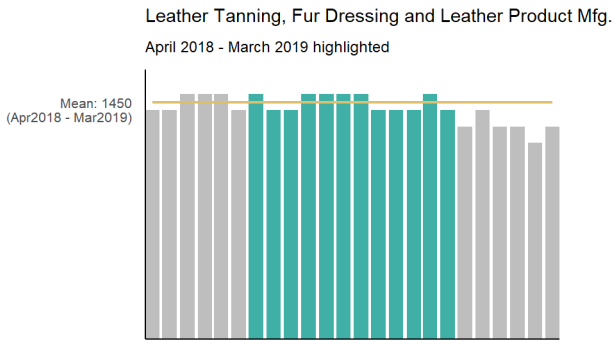
Max: 16,200 (Oct)

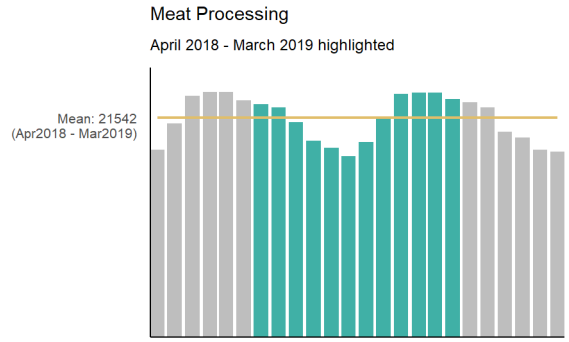
Min: 14,600 (May/Jun, Aug)

Red Meat and Wool Core Processing/Manufacturing

Leather Tanning, Fur Dressing and Leather Product Manufacturing (C132000)

Average: 1,450





Meat Processing (C111100)

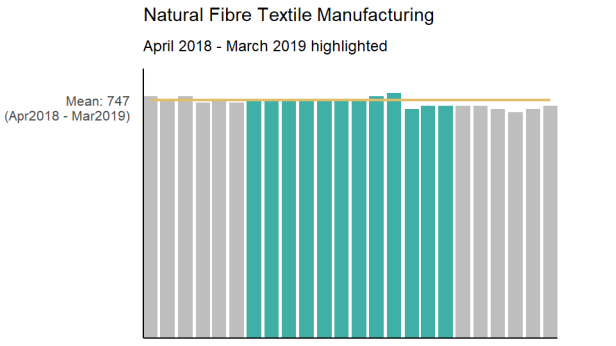
Average: 21,542

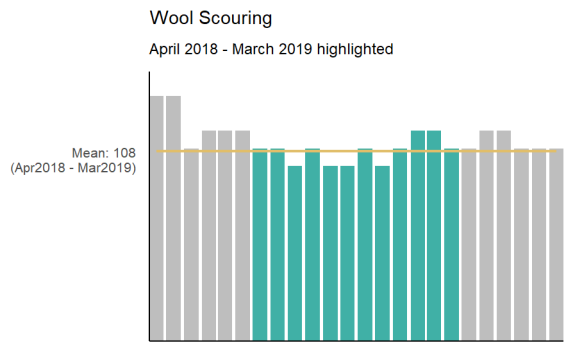
Max: 24,000 (Jan/Feb)

Min: 17,800 (Sep)

Natural Fibre Textile Manufacturing (C131200)

Average: 747





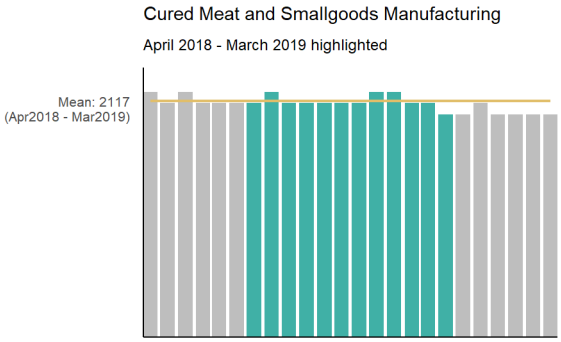
Wool Scouring (C131100)

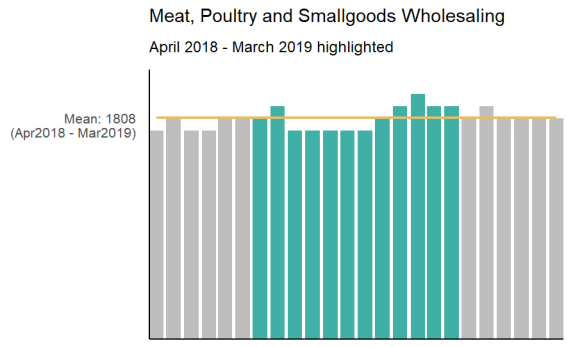
Average: 108

Red Meat and Wool Strongly Connected

Cured Meat and Smallgoods Manufacturing (C111300)

Average: 2,117





Meat, Poultry and Smallgoods Wholesaling (F360200)

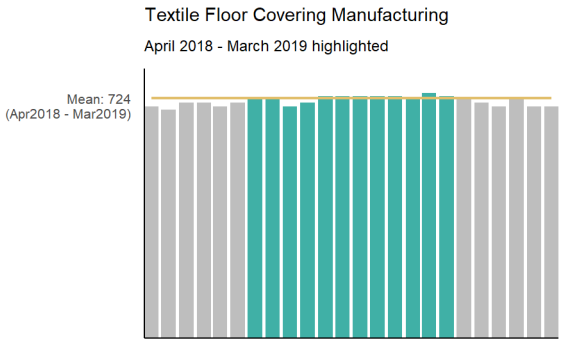
Average: 1,808

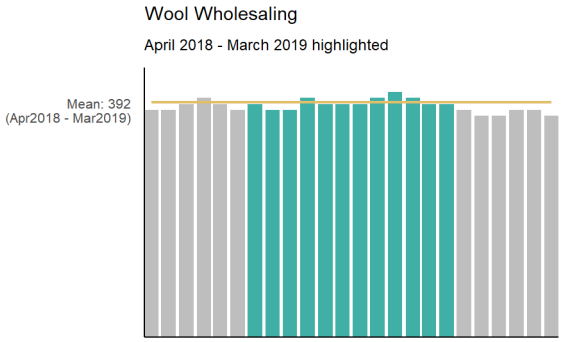
Max: 2,000 (Jan)

Min: 1,700 (Jun-Oct)

Textile Floor Covering Manufacturing (C133100)

Average: 724





Wool Wholesaling (F331100)

Average: 392

Max: 410 (Dec)

Min: 380 (May/Jun)

11.3 Red Meat and Wool role and skill level estimates

Information on role and skill levels in the Red meat and wool industries were obtained from interviews with Beef + Lamb on production, the New Zealand Shearing Contractors on shearing services, the Meat Industry Association on meat processing and a variety of people involved in the wool industry.

Table 57 Red Meat and Wool aggregate role and skill levels

Industry	Skill Composition		
	Managers	Semi-autonomous	Managed
Core Production			
Sheep, Beef, Goat & Deer Farming	**63%**	**28%**	**9%**
Shearing	**3%**	**17%**	**80%**
Core Processing/Manufacturing			
Meat Processing	**4%**	**52%**	**44%**
Wool Scouring	**20%**	**23%**	**57%**
Wool Manufacturing	**30%**	**20%**	**50%**
Strongly Connected			
Wool Brokers	**32%**	**18%**	**50%**
Wool Exporters	**59%**	**25%**	**16%**
Wool Merchants	**25%**	**25%**	**50%**
Wool Testing	**10%**	**15%**	**75%**

Source: Industry interviews/surveys

11.3.1 Red Meat and Wool Core Production

Sheep, beef, goat and deer farming (associated ANZSIC06 Class codes A014100, A014200, A014400, A014500 and A01800)

We have included sheep, beef cattle, goats and deer in this analysis.

According to Beef + Lamb New Zealand, farmers are generally owner operators with some full year workers, supplemented by part-year workers who tend to work over the summer months – October to March. Part year employees are approximately 10 percent of the workforce. This is reflected in the high number of managers (63 percent of the workforce). Most farm workers fit into the semi-autonomous skill category reflecting their high skill levels and self-directed work.

Table 58 Red Meat farm role and skill level estimates

2019, September years

Roles	Managers	Semi-autonomous	Managed
Skill composition	**63%**	**28%**	**9%**
Estimated Owners	10,406		
Estimated Managers	673		
Permanent Workers		4,908	
Estimated Casuals			1,539

Provider(s): Beef + Lamb

Source: Beef + Lamb Survey Data adjusted for deer and goats, Beef + Lamb Compendium of Facts, NZIER estimates. Note: Beef + Lamb figures are lower than Stats NZ, Integrated Data Infrastructure (IDI) numbers as they have restricted their analysis to "Commercial" farms based on minimum land area and/or stock unit thresholds.

Shearing Services (associated ANZSIC06 Class code A052200)

The wool value chain starts with sheep shearing on the farm. Characteristics of the shearing industry include:

- Shearing can be a full-time job if you follow the seasons in New Zealand and overseas. The amount of work available in New Zealand depends on how many times a farmer shears their sheep (once a year, twice a year or every eight months).
- A typical shearing gang for a 750 ha property would comprise four shearers and a presser.

In the following table, the workforce estimates have been provided by the New Zealand Shearing Contractors. Most of the shearing gangs are managed (81 percent), even though their skill level is relatively high, along with the need for a high work rate.

A wool handler or a head shearer manages the operation in the wool shed, and the shearing contractor arranges the jobs and employs the shearing gang.

Table 59 Shearing: role and skill level estimates

2021, June

Roles	Managers	Semi-autonomous	Managed
Skill composition	**3%**	**17%**	**80%**
Shearing Contractor	100	-	
Shearers		137	1,234
Wool Handlers		37	337
Cooks		77	
Administration		33	
Open Shed Shearers		274	
Wool Pressers	-	-	1,002

Provider: Estimates from New Zealand Shearing Contractors

11.3.2 Red Meat Processing (associated with ANZSIC06 Class code C111100)

In 2019, there were 45 meat processors spread across most regions of New Zealand.

- The Meat Industry Association advised that while each processor has its own approach to workforce development, a broad classification is used based on entry-level, medium skill, and high skill. In terms of the skill levels in this report we have grouped medium skill and high skill as semi-autonomous roles and entry-level roles as managed. The Meat Industry Association also commented that work in processing is seasonal, and the length of the season is dependent on weather conditions (rainfall and droughts).

The breakdown of the roles and skill levels in the red meat processing sector is set out in the following table. Most of the workforce is grouped in the semi-autonomous category (51 percent). Suggesting that skill levels are relatively high. Slightly fewer are in the managed skill group (44 percent).

Table 60 Red Meat Processing and marketing role and skill level estimates

2021

Roles	Managers	Semi-autonomous	Managed
Skill composition	**4%**	**52%**	**44%**
Management	800		
High Skilled (these include)		3,820	
Supervisor			
Leading Hand			
Carcass Grader			
Storeperson			
Shunter			
Butcher (A grade)			
Boner			
Medium skilled (these include)		6,869	
Chiller Hand			
Casings			
Renderer			
Cold Chain Dispatch			
Butcher (B grade)			
Trimer			
Yard Person			
Internal Products			
Blood			
Entry level (these include)			9,150
Packer			
Bagger			
Weigher			
Cleaners			
Floor Person			
Labourer (C grade)			
Trimmer (C grade)			
Yard Person (C grader)			
Internal Products (C grader)			
Blood (C grader)			

Provider(s): Meat Industry Association estimates

Regional estimates for meat processing volumes

Stock is processed in most areas of New Zealand. Major processing regions are Canterbury, Waikato and Southland. Although most other regions have some processing capacity.

Table 61 Regional estimates for meat processing volumes

2021, June

Region	Percent
Northland	2%
Auckland	9%
Waikato	14%
Bay of Plenty	2%
Gisborne	1%
Hawkes' Bay	10%
Taranaki	8%
Manawatu - Whanganui	10%
Wellington	3%
Tasman	0%
Nelson	1%
Marlborough	1%
West Coast	1%
Canterbury	16%
Otago	9%
Southland	13%

Source: Meat Industry Association

11.3.3 Wool Processing

Wool Scouring (associated ANZSIC06 Class code C131100)

Wool scouring is the process of removing contaminants such as wool grease from raw wool. The process also removes excess moisture. There is one scourer in New Zealand, WoolWorks, which has a 76 percent market share. Other wool is shipped directly offshore or to specialist operations such as icebreaker.

Most of the workforce is managed (57 percent), although the number of specialists and managers is approximately 40 percent of the total staff, which is relatively high. This reflects the specialist nature of some of the work required.

Most wool scouring occurs in Canterbury and Hawke's Bay.

Table 62 Wool Scouring: role and skill level estimates

2021, June

Roles	Managers	Semi-autonomous	Managed
Skill composition	**20%**	**23%**	**57%**
Management (these include)	30		
GM			
Corporate			
Operations			
Shipping			
H&S			
Administration			
Management Support		35	
Managed Staff			85

Source: WoolWorks

Wool Manufacturing (associated ANZSIC06 Class code C131200)

Wool Manufacturers develop and manufacture a wide range of wool products, from wool textiles and yarns to high end residential, commercial interiors and wool accessories.

There are a small number of manufacturers in New Zealand with a workforce dominated by managed workers (50 percent). Other workforce skill categories are balanced between managers (30percent) and semi-autonomous workers (20 percent). The high number of managers reflects the small firm size in this industry. The table below sets out the estimates.

Table 63 Wool Manufacturers: role and skill level estimates

2021, June

Roles	Managers	Semi-autonomous	Managed
Skill composition	**30%**	**20%**	**50%**
Management	30		
Management Support		10	
Team Leaders		10	
Handling, Logistics and Stores			50

Provider: Interviewee

11.3.4 Wool - Strongly Connected

Wool Brokers (associated ANZSIC06 Class code F331100)

The wool brokers association has seven members, with two large players. Wool brokers buy the wool and on-sell it at auction or through a private treaty. A wool broking business can be characterised by:

- Wool salespeople who have skills and knowledge about wool types, wool handling, and market values.
- Store operations which have a variety of functions including receiving and delivering wool (operating a forklift), various logistics operations, and wool classers – who operate sampling machines.
- Store staff tend to be long time employees.
- Part-year workers tend to work over the summer period and return each season.

Wool brokers mainly have managed staff (50 percent), with a number of specialist staff and managers. Part-year workers are a small part of the business.

Table 64 Wool Brokers: role and skill level estimates

2021, June

Roles	Managers	Semi-autonomous	Managed
Skill composition	**32%**	**18%**	**50%**
Management	70		
Management Support/Sales		40	
Stores, Logistics, Wool Handlers			110
Part year			15

Provider: Interviewee

Wool Exporters

Interviewee advised that wool exporters tend to work in teams. A manager does the trading, wool buyers secure the product for sale, a shipping clerk arranges the logistics, and administrators ensure the work is done smoothly. Staff have some degree of autonomy, but it is a highly directive operation. For example, a buyer will work with the GM to determine what type of wool is required and at what price. And other staff will work around that sale. It all feeds through – even the shipping clerk needs to have the relationships outside the business (with shipping agents), but the work comes through the GM; it is directed.

The large number of managers reflects the small size of these businesses (60 percent).

Table 65 Wool Exporters: role and skill level estimates

2021, June

Roles	Managers	Semi-autonomous	Managed
Skill composition	**59%**	**25%**	**16%**
Management	45		
Buyers		6	4
Shipping Clerks		6	4
Administrators		7	4

Provider: Interviewee

Private Wool Merchants **(associated ANZSIC06 Class code F331100)**

Nearly half of all wool in New Zealand is traded by private wool merchants. They tend to be small local firms with niche positions within the industry (managers represent 25 percent of the workforce). They buy direct from growers and compete directly with wool brokers. These businesses have mainly managed workers (50 percent).

Table 66 Wool Merchants: role and skill level estimates

2021, June

Roles	Managers	Semi-autonomous	Managed
Skill composition	**25%**	**25%**	**50%**
Management	30		
Management Support		15	
Team Leaders		15	
Handling, Logistics and Stores			60

Source: Interviewee

Wool Testing

Wool testers provide certification for the wool trade. They guarantee the wool quality and quantity. They are independent of other players within the wool industry. Providing very specific information to customers, they effectively facilitate the trade by bringing certainty to the process. Wool that has been tested tends to sell for a much higher price than untested wool.

There are two main entities in New Zealand that test wool. It is more like a factory process than testing in a laboratory. Most of the workforce is involved in managed positions where their work is directed (76 percent).

Table 67 Wool Testing: role and skill level estimates

2021, June

Roles	Managers	Semi-autonomous	Managed
Skill composition	**10%**	**15%**	**75%**
Management Team	8		
Team Leaders		12	
Directed Workforce			60

Provider(s): SGS New Zealand Limited

12 Seafood

The seafood sector includes the deep sea and inshore fisheries, aquaculture and seafood processing and wholesaling, along with ship and boat building and repair services. As mentioned earlier, the way industry views the value chain can be different from the standard industry classification within ANZSIC06. It is not possible to directly align ANZSIC06 Class codes with deep sea and in-shore fishing, nor necessarily distinguish seafood processing between the aquaculture sector and the rest of the seafood sector.

12.1 Seafood workforce count

Table 68 Seafood aggregate workforce count

Tax year ending March 2019

	Average	Max	Min
Core Production	6,075	6,300	5,900
Core Processing	4,808	5,000	4,600
Strongly Connected	1,225	1,300	1,200
Relevant*	500		
Total	**12,392**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant reflects 15% of the underling count, which is the amount considered attributable to the food and fibre workforce

Note: Average column designation components will not sum to the column total which is an aggregated total reflecting unique individuals at the sector level.

Table 69 Seafood workforce count by ANZSIC06 Class code

Tax year ending March 2019

Designation	ANZSIC06 Class code	ANZSIC06 Class code description	Average	Max	Min
Core Production	A020100	Longline and Rack (Offshore) Aquaculture	615	650	590
	A020200	Caged (Offshore) Aquaculture	149	170	140
	A020300	Onshore Aquaculture	238	270	220
	A041100	Rock Lobster and Crab Potting	564	580	540
	A041300	Line Fishing	1,008	1,100	1,000
	A041400	Fish Trawling, Seining and Netting	2,808	3,000	2,600
	A041900	Other Fishing	983	1,000	960
Core Production Total			**6,075**	**6,300**	**5,900**
Core Processing/ Mfg	C112000	Seafood Processing	4,808	5,000	4,600
Core Processing/ Mfg Total			**4,808**	**5,000**	**4,600**
Strongly Connected	F360400	Fish and Seafood Wholesaling	1,225	1,300	1,200
Strongly Connected Total			**1,225**	**1,300**	**1,200**
Relevant	C239100	Shipbuilding and Repair Services	84		
	C239200	Boatbuilding and Repair Services	416		
Relevant Total			**500**		
Seafood Total			**12,392**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant reflects 15% of the underling count, which is the amount considered attributable to the food and fibre workforce

Note: Table column counts by ANZSIC06 industry categories will not sum to column sub-totals which are aggregated totals reflecting unique individuals at the designation level of each sector. Also, the designation level sub-total columns will not sum to the sector total which is a unique count of individuals at the sector level.

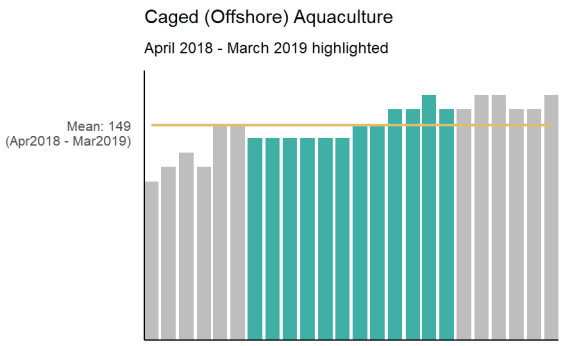
12.2 Seafood workforce over a year

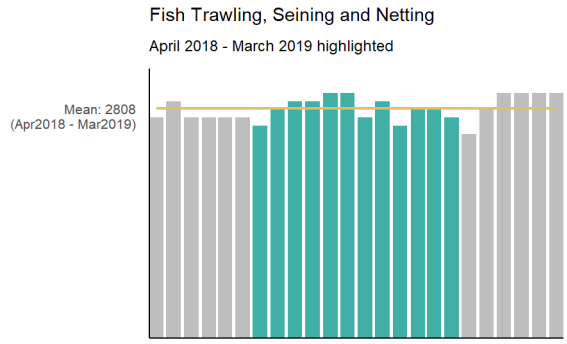
The following summaries provide a visual overview of the relationship between the average workforce count and the maximum and minimum workforce counts at an ANZSIC06 class code level over a year. The gold line represents the annual average figure for the tax year ending March 2019 and the green bars represent monthly counts of the tax year ending March 2019.

Seafood Core Production

Caged (Offshore) Aquaculture (A020200)

Average: 149





Fish Trawling, Seining and Netting (A041400)

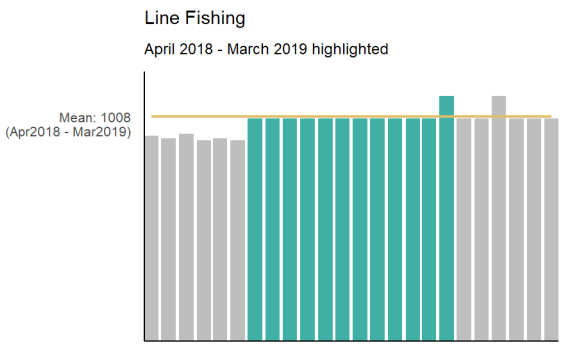
Average: 2,808

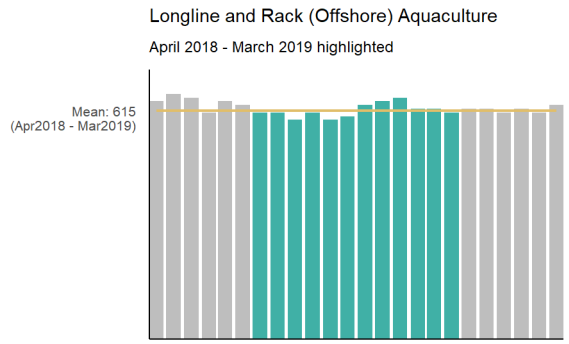
Max: 3,000 (Aug/Sep)

Min: 2,600 (Apr, Dec)

Line Fishing (A041300)

Average: 1,008





Longline and Rack (Offshore) Aquaculture (A020100)

Average: 615

Max: 650 (Dec)

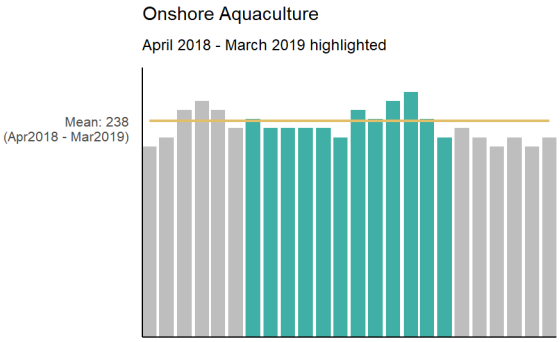
Min: 590 (Jun/Aug)

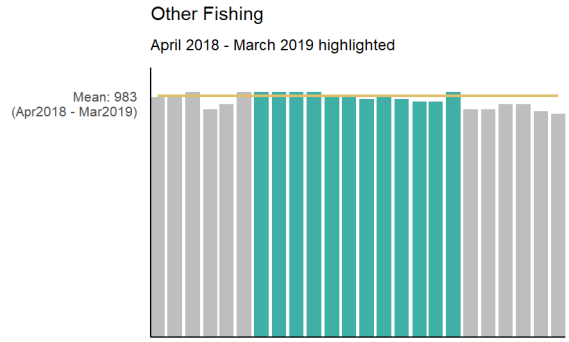
Onshore Aquaculture (A020300)

Average: 238

Max: 270 (Jan)

Min: 220 (Mar, Sep)





Other Fishing (A041900)

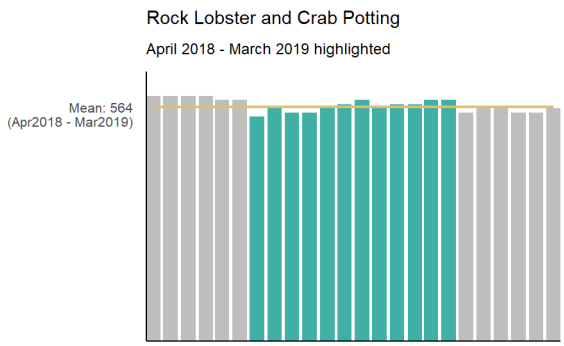
Average: 983

Prawn Fishing (A041200)

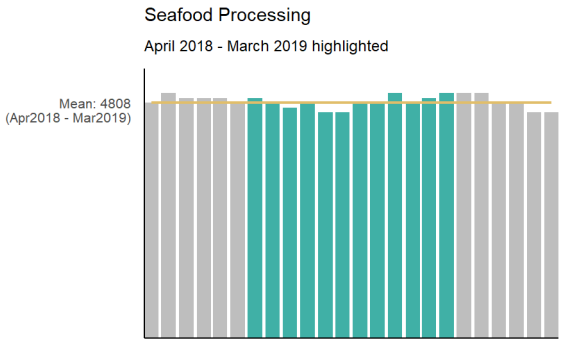
There were too few individuals and/or businesses in this ANZSIC06 class code for analysis using IDI data.

Rock Lobster and Crab Potting (A041100)

Average: 564



Seafood Core Processing/Manufacturing



Seafood Processing (C112000)

Average: 4,808

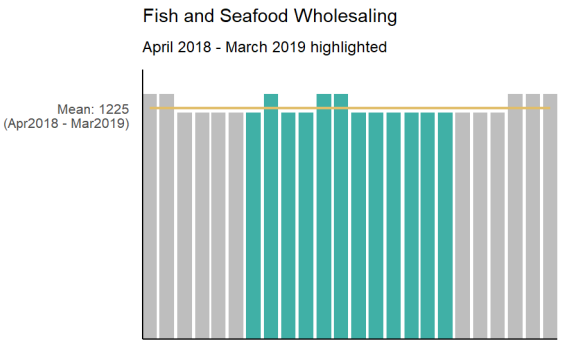
Max: 5,000 (Mar, Dec)

Min: 4,600 (Aug/Sep)

Seafood Strongly Connected

Fish and Seafood Wholesaling (F360400)

Average: 1,225



12.3 Seafood roles and skill levels

The information on roles and skill level information in the seafood sector has been taken from the "Report of the Ministerial Inquiry into the use and allocation of migrant labour in the seafood sector"[10]. As part of the Ministerial Inquiry, large seafood industry firms were surveyed (representing an estimated 50% of the workforce).

Table 70 Seafood aggregate role and skill level estimates

Industry	Skill Composition		
	Managers	Semi-autonomous	Managed
Core Production			
Seafood Production	**11%**	**29%**	**60%**
Core Processing/Manufacturing			
Seafood Processing	**9%**	**13%**	**78%**

Source: Industry interviews/surveys

12.3.1 Seafood Core Production (associated ANZSIC06 Class codes A020100, A020200,A020300, A041100, A041200, A041300, A041400, A041900)

Table 71 Seafood Production – role and skill level estimates

2021, September

Roles	Managers	Semi-Autonomous	Managed
Skill composition	**11%**	**29%**	**60%**
Skippers	101		
Managers	144		
Mates		135	
Engineers (DeepSea/Inshore)		275	
Deck Bosses		69	
Factory Supervisors		67	
Technical Staff		133	
Deck Hands			329
Mates/Deck Crew			375
Processing Staff (Deep Sea)			580
Cooks and Assistants			110

Provider(s): Report of the Ministerial Inquiry into the use and allocation of migrant labour in the seafood sector, Oct 2021
Data source: Large Companies Survey representing almost 50% of workforce

[10] Report is available https://www.mpi.govt.nz/legal/legislation-standards-and-reviews/ministerial-inquiry-into-new-zealands-seafood-workforce/

12.3.2 Seafood Core Processing/Manufacturing (associated ANZSIC06 Class code C112000)

Table 72 Seafood Processing – role and skill level estimates

2021, September

Roles	Managers	Semi-Autonomous	Managed
Skill composition	**9%**	**13%**	**78%**
Factory Managers	98		
Sales and Marketing	81		
Engineering (Shore Based)	103		
Factory Supervisors		188	
Human Resources		23	
Quality Assurance		62	
Technical Staff		139	
Team Leaders		10	
Administration			198
Logistics/Supply Chain			275
Finance			11
Processing Staff (Shore Based)			1,759
Hatchery Staff			52
Sea Farm Staff			59
Unspecified Roles			94

Provider(s): Report of the Ministerial Inquiry into the use and allocation of migrant labour in the seafood sector, Oct 2021
Data source: Large Companies Survey representing almost 50% of workforce

13 Cross Sector

There are many people employed in by businesses that operate in the food and fibre sectors, that cannot be attributed to a single sector and value chain. This could be because they are difficult to identify within the data, or because the businesses provide services across a range of different primary sectors and/or to other industries or consumers. Many tasks that are outsourced to contracting firms are included within this category, in particular many provide services to the horticulture sector (including viticulture).

13.1 Cross Sector workforce

Table 73 Cross Sector workforce aggregate count

Tax year ending March 2019

	Average	Max	Min
Core Production	26,275	31,500	23,100
Strongly Connected	10,450	10,600	10,200
Relevant*	20,826		
Other*	6,181		
Total	**63,724**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant and Other reflect 15% of the underling counts, which is the amount considered attributable to the food and fibre workforce

Note: Average column designation components will not sum to the column total which is an aggregated total reflecting unique individuals at the sector level.

Table 74 Cross Sector workforce count by ANZSIC06 Class code

Tax year ending March 2019

Designation	ANZSIC06 Class code	ANZSIC06 Class code description	Average	Max	Min
Core Production	A052900	Other Agriculture and Fishing Support Services	26,275	31,500	23,100
Core Production Total			**26,275**	**31,500**	**23,100**
Strongly Connected	C183100	Fertiliser Manufacturing	1,067	1,100	1,000
	C183200	Pesticide Manufacturing	184	200	170
	C184200	Veterinary Pharmaceutical and Medicinal Product Manufacturing	977	1,000	940
	C246100	Agricultural Machinery and Equipment Manufacturing	2,250	2,300	2,200
	M697000	Veterinary Services	5,983	6,100	5,800
Strongly Connected Total			**10,450**	**10,600**	**10,200**
Relevant	C115000	Oil and Fat Manufacturing	63		
	C133200	Rope, Cordage and Twine Manufacturing	24		
	C203100	Cement and Lime Manufacturing	67		
	F332300	Industrial and Agricultural Chemical Product Wholesaling	481		
	F341100	Agricultural and Construction Machinery Wholesaling	809		
	I461000	Road Freight Transport	5,005		
	I521100	Stevedoring Services	319		
	I521200	Port and Water Transport Terminal Operations	499		
	M691000	Scientific Research Services	1,345		
	M692300	Engineering Design and Engineering Consulting Services	4,474		
	M692500	Scientific Testing and Analysis Services	852		
	M700000	Computer Systems Design and Related Services	6,889		
Relevant Total			**20,826**		
Other	N721200	Labour Supply Services	6,181		
Other Total			**6,181**		
Cross Sector Total			**63,724**		

Source: MPI using Stats NZ, Integrated Data Infrastructure (IDI)

* Relevant and Other reflect 15% of the underling counts, which is the amount considered attributable to the food and fibre workforce

Note: Table column counts by ANZSIC06 industry categories will not sum to column sub-totals which are aggregated totals reflecting unique individuals at the designation level of each sector. Also, the designation level by sector sub-total columns will not sum to the sector total which is a unique count of individuals at the sector level.

13.2 Cross Sector workforce over a year

The following summaries provide a visual overview of the relationship between the average workforce count and the maximum and minimum workforce counts at an ANZSIC06 class code level over a year. The gold line represents the annual average figure for the tax year ending March 2019 and the green bars represent monthly counts of the tax year ending March 2019.

Cross Sector Core Production

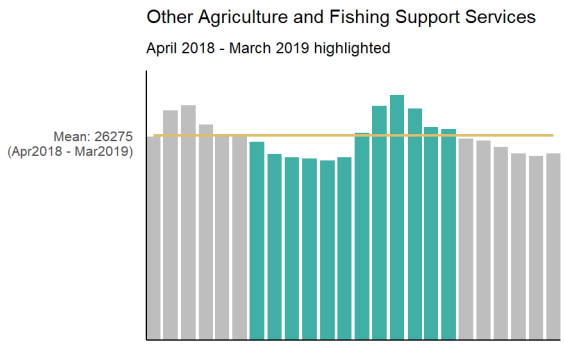
Other Agriculture and Fishing Support Services (A052900)

Average: 26,275

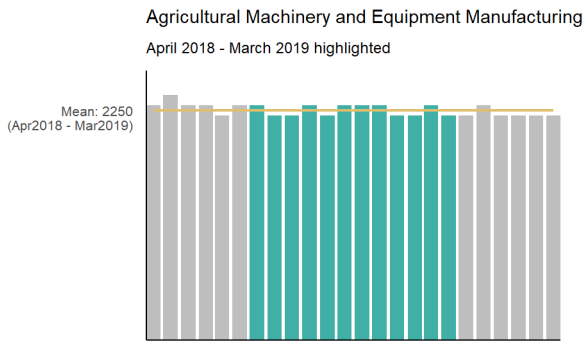
Max: 31,500 (Dec)

Min: 23,100 (Aug)

This ANZSIC06 code contains a range of businesses involved in supporting activities and includes (among many other activities) horticultural contracting, and contract milking services.



Cross Sector Strongly Connected

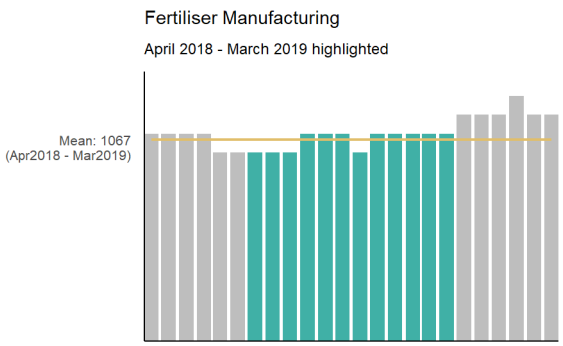


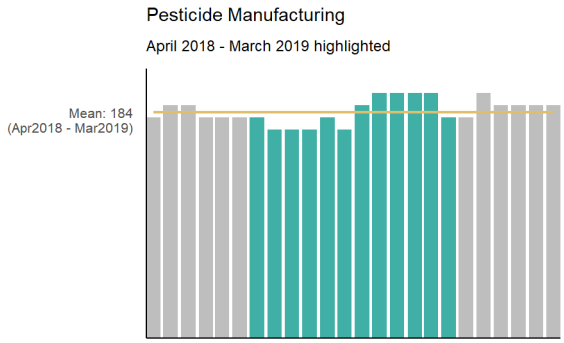
Agricultural Machinery and Equipment Manufacturing (C246100)

Average: 2,250

Fertiliser Manufacturing (C183100)

Average: 1,067





Pesticide Manufacturing (C183200)

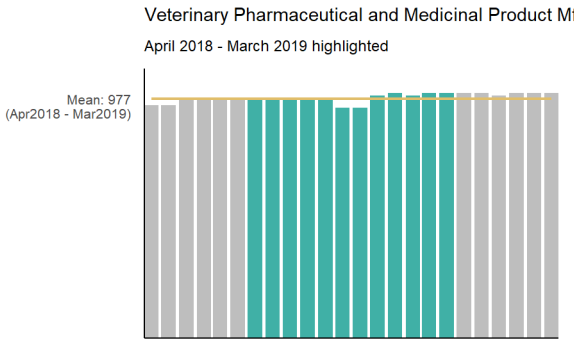
Average: 184

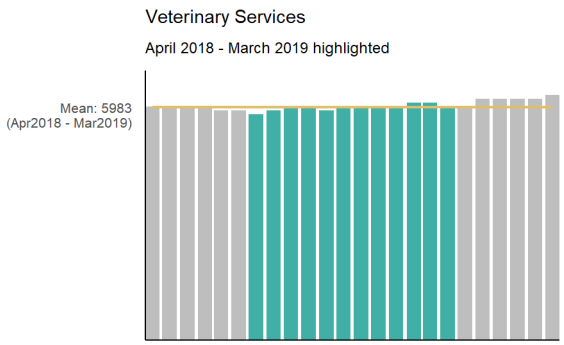
Max: 200 (Jan/Feb/Nov/Dec)

Min: 170 (May/Jun/Jul/Sep)

Veterinary Pharmaceutical and Medicinal Product Manufacturing (C184200)

Average: 977





Veterinary Services (M697000)

Average: 5,983

14 Next steps

The information in this paper forms the baseline for the workforce count and skill composition for the Workforce forecasts.

The information in this report, will also be made available through the website that is being developed.

Appendix A Project governance

The Primary Sector Employment Dataset and Forecasting Working Group

Name	Position/Affiliation
Louise Sherrell	Chair; Acting Manager, Primary Sector Workforce Policy, Policy and Trade, MPI
Kerry Allen	Secretary / Treasurer of New Zealand Horticulture / Agriculture Teachers Association (HATA)
Jeremy Baker	Muka Tangata NZ
Hugh Bigsby	Dean, Professor, Forestry Business, Agribusiness & Commerce, Lincoln University
Jay Bocock	Te Awanui (Maori Economic Development)
Nicola Crennan	NZ Wine
David Evison	Forestry and wood processing Workforce Council & University of Canterbury
Christine Ewart	National Manager of Forestry, Competenz
Dion Gamperle	Senior Insights Analyst, Regional Skills Leadership Groups, MBIE
Michelle Glogau	Chief Executive, PICA
Angela McFetridge	Design Lead, Beef & Lamb NZ
Gerald Minnee	Policy Director, Labour Market & Immigration, MBIE
Blair Morgans	Primary ITO
Mike Murphy	Communications Manager, NZKGI
Callum Neil	Beef & Lamb NZ
Rose Ryan	Muka Tangata NZ
Marion Schrama	Manager, Skills, Training & Workforce Safety
Erin Simpson	NZAPI
Fraser Sloane	Team Lead Innovation, TEC
Justine Stephen	Muka Tangata NZ
Geoff Taylor	Associate Strategy & Investment Leader, DairyNZ
Cathy Webb	Seafood Standards Manager, Seafood NZ
Phil Williams	Accounts Manager of Forestry, Competenz
MPI staff	
Maryanne Aynsley	Principal Adviser, Skills, MPI
Mark Hampshire	Principal Data Analyst, Skills, MPI
Richard Lynch	Principal Adviser, Skills, MPI
Danny Young	Senior Data Analyst, Skills, MPI

Appendix B Sectors by designation, by ANZSIC06 Class code

Sector	Designation	ANZSIC06 Class code	ANZSIC06 Class code description
Arable	Core Production	A014900	Other grain growing
		A015900	Other crop growing nec
	Core Processing/Mfg	C116100	Grain mill product manufacturing
		C119200	Prepared animal and bird feed manufacturing
	Strongly Connected	C116200	Cereal, pasta and baking mix manufacturing
		C117100	Bread manufacturing (factory based)
		C117200	Cake and pastry manufacturing (factory based)
		C117300	Biscuit manufacturing (factory based)
		C117400	Bakery product manufacturing (non-factory based)
		C118100	Sugar manufacturing
		C121200	Beer manufacturing
		C121300	Spirit manufacturing
		F331200	Cereal grain wholesaling
		I530100	Grain storage services
	* Relevant	C118200	Confectionery manufacturing
Dairy	Core Production	A016000	Dairy cattle farming
	Core Processing/Mfg	C113100	Milk and cream processing
		C113200	Ice cream manufacturing
		C113300	Cheese and other dairy product manufacturing
	Strongly Connected	F360300	Dairy produce wholesaling
Forestry & Wood Processing	Core Production	A030100	Forestry
		A030200	Logging
		A051000	Forestry support services
	Core Processing/Mfg	C141100	Log sawmilling
		C141200	Wood chipping
		C141300	Timber resawing and dressing
		C149300	Veneer and plywood manufacturing
		C149400	Reconstituted wood product manufacturing
		C151000	Pulp, paper and paperboard manufacturing
	Strongly Connected	C149200	Wooden structural fitting and component mfg
		C149900	Other wood product manufacturing nec
		C152100	Corrugated paperboard and paperboard container mfg
		C152200	Paper bag manufacturing
		C251100	Wooden furniture and upholstered seat mfg
		F333100	Timber wholesaling
	* Relevant	C149100	Prefabricated wooden building manufacturing
		C152300	Paper stationery manufacturing
		C152400	Sanitary paper product manufacturing
		C152900	Other converted paper product manufacturing

** Note: The designations of "Relevant" and "Other" have both had a 15% employment count weighting applied against them*

Sector	Designation	ANZSIC06 Class code	ANZSIC06 Class code description
Horticulture	Core Production	A011100	Nursery production (under cover)
		A011200	Nursery production (outdoors)
		A011300	Turf growing
		A011400	Floriculture production (under cover)
		A011500	Floriculture production (outdoors)
		A012100	Mushroom growing
		A012200	Vegetable growing (under cover)
		A012300	Vegetable growing (outdoors)
		A013100	Grape growing
		A013200	Kiwifruit growing
		A013300	Berry fruit growing
		A013400	Apple and pear growing
		A013500	Stone fruit growing
		A013600	Citrus fruit growing
		A013700	Olive growing
		A013900	Other fruit and tree nut growing
		OIERSE	RSE found in other ANZSIC06 codes (Aggregation)
	Core Processing/Mfg	C114000	Fruit and vegetable processing
		C121400	Wine and other alcoholic beverage mfg
		I530900	Other warehousing and storage services (Coolstores)
		N732000	Packaging Services (Packhouses)
	Strongly Connected	C119100	Potato, corn and other crisp mfg
		F360500	Fruit and vegetable wholesaling
	* Relevant	C121100	Soft drink, cordial and syrup mfg
Pork, Poultry, Bees and Other	Core Production	A017100	Poultry farming (meat)
		A017200	Poultry farming (eggs)
		A019100	Horse farming
		A019200	Pig farming
		A019300	Beekeeping
		A019900	Other livestock farming nec
		A042000	Hunting and trapping
	Core Processing/Mfg	C111200	Poultry processing
	Strongly Connected	C119900	Other food product manufacturing nec
		F331900	Other agricultural product wholesaling

** Note: The designations of "Relevant" and "Other" have both had a 15% employment count weighting applied against them*

Sector	Designation	ANZSIC06 Class code	ANZSIC06 Class code description
Red Meat and Wool	Core Production	A014100	Sheep farming (specialised)
		A014200	Beef cattle farming (specialised)
		A014300	Beef cattle feedlots (specialised)
		A014400	Sheep-beef cattle farming
		A014500	Grain-sheep or grain-beef cattle farming
		A018000	Deer farming
		A052200	Shearing services
	Core Processing/Mfg	C111100	Meat processing
		C131100	Wool scouring
		C131200	Natural textile manufacturing
		C132000	Leather tanning, fur dressing & leather product mfg
	Strongly Connected	C111300	Cured meat and smallgoods manufacturing
		C133100	Textile floor covering manufacturing
		F331100	Wool wholesaling
		F360200	Meat, poultry and smallgoods wholesaling
	* Relevant	C133300	Cut and sewn textile product mfg
Seafood	Core Production	A020100	Longline and rack (offshore) aquaculture
		A020200	Caged (offshore) aquaculture
		A020300	Onshore aquaculture
		A041100	Rock lobster and crab potting
		A041200	Prawn fishing
		A041300	Line fishing
		A041400	Fish trawling, seining and netting
		A041900	Other fishing
	Core Processing/Mfg	C112000	Seafood processing
	Strongly Connected	F360400	Fish and seafood wholesaling
	* Relevant	C239100	Shipbuilding and repair services
		C239200	Boatbuilding and repair services
Cross Sector	Core Production	A052900	Other agriculture and fishing support services
	Strongly Connected	C246100	Agricultural machinery and equipment mfg
		C183100	Fertiliser manufacturing
		C183200	Pesticide manufacturing
		M697000	Veterinary services
		C184200	Veterinary pharmaceutical and medicinal product mfg
	* Relevant	C203100	Cement and lime manufacturing
		F332300	Industrial and agricultural chemical product wholesaling
		F341100	Agricultural and construction machinery wholesaling
		I461000	Road freight transport
		I471000	Rail freight transport
		I521100	Stevedoring services
		I521200	Port and water transport terminal operations
		M691000	Scientific research services
		M692300	Engineering design and engineering consulting services
		M692500	Scientific testing and analysis services
		M700000	Computer system design and related services
		C115000	Oil and fat manufacturing
		C133200	Rope, cordage and twine manufacturing
	* Other	N721200	Labour Supply Services

** Note: The designations of "Relevant" and "Other" have both had a 15% employment count weighting applied against them*

Appendix C Questionnaire for semi-structured interviews

Overview

Building a highly skilled primary industries workforce is critical to the success of businesses and entities across the food and fibre sectors, now and in the future.

The NZ Institute of Economic Research (NZIER) has been engaged by the Ministry for Primary Industries and its stakeholders represented by a Data and Forecasting Working Group, to identify the current jobs and forecast possible future jobs under a range of scenarios.

We are seeking your assistance to identify future labour force requirements and are asking you to cooperate so that we can identify current and future primary sector jobs.

We appreciate that you are putting time and effort into this process, and this is not costless.

Below we have set out the type of questions we wish to ask to understand the make-up and characteristics of the present labour force across the various industries. We are also looking for your opinion on what future jobs may look like over the next 10 years.

These questions are detailed and while you may not have all of the information/data required, we would like to understand where we have data and where we may have to make assumptions.

The survey instrument is intended to guide discussions with key stakeholders and could be used as a formal questionnaire.

The survey responses

The results from our interviews will be triangulated with other sources so we can verify (as far as possible) current job counts and the skill sets and roles. This data is necessary to identify and respond to possible labour force pressures and how the workforce may evolve over the next decade or more.

To forecast primary industry workforce requirements the NZIER first need to establish in each primary industry:

- The number of workers in the industry
- The job descriptions and numbers working at each job type
- The skill levels associated with each job type.

The aim is to regionally estimate the approximated size of the labour force under job type categories and the skills of those people in primary industries. We expect the base year for this data to be 2019.

This information/data is the base data that will be used to forecast alternative futures that MPI and its stakeholders in the Data and Forecasting Working Group want to explore. As part of this process the NZIER is interviewing key players within primary industries to understand numbers employed in each job category, skill levels, and current/likely workforce trends.

Identification of interviewee

Name:

Firm/entity:

Industry:

Date interviewed:

Issue to be discussed:

Existing information /data

Information on the existing workforce in each industry is variable. The NZIER needs to identify what is known and establish the factual basis to work from.

- Key participants can assist this process by:
- Pointing to key information/data
- Granting access to key informants and information/data
- Detailing the gaps in information/data
- Pointing to the strengths and weaknesses of information/data.

Questions include:

1 What workforce data/information is available?

2 How detailed or fine grained is the data? i.e.:

a. Are the specific job categories described along with numbers employed in each job category?
b. Are skill levels identified (these may or may not be based on qualification standards)[11]

3 How many people work in your sector?

c. How do you know that? What is the source of that information?
d. How does that number break down in terms of roles skills and periods of employment (i.e. part year roles compared to full year roles)?

Workforce numbers

1 What information do you have on the number of people employed in your industry?

2 Can you please clarify what these numbers represent?

a. Total number employed in the industry e.g.:
    i. Employers
    ii. Employees
    iii. Self-employed/contractors

b. What time period do these numbers represent?
    i. Annual count e.g. 2019
    ii. Monthly count
    iii. Quarterly
    iv. Other

If you have an annual count are these numbers:

[11] https://www.careers.govt.nz/courses/find-out-about-study-and-training-options/qualifications-and-their-levels/

v. Peak workforce
vi. At a point in time e.g. 31 March
vii. Averaged over the year

c. How are they measured:
   i. Head count
   ii. Full time equivalent (FTE)

d. Are the figures broken down by:
   i. People who work full time (e.g. permanent workers)
   ii. People who work part of year

e. Are the figures broken down regionally?

f. What is the source of the data?
   i. Statistics NZ e.g. LEED
   ii. Industry survey
   iii. Modelling e.g. bottom up estimations of tasks and therefore a sense of labour demand as has been done for some horticultural roles.
   iv. Other

Definition of the Sector

1 How do you define/describe the sector? e.g.:

   i. People involved in production
   ii. Processing
   iii. Support services

Discussion of different data

The above questions and discussion are designed to understand the interviewee's data and workforce structure and dynamics. We will need to triangulate this data with other information and data e.g., ANZSIC06 Class codes put out by Statistics NZ.

We would like to understand how various food and fibre industries view official statistics and how they might be connected to data that industries hold.

Roles

We are also interested in roles and skills within the food and fibre sectors and how these may change overtime as businesses/entities respond to market incentives, technology, and how people like to work.

We recognise that there are multiple roles, varying job titles and job descriptions, and varying skill levels between different roles.

We also recognise that job descriptions and formal qualifications may provide an indication of skill, but we also know that there are many skilled people within the sectors that have developed their skills through experience and on-the-job training.

We are interested in what information you may have on the breakdown of your workforce by roles/skill levels?

One potential way to think about this is by:

- Number of people who are semi-skilled or work under supervision
- Number of people who are skilled and can work independently

- Number of people who are highly skilled or work in managerial roles.

Do industries have data on this? Or can industries make approximations on the relative numbers in each of the categories set out above (if these are the right categories).

Could we also breakdown data and distinguish between skill levels for people who work all year vs those who only work part of the year?

Another approach could be to focus on the structure of the firm workforce e.g. the typical labour structure on a small, medium and large entity, e.g.: a 300 cow dairy farm, 600 cow dairy farm, and 900 cow plus dairy farm.

Other people to talk to about workforce numbers and roles

Can you identify knowledgeable people in your industry that we can talk to about:

- workforce numbers
- structure of workforce
- skills
- industry dynamics.

Strategy

We are also interested in forecasting what the workforce may need to be in the future, both in terms of numbers and skills.

To help with this we are interested in obtaining any strategic documents and insights you may have about how the sectors may look like in the future.

Are there any documents you recommend we access, and who else should we talk to?

Next Steps

Thank you for your help today. The information will be very helpful in trying to better understand the workforce in greater detail.

We will also be drawing on other sources of information, such as the data from Statistics NZ. From this we will develop a baseline set of numbers to help with the forecasting.

We will be working closely with a sector Data and Forecasting Working Group to ensure that the number are as consistent and robust as possible.

How would you like to be involved going forward and are we able to contact you if we have further questions or clarifications?

Appendix D List of people interviewed

Name	Position/Affiliation
Erin Simpson	Manager, Labour and Capability, New Zealand Apples & Pears
Mike Murphy	Head of Communications & Strategic Projects, New Zealand Kiwifruit Growers Incorporated
Gavin Stagg	Labour Coordinator, New Zealand Kiwifruit Growers Incorporated
Georgia Monks	Data/Policy Analyst, New Zealand Kiwifruit Growers Incorporated
Helen Barnes/Rebecca Fisher	Project Manager Horticulture New Zealand
Nicola Crennan	External Relations Manager, New Zealand Wine
Philip Gregan	CEO, New Zealand Wine
John Ballingall	Board member, New Zealand Wine
Tim Nowell-Usticke	CEO, WineWorks
Kate Hellstrom	CEO, Summerfruit New Zealand
Tracey Mansfield	Labour Coordinator, Summerfruit New Zealand
Alex Huffadine	Researcher, Contractor to Summerfruit New Zealand
Richard Mills	Coordinator, Summerfruit New Zealand
Andrea Crawford	Coordinator, Summerfruit New Zealand
Geoff Taylor	Strategy & Investment, Dairy New Zealand
Lynne Miller	General Manager, Technical Capability, Fonterra
Chris Flatt	National Secretary, Dairy Workers Union
Angela McFetridge	Design & Capability Lead, Beef + Lamb New Zealand
Callum Neil	Insights and Capability Co-ordinator, Beef + Lamb New Zealand
Paul Crick	Insights and Capability Co-ordinator, Beef + Lamb New Zealand
John Ladley	Insights and Capability Co-ordinator, Beef + Lamb New Zealand
Olivia Weatherburn	Insights and Capability Co-ordinator, Beef + Lamb New Zealand
Cathy Webb	Seafood Standards Manager, Seafood New Zealand
Alison Stewart	CEO, Foundation for Arable Research
Tania Watson	Research Liaison, Baking Industry Research Trust
Michael Brooks	Executive Director, Poultry Industry Association of New Zealand
Thomas Chin	General Manager, NZ Grain & Seed Trade Association and NZ Plant Breeding & Research Association
Ivan Lawrie	General Manager Business Operations FAR and Manager, Seed Industry Research Centre (SIRC)
Colin Hurst	Chairperson Arable Industry Group, Federated Farmers
Phil Edmonds	CEO, Apiculture New Zealand Inc
Sean Goodwin	CEO, 100% Pure New Zealand Honey
Jen Scoular	CEO, New Zealand Avocado

Mike Turk	Operations Manager, Turks Poultry
Maitland Manning	National Industry Support Manager, New Zealand Pork
Don Carson	Communications Manager, Forest Owners Association
Mark Ross	CEO, Animal & Plant Health NZ (formerly Agcarm)
Christopher Guy	In house Legal Counsel, Meat Industry Association
Paul Goldstone	Policy Manager, Meat Industry Association
Tatyana Protsenko	Industry Training and Workforce Development Senior Advisor, Meat Industry Association
Andrew Hancock	Principal Analyst, Statistics NZ
Hannah Binnie	Project Manager, Scarlatti
Adam Barker	Director, Scarlatti
Michelle Glogau	Chief Executive, Primary Industry Capability Alliance
Fraser Sloane	Principal Analyst, Tertiary Education Commission
Jo Finer	Chief Executive, New Zealand Institute of Primary Industry Management
Rosstan Mazey	Chairman, National Council of New Zealand Wool Interests
Andy Caughey	Strong Wool Action Group
Jeremy Wear	Natural Resources Business Manager, Wool Testing Services, SGS
Mark Johnston	President, NZ Council of Wool Exporters Incorporated
Grant Edwards	GM Wool, PGG Wrightsons
Dean Harrison	CEO, New Zealand Wool Private Merchants Federation
Phil Holden	Manager, New Zealand Shearing
Marg Forde	Registrar, New Zealand Wool Classers Association
Laurie Boniface	Tutor, Wool industry
Richard Gavigan	Sheep and Beef farmer
Nigel Hales	CEO, WoolWorks
Louise Winhall	Administration Manager, WoolWorks