

March 2026

Future workforce needs of New Zealand's kiwifruit industry

Insights to support industry planning,
investment and sustainable labour
pathways





The following report has been prepared by Scarlatti for New Zealand Kiwifruit Growers (NZKGI) as a deep dive into the industry's current and future permanent workforce to provide insights that support workforce planning, investment and sustainable labour pathways.

Acknowledgements

Thank you to the industry stakeholders who generously shared their time, experience and insights during the interviews. Their contributions were invaluable in shaping the insights shared in this report.



Priority One
Tauranga
Moana



**MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT**
HĪKINA WHAKATUTUKI



**Western
Bay of Plenty**
District Council

Executive summary

Context

This report provides an evidence base for planning the kiwifruit industry's future workforce needs

New Zealand's kiwifruit production continues to increase, and NZKGI require a comprehensive and current view of the workforce needed to support this growth, particularly in permanent roles.

Scarlatti has been commissioned by NZKGI, alongside industry partners, to examine the current and future permanent workforce requirements of New Zealand's kiwifruit industry through to 2035, also noting trends in the seasonal workforce. This work draws on workforce modelling, industry interviews, and analysis of Statistics New Zealand's Integrated Data Infrastructure to estimate workforce demand over time and identify the risks and levers available to support sustainable growth across the industry.

Key findings

The kiwifruit industry is comprised of a core permanent workforce as well as high seasonal labour demand

In 2025, demand is estimated at approximately 3,100 permanent full-time equivalents (FTEs), comprising around 1,100 FTEs on-orchard, 42 FTEs in maturity services, and 1,900 FTEs in post-harvest. Alongside this sits a much larger seasonal requirement, with peak demand estimated at around 13,000 FTEs on-orchard, 450 in maturity services, and 14,000 in post-harvest. This confirms that while seasonal labour remains central to the industry's operating model, a significant permanent workforce is already essential to maintain continuity, leadership, quality control, and technical capability.

Permanent workforce demand is expected to grow steadily, while seasonal demand will remain a major pressure point

Looking ahead, modelling indicates steady growth in permanent labour demand as the industry expands. By 2035, the permanent workforce is expected to increase to around 3,700 FTEs, representing growth of roughly 20 percent. This includes an increase to about 1,400 permanent FTEs on-orchard, 45 in maturity services, and about 2,200 in post-harvest. Seasonal labour demand is also forecast to remain very high, with peak seasonal demand across the industry expected to rise to around 25,000 workers. Future industry growth will depend not only on maintaining an adequate seasonal workforce, but also on growing and retaining a capable permanent workforce.

Automation will improve productivity and reshape some roles, but it will not remove the industry's reliance on labour

Automation is likely to *change* jobs quicker than it removes them. The greatest scope for productivity gains lies in post-harvest facilities, where automation has already improved labour productivity and where further gains are feasible, particularly through grading, packing, palletising, and related processes. However, automation is unlikely to eliminate the need for labour at scale. Instead, it will reduce labour intensity in some roles while increasing demand for a smaller number of more technical roles linked to maintenance, systems operation, and process oversight.

On-orchard and maturity services work will continue to rely on manual labour and human judgement

By contrast, on-orchard and maturity services work remain heavily dependent on manual labour and human judgement, with only marginal medium-term opportunities for labour-saving automation. Technology is more likely to improve decision-making and efficiency than materially reduce headcount. This means that labour availability will remain a critical constraint, particularly during peak periods. While productivity improvements are still possible, they are more likely to come from better systems, better planning, and improved deployment of workers than from major reductions in labour demand.

Retention matters because capability builds over time, but high turnover continues to weaken workforce stability

Retention is one of the most important workforce issues facing the industry. Capability in kiwifruit work accumulates over time, but high turnover means that knowledge, skills, and consistency are frequently lost. Even within the permanent workforce, evidence suggests that tenure is relatively low compared with other sectors, and the seasonal workforce has particularly low repeat participation, with about 70 percent of seasonal workers not returning in later years. Across the industry, the key shared challenge is year-round utilisation, as businesses are more willing to retain permanent employees when they can provide meaningful work across the full year.

Permanent roles are concentrated where continuity, skill retention, and operational control are most valuable

Permanent roles are used where continuity, skill retention, and risk reduction matter most. On-orchard, permanent staff help protect long-term orchard performance, quality, and timing, but growers are constrained by whether they can keep staff productively employed year-round. In maturity services, the permanent workforce is deliberately lean and focused on technical, operational, and quality-critical roles, while seasonal staff are used to scale up during harvest. In post-harvest facilities, permanent roles are concentrated in management, technical, logistics, quality, and support functions.

Future labour supply constraints may place upward pressure on wages

Future permanent demand is likely to be manageable in numerical terms, but increased seasonal labour supply may prove more challenging. The industry already relies significantly on overseas labour, with migrants making up a material share of both the permanent and seasonal workforce (30% of permanent workers in 2025 being on a visa including residency, and similarly 74% of all 2025 seasonal workers). The experience of COVID-19 border closures is treated as a useful natural experiment: when migrant labour was sharply reduced, the industry was still able to secure labour, but only by raising wages substantially and at a cost to fruit quality. If labour demand continues to rise and immigration does not expand correspondingly, real wage growth for seasonal workers is a real possibility in the medium-term.

Meeting future workforce needs will require a combined strategy focused on productivity, retention, and labour supply

There is no single solution to meeting future workforce needs. Sustainable industry growth will require a combination of measures: selective productivity gains through automation, particularly in post-harvest; stronger retention and utilisation of permanent staff; and continued expansion of labour supply through immigration, industry changers, and other workforce pathways. The most important strategic implication is that workforce planning needs to focus not only on *attracting* enough people, but on *retaining* them: building a more stable, capable, and adaptable workforce that can support industry growth over time.

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Introduction

Context

In 2019, New Zealand Kiwifruit Growers Incorporated (NZKGI); with support from the Ministry for Primary Industries (MPI), Western Bay of Plenty District Council, Priority One, Horticulture NZ and Zespri; contracted Scarlatti to undertake research into the New Zealand kiwifruit workforce. The key objectives of this work were to estimate the size of the on-orchard and packhouse workforces at the time, broken down by permanent and seasonal workers, and forecast labour requirements to 2035 under different scenarios.

New Zealand's kiwifruit production has continued to increase and is forecast to continue growing to 2035 and beyond. To coordinate industry and government efforts to prepare for future growth, NZKGI require a comprehensive and updated understanding of the number of workers needed to meet demand, particularly those required to fill permanent positions.

Scope of work

The following report presents insights into the current and future requirements of the permanent, employed workforce in the New Zealand kiwifruit industry across on-orchard, maturity services, and post-harvest roles. Although this work focuses on permanent workforce needs, the analysis requires modelling both seasonal and permanent labour to ensure a consistent approach.

Important exclusions from this work are:

1. Self-employed orchard owners and contractors. Based on work undertaken in 2021, this group is approximately 1,000 FTE. In addition, there is approximately 2,000 – 2,500 orchard owners that contract the majority of their orchard management work out.
2. Employees of Zespri. As of the 2024/25 financial year, this was approximately 930 employees, split roughly 50%/50% onshore and offshore.
3. Employees of the Kiwifruit Breeding Centre. These employees number approximately 60 permanent staff.

The analysis includes assessing workforce demand under current industry conditions and projected industry growth, alongside an evaluation of current and future labour availability. By bringing these elements together, we analyse how supply and demand interact and identify implications for industry growth.

Research objectives

The research questions that guide this analysis are:

1. What is the current and future demand for the permanent workforce?
2. What is the opportunity for medium-term productivity gains from automation?
3. What are the desired and future skills of the workforce?
4. What is the supply of the kiwifruit industry workforce?
5. How could industry growth be constrained by the availability of labour?

Methodology

Our approach uses mixed methods that combine primary and secondary research activities to produce an assessment of workforce demand and supply.

Industry workforce framework

The industry workforce framework provides a structured view of the groupings of key roles that make up the on-orchard, maturity services, and post-harvest workforces. Each group of roles is intended to have a similar core skillset requirement. By organising the roles in this way, the framework helps to clarify where workforce and skill shortages may emerge as the industry grows.

Table 1: Industry workforce framework

Supply chain segment	Role
On-orchard	Orchard management / administration
	Canopy crews: Permanent
	Canopy crews: Seasonal
Maturity services	Leadership and operations management
	Sampling and field operations management
	Laboratory operations and management
	Quality, compliance, and technical governance
	Planning, logistics, and sample intake
	Health, safety, and workforce capability
	Specialist analytical capability (optional)
	Laboratory labour - Supervisor
	Laboratory labour - Testers
	Sampling labour - Supervisor
	Sampling labour - Samplers
Post-harvest	Leadership and management
	Operations: Permanent
	Operations: Packing labour
	Operations: Re-packing labour
	Quality
	Logistics and storage
	Technical specialists
	Business support

Excel-based modelling

We developed an Excel model to address three research questions:

- RQ1: What is the current and future demand for the permanent workforce?
- RQ2: What is the opportunity for medium-term productivity gains from automation?
- RQ5: How could industry growth be constrained by the availability of labour?

Modelling baseline workforce demand (2025)

The baseline kiwifruit workforce demand (2025) is modelled using three bottom-up sub-models, one each for the on-orchard, maturity services, and post-harvest workforces. The three approaches, as described below, reflect how demand is created at different stages of the supply chain.

1. **On-orchard.** On-orchard labour demand is primarily driven by the kiwifruit vine's biological growth cycle and the number of producing and non-producing hectares. To model the 2025 baseline, we built a detailed, variety-specific (e.g., green, gold and red) activity schedule that specifies:
 - a. The core on-orchard tasks,
 - b. The labour hours required to complete each task per hectare, and
 - c. How those hours are distributed across ISO weeks to reflect when the work must occur.

Weekly task hours were then scaled by the industry's 2025 area footprint (in hectares) to estimate the total industry-wide hours required to deliver each activity for the three varieties. These hours were converted to weekly FTE requirements (FTE assumes a 45-hour week) and summed across tasks to produce a seasonal labour demand profile that captures the timing and magnitude of peak labour needs for each variety. For on-orchard roles that do not follow a distinct seasonal task profile (e.g., administration and orchard management), demand was estimated using standard hours-per-hectare assumptions.

The model adjusts from "total labour required" to "employed labour required" by deducting the share of canopy, orchard management, and administrative hours typically undertaken by orchard owners. This produces a baseline estimate of the workforce that needs to be supplied through employees and contractors, rather than owner labour.

Finally, the model distinguishes between the permanent and seasonal workforce by using the weekly demand profile to define a baseline "core" requirement, and a variable "peak" requirement. The permanent demand is estimated as the minimum weekly demand across the year, with a discount factor to account for the proportion of seasonal workers, or those in other short-term roles, working even at points of minimum demand. This methodology and the associated discount factor is calibrated to the findings from work undertaken for the Food & Fibre CoVE¹. Refer to 'Defining the seasonal workforce' below for a more detailed description of the approach taken to distinguish between the permanent and seasonal workforce.

2. **Maturity services.** The baseline demand for maturity services labour is estimated using a similar approach to the on-orchard baseline model. The key difference is the demand driver. Rather

¹ <https://foodandfibrecove.nz/reports-and-resources/project-delivery/ff-initiatives/retention-and-vet-opportunities-for-seasonal-workers/>

than being driven by the number of planted hectares, the demand driver for maturity services is the volume and timing of samples processed during the harvest period.

We first develop a weekly profile of sample volumes across ISO weeks using actual 2025 sampling data that demonstrate how sampling intensity rises and falls through the season. These weekly sample requirements are converted into labour demand using a throughput assumption for the number of samples one FTE can complete daily on average. Dividing weekly sample volumes by this estimate produces a weekly FTE requirement, which forms the seasonal maturity services workforce demand.

- 3. Post-harvest.** Post-harvest labour demand is driven by the volume of fruit (measured in trays) moving through packhouses and coolstores over the season. We estimate demand using a stocks-and-flows framework that tracks fruit as it enters the post-harvest system—based on the timing of harvest from the on-orchard schedules—and progresses through key stages such as inwards goods, grading, packing, storage, and distribution.

At each stage, specific roles support the movement, processing, and storage of fruit. The model applies stage-specific productivity assumptions (e.g., trays per person-hour) to convert weekly tray volumes into the labour hours required to complete each activity (for roles where throughput is the primary constraint). These hours are then converted to weekly FTE requirements (using shift lengths and packing days each week) and summed across stages to produce a weekly workforce demand profile for post-harvest operations. The separation of the FTEs into seasonal and non-seasonal is inherited from the role framework.

Refer to **Appendix 1: Model details** for further information on the modelling component of this work.

Industry interviews

We conducted interviews with industry participants to address three research questions:

- RQ2: What is the opportunity for medium-term productivity gains from automation?
- RQ3: What are the desired and future skills of the workforce?
- RQ5: How could industry growth be constrained by the availability of labour?

Purpose

Interviews were undertaken to strengthen the evidence base for this project by incorporating qualitative insights from stakeholder groups across the kiwifruit supply chain (including on-orchard, maturity services, and post-harvest). Discussions focused on how each group design their permanent workforce and how they have adopted, and intend to adopt, technology and automation to improve productivity. In addition to informing the qualitative findings, interview insights were used to inform, refine and validate key inputs and assumptions underpinning the Excel-based demand modelling.

Recruitment and sampling

NZKGI shared contact details for potential interviewees across the three stakeholder groups. We emailed each potential participant and invited them to take part in an online interview for 30 to 60 minutes. The primary purpose of the interviews was to identify consistent themes, validate assumptions and contextualise the demand model outputs. Table 2 below notes the number interviewed in each stakeholder group.

Table 2: Interview sample sizes

Stakeholder group	Number interviewed (n)
On-orchard	9
Maturity services	2
Post-harvest	6
Total	17

Question framework

While the specific line of questioning varied for each stakeholder group, the interviews were anchored to a consistent set of themes to support a structured synthesis of the permanent workforce across the orchard, maturity services and post-harvest continuum, and how workforce design decisions interact across the supply chain. The themes covered:

1. Permanent workforce structure
2. Current capability requirements
3. Current technology/automation and productivity
4. Future technology/automation pathway and opportunities
5. Future capability requirements and other workforce implications of change
6. Barriers and enablers to adopting technology/automation
7. Workforce challenges and risks.

Participation and confidentiality

Participation in the interviews was voluntary, and interviewees were informed that they could decline to answer any question(s) they were uncomfortable with. Where questions were considered sensitive, participants were encouraged to provide general observations rather than specific operational details if they preferred. Interviewees were reassured that responses would be treated confidentially and reported anonymously (unless explicit prior approval was given). The findings would also be aggregated across participants to identify trends and patterns rather than attributing statements to individual interviewees. This approach supported open and constructive conversations and reduced barriers to sharing candid insights.

Limitations of the insights collected

There are two key limitations to the interview process that should be considered when interpreting the insights shared throughout this report:

1. **Small sample size.** The sample sizes are not set to be statistically representative but provide insights into workforce themes and patterns across the industry (e.g. how things are and why things happen the way they do). While a non-representative sample is expected in research projects like this involving interviews, it is worth being aware of what interpretations the insights in this report can reasonably support.
2. **Labour-market influence.** The labour market context at the time of interviewing may have influenced how participants viewed labour scarcity and the opportunity for technology/automation in their future. At the time of the interviews, the local labour market was observed as competitive, with several interviewees indicating significant interest in advertised roles. In tighter labour markets, as the industry observed around 2020 to 2022, labour-saving technology and productivity improvements may be perceived as more urgent.

Statistics NZ IDI analysis

The Integrated Data Infrastructure

Statistics NZ's Integrated Data Infrastructure (IDI) is a large, de-identified database that brings together microdata about people and households. The database draws on administrative sources (e.g. tax, health, education, benefits, migration, justice) and some other Statistics NZ surveys. For this work, the IDI enables us to analyse employment patterns using data derived from tax records that are consistent across sectors and regions. It is possible to drill down on results by region and/or sector to explore the demographic attributes of people working in those sectors.

Research questions

This work utilises the IDI to explore the supply of the kiwifruit workforce, addressing the following research question:

- RQ4: What is the supply of the kiwifruit industry workforce?

Within this question we addressed four subsidiary research questions:

- RQ4.1: How has the workforce supply changed over the past 10 years?
- RQ4.2: What are the different sources of seasonal and permanent employees?
- RQ4.3: What is the turnover and attrition of permanent and seasonal employees?
- RQ4.4: What are the sizes of the wider talent pools that the kiwifruit workforce could draw on to meet future demand?

Defining the kiwifruit industry in the IDI

We use the Australian and New Zealand Standard Industrial Classification (ANZSIC) codes recorded for business enterprises in the IDI to define the kiwifruit industry workforce. As the core of this definition, we use ANZSIC 0132 (Kiwifruit Growing).

Using ANZSIC is the quickest way to approximate the size of the kiwifruit workforce, but there are important limitations when using employer industry codes to define an industry workforce in the IDI. ANZSIC codes describe an employer's predominant business activity, not an employee's occupation or the specific tasks they perform. As a result, this approach identifies employees who work for businesses coded to kiwifruit-related ANZSIC industries, rather than all people performing kiwifruit-related work.

Misclassification can occur in both directions. First, kiwifruit-related workers may be missed where their employer has diversified operations and is coded to a different predominant activity (e.g., other horticulture, farming, contracting, labour hire, or transport). In these cases, substantial kiwifruit-related employment can sit outside 0132. Second, the approach can overstate kiwifruit employment where businesses coded to 0132 also undertake other activities (e.g., multi-fruit growing), meaning not all employees captured in 0132 are necessarily attributable to kiwifruit.

To reduce the risk of undercounting kiwifruit labour employed through contractors, we also include ANZSIC 0529 (Other Agriculture and Fishing Support Services) in the IDI queries. This broadens coverage to include service firms that may supply labour into kiwifruit. However, it also introduces additional noise because 0529 includes support services across many agricultural industries. To improve specificity, we use regional disaggregation (and, where relevant, seasonality patterns) to interpret

results, focusing on kiwifruit-dominant regions where 0529 employment is more likely to be kiwifruit-related.

While this dataset has limitations, we present results cautiously and often prefer relative measures (e.g., percentages) to illustrate trends and patterns, rather than relying on absolute counts.

Refer to **Appendix 2: IDI workforce definition details** for additional information regarding the IDI analysis, and figures showing the workforce size over time for these two ANZSIC industry codes.

IDI Disclaimer

Access to the data used in this study was provided by Stats NZ under conditions designed to give effect to the security and confidentiality provisions of the Data and Statistics Act 2022. The results presented in this study are the work of the authors, not Stats NZ or individual data suppliers.

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.

Chapter 1: The 2025 permanent workforce

This chapter establishes the current permanent workforce picture across on-orchard, maturity services, and post-harvest in 2025. It combines the modelled baseline demand with workforce supply characteristics and interview insights that explain how and why today's workforce is structured the way it is.



Overview

This section estimates the size and composition of the 2025 permanent workforce demand across on-orchard, maturity services, and post-harvest. These estimates combine both quantitative and qualitative data, establishing a baseline from which to forecast future demand (in Chapter 2).

Our quantitative modelling estimated a permanent workforce size of **3,100 FTEs in 2025**. This breaks down by supply component as:

- **On-orchard:** A permanent workforce demand of 1,100 FTEs, and a seasonal workforce demand of 13,000 FTEs at its peak.
- **Maturity services:** A permanent workforce of 42 FTEs, with a peak seasonal workforce demand of 450 FTEs.
- **Post-harvest:** A permanent workforce of 1,900 FTEs, with a peak seasonal workforce demand of 14,000 FTEs.

Table 3: Summary of 2025 demand estimates and qualitative findings from Chapter 1.

	Permanent FTE demand	Peak seasonal FTE demand	Current use of technology	Challenges and constraints
On-orchard	1,100	13,000	Mixed responses, human labour remains key.	Year-round utilisation, low retention.
Maturity services	42	450	Remains manual due to key constraints.	Low retention, year-round utilisation, automation consistency and ROI.
Post-harvest	1,900	14,000	Notable opportunities, uptake varies by packhouse.	Year-round utilisation and retention of technical roles.

Modelled workforce demand

On-orchard workforce demand

Modelling was undertaken to estimate the size of the permanent kiwifruit workforce on-orchard, from a demand perspective. That is, based on the amount of work that occurred in 2025 by week, how many FTEs would have been needed to complete the work.

Demand for on-orchard activities was broken into three parts:

1. **Permanent: Direct** – permanent employed canopy crews (pruning, thinning etc).
2. **Permanent: Indirect** – orchard administration / management (oversight, spraying etc).
3. **Seasonal** – seasonal canopy crews (including picking).

As seen in Figure 1 below, the model estimated approximately **1,100 permanent FTEs on-orchard in 2025**, including 610 FTEs in canopy crews, and 520 FTEs in orchard management and administration. The magnitude of picking labour by time of year is highlighted in Figure 2.

We observe the expected peaks through the year in the seasonal workforce demand – particularly in the week starting 27 October (ISO week 44, with 13,000 FTEs). That said, we note that there is still opportunity to refine the seasonal demand model, particularly in the October to January period.

Note that this model captured the *employed* workforce only. It excluded business owner contributions.

Figure 1: Estimated weekly demand (FTE) for on-orchard activities in 2025 (Scarlatti model)

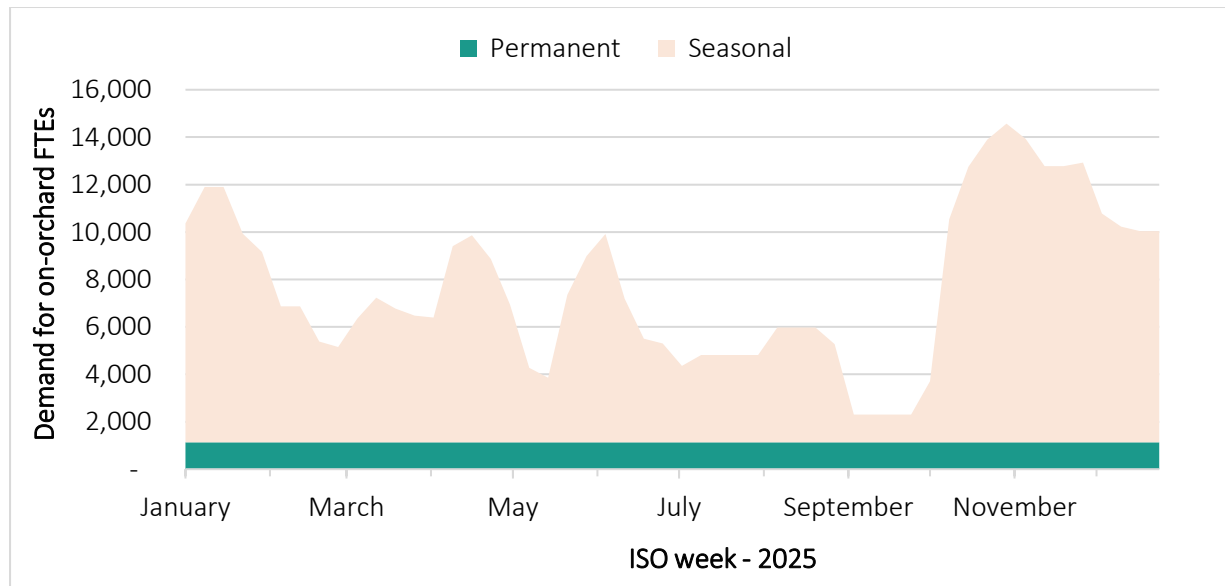
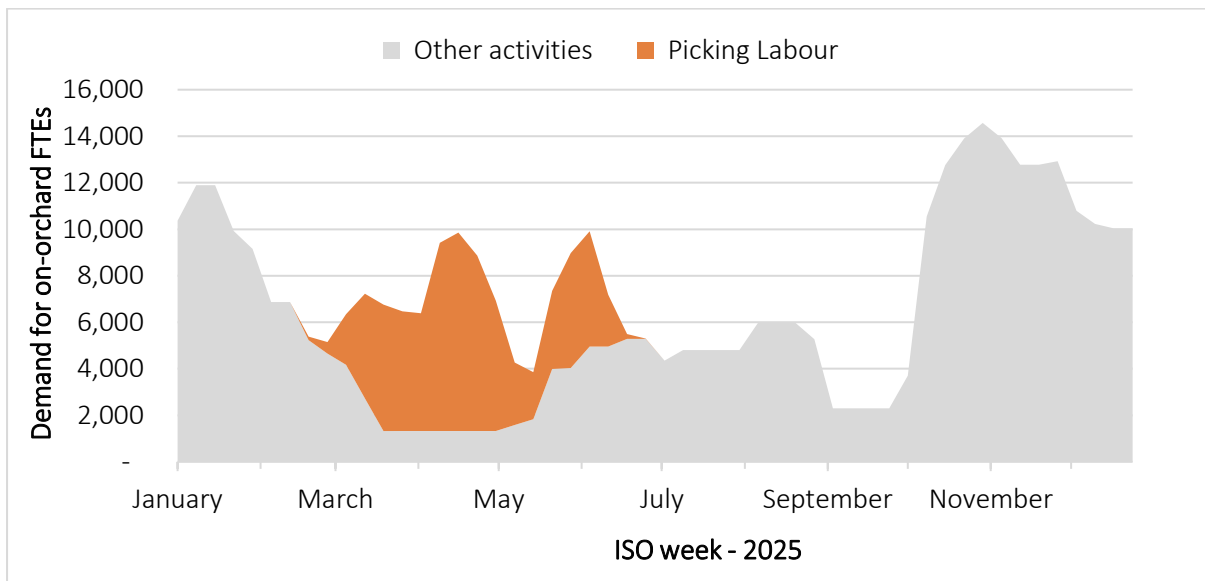


Figure 2: FTE demand for on-orchard picking labour in 2025 (Scarlati model)



Maturity services workforce demand

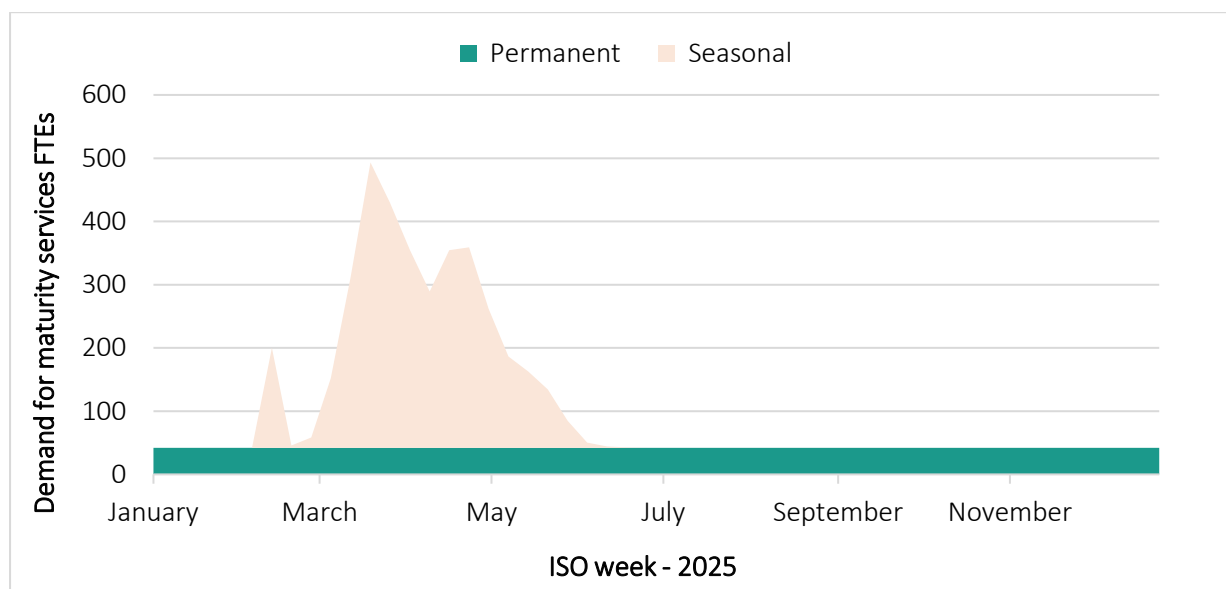
This component of the model estimated the number of FTEs needed to complete kiwifruit maturity services throughout the year. This part of the model was driven by the volume of lab tests that were conducted by week in 2024, and scaled up to 2025.

Demand for maturity services was broken down by activity and nature:

- **Permanent activities:** Including activities like operations management, sampling management, laboratory operations, quality, and health, safety & workforce capability.
- **Seasonal activities:** Including laboratory and sampling labour (both supervisors and testers / samplers).

Seen in Figure 3, this model estimated approximately **42 permanent maturity services FTEs in 2025**. It also estimated at its peak, 450 seasonal FTEs in the week starting 17 March (ISO week 12).

Figure 3: Estimated weekly demand (FTE) for maturity services activities in 2025 (Scarlattti model)



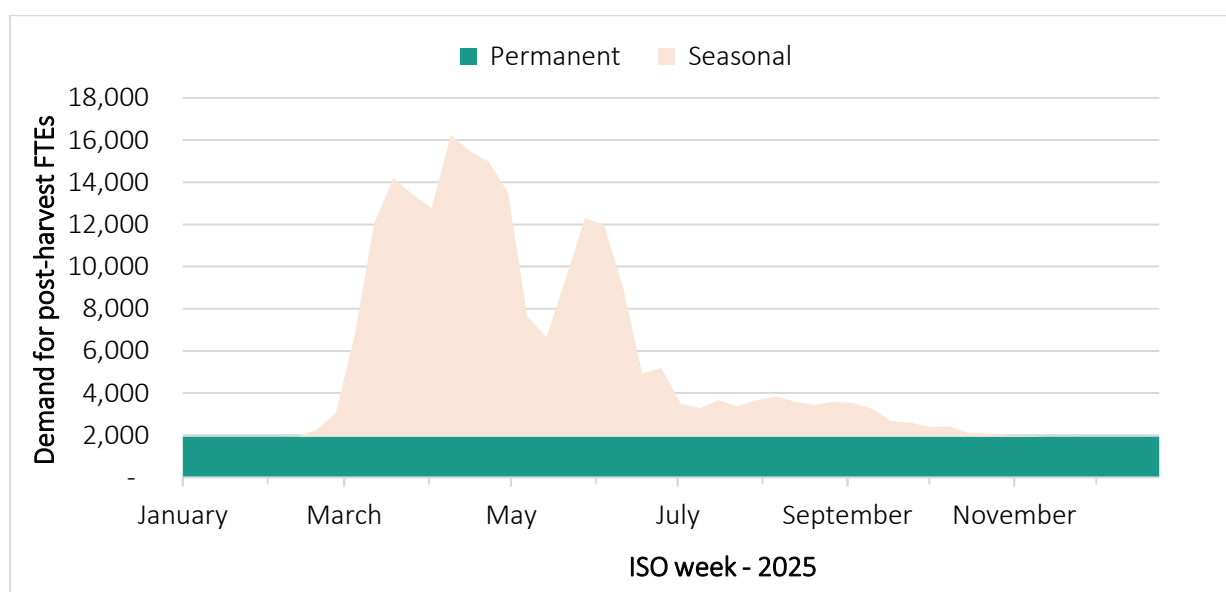
Post-harvest workforce demand

Lastly, this part of the model estimated the number of FTEs needed to complete post-harvest activities. Underpinning this part of the model was the 2025 total tray throughput, including output volumes by ISO week. As with maturity services, demand was broken down by activity and nature:

- **Permanent activities:** Including activities like leadership and management, permanent operations such as line management and oversight, quality assurance and compliance, logistics and storage, technical specialists, and business support.
- **Seasonal activities:** Including short-term seasonal packing and re-packing labour.

Seen in Figure 4, this model estimated approximately **1,900 permanent post-harvest FTEs in 2025**. It also estimates over 14,000 seasonal FTEs, peaking in the week starting 7 April (ISO week 15).

Figure 4: Estimated weekly demand (FTE) for post-harvest activities in 2025 (Scarlati model)



Current permanent workforce design and challenges

This section summarises the qualitative insights provided from interviewees regarding the structure of the permanent workforce: what is working and what is not.

On-orchard permanent workforce

The binding constraint is year-round utilisation

The most consistent constraint on permanent or directly employed crews was the ability to keep people meaningfully employed throughout the year. Growers expressed reluctance to hire permanent staff when there is a risk of extended downtime between seasonal peaks, both because of cost and because under-utilisation can negatively impact retention and morale. This “utilisation problem” sits at the core of many workforce-related decisions and helps explain why contracting remains prevalent even in cases that growers perceive that direct employment can produce better long-term outcomes. At this point, the decision becomes a balance between long-term gain and short-term cost, a familiar trade-off in many walks of life.

Two practical enablers of employment that were repeatedly identified as improving the viability of permanent employees that improve utilisation across different scales of production include:

1. **Mixed-enterprise properties** that enable staff to shift across enterprises as orchard workloads fluctuate (e.g. kiwifruit orchard plus dairy, sheep and beef, bees, other horticulture)
2. **Growing mixed varieties** which smooths the timing of on-orchard activities and reduces downtime across the year, although the size of the opportunity is unclear. Some interviewees noted that diversity in the varieties grown (e.g. green, gold and red) can support a more stable work programme, while others questioned the significance of this opportunity. Interviewees consistently shared that growing mixed varieties can improve year-round utilisation where the varieties are complementary and do not have overlapping seasonal activity schedules. Some interviewees highlighted a risk that if red overlaps with gold, then workforce challenges would be exacerbated rather than relieved (i.e. an increase in labour demand during peak weeks).

Permanent roles have long term benefits

Interviewees consistently described the purpose of maintaining a permanent (or directly employed) on-orchard workforce as less about minimising labour costs and more about protecting orchard performance over the long run. The strongest driver was control over quality and timing, particularly for canopy and vine-structure decisions, where the consequences compound over multiple seasons. In this context, permanent roles function as an “insurance policy” for orchard outcomes, providing continuity, ensuring standards are met, and reducing the variability introduced by externally contracted labour.

A “supervision and QA” model is an option for small-scale owner-operators

For smaller orchards, several interviewees described a fixed-term supervisor/QA presence to oversee critical seasonal tasks as a pragmatic alternative to employing a full-time, permanent employee(s). This person’s role is to oversee contractor crews in the orchard and check the quality of their work against the owner’s standards and intervene early when issues emerge. This preference was driven by a dissatisfied relationship with an external orchard management company and the quality of work they delivered, while still recognising the orchard’s reliance on the manual labour they provide.

As orchards scale, structures professionalise and roles differentiate

As the orchard scale increases, interviewees described a more formalised permanent workforce structure, typically with clearer role definition and separation of responsibilities. Common roles include:

- **Orchard management / administration roles** overseeing seasonal activity schedules, performing administrative work such as overseeing health and safety, and coordinating year-round operational priorities.
- **Canopy crews** who work year-round or on a longer fixed term contract in the orchard, undertaking many of the day-to-day canopy management activities. These activities are regularly supplemented with seasonal labour during peak periods.

Depending on orchard scale, permanent on-orchard employees often cover multiple roles to maintain year-round utilisation.

Contracting and management models appear to be growing

Several interviewees perceived a trend towards greater reliance on contractors and orchard management companies to oversee orchard activities. These interviewees made a connection between aging ownership and a shift in ownership values, with (arguably) less value placed on long-term production outcomes. Importantly, this does not necessarily mean a more seasonal workforce. As the management portfolios of these companies grow in diversity, this shift in management model would still support more continuous employment.

Views on performance are varied, with many interviewees arguing that direct employment can deliver stronger long-term results, when scale allows, through continuity of orchard knowledge and stronger quality control. At the same time, interviewees acknowledged that contractors and orchard management companies can achieve strong outcomes. The concerns related to how incentives favour speed and short-term outcomes over long-term outcomes, weakening the orchard's stewardship. The decision to employ an orchard management company is a personal decision and depends heavily on personal circumstances and values. While we hypothesise the factors that influence this decision, the sample in this work is too small to determine with certainty.

Skills gaps are greatest at orchard manager level

On orchard, the core workforce challenge is not a shortage of generic horticultural knowledge. It is a shortage of capable orchard managers, supervisors, and team leaders who combine technical understanding with practical judgement, people management, and the ability to maintain quality over time. Growers repeatedly emphasised that orchard performance depends on experience, continuity, and close supervision of critical tasks such as winter pruning, canopy management, thinning, spraying, and machinery use. The most valued people are those who understand how today's decisions affect orchard performance over multiple seasons, rather than those who simply complete a task to specification.

This has implications for training. Interviewees were generally unconvinced that broad horticulture qualifications, on their own, prepare people to manage kiwifruit orchards well. Larger orchard businesses are already responding by building internal cadet pathways, mentoring models, and role-based development programmes focused on doing the job, supervising others, planning work, managing budgets, and teaching standards. They also identified a gap in soft skills development, particularly communication, delegation, conflict resolution, time management, and problem solving. For the education sector, this suggests the strongest contribution is not more generic horticulture

content, but more applied orchard-management development that is grounded in real kiwifruit operating contexts, delivered with industry input, and designed to complement workplace mentoring rather than replace it. Technology is changing orchard management, but mainly by increasing the technical and decision-making demands on supervisors and managers rather than by removing large numbers of workers. Crop scanning, mapping, targeted nutrient decisions, and other data-enabled tools are increasing the value of managers who can interpret information and use it to target labour and inputs more effectively. The implication is that on-orchard training should increasingly blend practical crop knowledge with digital and data-enabled decision-making capability.

Maturity services

The workforce is structured to protect continuity and consistency

Insights from the interviews with representatives of the industry's maturity services providers highlighted that the permanent workforce is intentionally lean. Utilisation in the maturity services workforce is highly challenging, more so than it is for the on-orchard workforce. We heard there is a deliberate push for maturity services to consider which roles must be permanent for year-to-year continuity and consistency, and which can be trained quickly to an adequate standard ahead of the harvest season (i.e. seasonal capacity). This has set a reasonably clear workforce split where the permanent workforce fills roles including:

- Leadership and operations management
- Sampling and field operations management
- Laboratory operations and management
- Quality, compliance and technical governance
- Planning, logistics, and sample intake
- Health, safety, and workplace capability
- Specialist analytical capability (optional).

This structure reflects an effort to protect year-on-year continuity and consistency where it matters most (e.g. specialist capability, technical control, and process discipline), while using seasonal employees (e.g. seasonal leadership, sample collectors, lab workers, etc) to scale up the delivery of maturity services between January and June each year.

Role requirements are role-specific, and are shifting over time

Recruitment for seasonal roles was described as selective, but role-specific. Sampling roles were framed as requiring a certain level of physical fitness and the ability to follow guides and work independently. While seasonal laboratory roles were described as favouring detail-oriented individuals comfortable with repetitive tasks. Generally, the seasonal maturity services roles do not require specialist skills, although people leadership abilities are valuable for certain team oversight roles.

In contrast, the permanent workforce was described as requiring technical skills and relevant experience, particularly on the laboratory/testing side of operations. There appears to be some shift in recent preferences toward permanent employees, presented as a response to operational complexity and the need for consistent application systems, documentation and testing requirements.

Year-round utilisation is a significant challenge

Despite the focus on continuity, interviewees highlighted that there is high turnover in the maturity services workforce. This was mainly attributed to demanding shift patterns and work-life balance in-season, and low utilisation during the off-season. Interviewees crudely split the year into two: the first six months (January to June) being in-season, and the second six months (July to December) being the off-season.

The off-season typically starts with a “wind down” period, effectively putting the maturity services operations and equipment into hibernation until next year. The off-season starts with a review and evaluation of the previous season and identifying opportunities for improvement in the following season. The challenge during this time is to keep the permanent workforce meaningfully engaged.

Those in permanent positions are justified as permanent because the specialist skills and experience preferred for these roles cannot be redeveloped each year, as with seasonal hiring. Interviewees did acknowledge some examples of how their workforce is utilised throughout the year; however, emphasised that the off-season work for permanent employees can shift towards low-skill “general labouring”. For some, this can lead to disengagement and low retention.

Efforts are being made to mitigate other causes of permanent employee attrition

Off-season utilisation is not the only cause of low retention in the permanent workforce. Challenging work-life balance during the season (e.g. long or anti-social shifts) also leads to people leaving the maturity services workforce.

Efforts to improve retention of the permanent employees by those we talked to included:

- **Balancing the size of the permanent workforce.** Maintaining a lean permanent workforce will help with year-round utilisation, with fewer people during the off-season needing to be meaningfully engaged by limited opportunities. However, carrying a lean team also creates a few risks:
 - a. A lean team means there is less contingency for people exiting key roles. Some mitigations we heard included employing second in commands for sampling and laboratory managers in case of natural attrition.
 - b. A lean team also means there is less capacity in-season to manage all the sampling and laboratory shifts. Often these teams work 6 to 7 days a week. A fuller team will help manage demanding schedules and encourage a better work-life balance during peak.
- **Secondments and internal redeployment.** Where we heard a maturity services organisation carried a larger permanent workforce (as a mitigation to the above risks), they emphasised the importance of short-term secondments and internal redeployments (e.g. with vertical integration) to meaningfully engage the permanent workforce.

At the same time, interviewees highlighted that seasonal workloads are inherent to the kiwifruit industry and for the timing of when maturity services are delivered. While there is a preference for hiring permanent employees with technical expertise, particularly on the laboratory/testing side of operations, interviewees acknowledged that ‘operational fit’ is another key factor to someone’s retention in the workforce. In this instance, operational fit refers to someone with an aptitude for hands-on work, a tolerance for peak season intensity, off-peak flexibility and the ability to “switch back on” again when the next season begins.

Maturity services presents some training opportunities

Maturity services show a different training profile from the rest of the supply chain. While seasonal field and lab roles can still be trained relatively quickly, the permanent workforce is becoming more specialised, more compliance-heavy, and less interchangeable. Interviewees described a shift toward technical roles in quality control, calibration, traceability, equipment management, and accredited lab processes. For maturity services, the evidence for more formal technical capability is stronger than elsewhere: permanent staff increasingly need relevant laboratory, quality, and compliance experience, not just general kiwifruit familiarity.

At the same time, maturity services still rely on a large seasonal workforce, and the requirements differ sharply by role. Field samplers need independence, physical capability, reliability, and judgement because they often work alone and have significant responsibility for accurate collection. Lab technicians can be brought in more readily, but still need attention to detail, process discipline, and the ability to work effectively in repetitive, shift-based environments. This suggests that the education opportunity is twofold: better pre-employment preparation for seasonal entry roles, and stronger technical pathways for permanent lab and analytical roles.

For education providers, maturity services appear to be the clearest case for more structured technical provision. Useful offerings could include short, applied programmes in laboratory practice, quality assurance, traceability, calibration, accreditation, and technical reporting, alongside work-readiness preparation for shift work, peak-season intensity, and highly procedural environments. Because off-season utilisation is a major challenge in this segment, there is also a case for designing transferable capability that can move across adjacent testing, compliance, or quality roles outside peak kiwifruit months.

Post-harvest

Training requirements and continuity needs shape the structure of the workforce

Similar to maturity services, post-harvest permanent roles are only considered when the skills and responsibilities of a role cannot be trained to a functional level within a few weeks. In other cases, roles become seasonal. The natural make-up of a permanent workforce appears to be down to a second level of management and people leadership (i.e. two-tier management), plus several specialist roles requiring scarce or established skillsets (e.g. automation and technology, engineering, maintenance, cool store specialists, etc.).

The second layer of permanent managers is used to scale seasonal capacity and supervision during key periods, including training seasonal employees in preparation for the season ahead.

Stakeholders emphasised that roles that can be developed to a reasonable capability quickly are usually seasonal by design. The key exception is specialist roles where expertise is difficult to rebuild each season (maintenance, refrigeration, automation/technology), making year-to-year continuity and capability retention more critical.

The drivers of demand for labour vary by role

Interviewees described post-harvest workforces around seven core role families:

- Leadership and management (e.g. CEO, general managers, tier-two managers)
- Planning and coordination (e.g. intake/pack planning, production scheduling)

- Operations (e.g. managers/supervisors, packhouse production and machine operation, supplemented with seasonal labour during peak periods)
- Quality assurance and compliance (e.g. quality control and compliance)
- Logistics and storage (e.g. manage fruit movements and storage)
- Technical specialists (e.g. maintenance, engineering, refrigeration, automation/technology)
- Business support (e.g. EDI/data, finance, people and culture/HR, health and safety)

The permanent workforce is concentrated in roles where continuity, site-specific knowledge and technical capability are most valuable. All but operations typically retain a permanent core, while operations scale with seasonal labour during peak periods.

Across these families, stakeholders noted that the permanent workforce core can often absorb additional capacity without a proportional increase in headcount (i.e. they have a responsiveness value (RV) between 0 and 1). Industry growth and additional throughput can be managed through efficiency and capability gains. In contrast, the seasonal operation team will need to scale more proportionately with volume because these roles are more directly linked to throughput.

The range of technical specialists employed in permanent positions can depend on several factors. For example, qualified and specialist engineers may be provided by the equipment supplier for more complex maintenance and upgrades rather than the capability needing to be employed in-house. Proximity (i.e. the time it takes a specialist to reach the packhouse) and security might be reasons a post-harvest facility chooses to employ this specialist capability in-house to minimise operational downtime, particularly in-season.

Practical capability is favoured over qualifications for specialist roles

A consistent theme heard from interviewees was that formal qualifications are “nice to have”, but demonstrated skill and experience, a strong aptitude to learn, and “industry fit” are often more important for technical specialist roles. In some cases, where formal qualifications are relevant, trade certificates may be preferred because they are perceived as:

- More hands-on and practical for electro-mechanical systems and automation
- More easily redeployed across off-season packhouse activities.

This preference for practical capability and aptitude over formal qualifications was heard from interviewees but also reflected in a recent automation manager job advertised. In this instance, the job generally emphasised proven experience (or strong interest), mechanical aptitude, and practical problem solving rather than specifying a particular qualification. Other advertisements specified experience with specific brands of technology and automation as valuable, highlighting the uniqueness of the technology used.

For the education sector, the strongest implication is the case for short, applied, industry-linked learning rather than long-form formal retraining pathways. The industry appears to need broad technical foundations in areas such as mechanics, electrical systems, automation, and PLC²-related capability, but then expects much of the final capability to be built on site. This suggests education providers are best placed to support post-harvest by building modular, stackable learning that sits

² Programmable logic controller

between generic trades training and highly-specific packhouse practice. There is also a strong opportunity to partner with equipment suppliers and employers to provide site exposure, short technical modules, and product-specific learning that helps bridge the gap between general training and workplace application.

Off-season utilisation is becoming less of a challenge for some roles

Within post-harvest, transitions to off-peak periods are becoming more gradual, extending through to late October or November. This is because operational activities are extending later in the year, partially due to differing picking times for each variety (such as later picking for red kiwifruit), and increased maintenance requirements for automation. This is improving utilisation of the permanent core throughout the year. In some cases, improving utilisation may require redistributing permanent employees between the six core role families (e.g. from quality to operations). After the extended packing window, re-packing, evaluating the previous season, planning and preparing for the upcoming season, and annual leave entitlements, there is little more than a month or two of underutilised time throughout the year.

Despite this, the most difficult design problem for the permanent workforce was consistently identified as retaining those in the technical specialist roles. Interviewees identified a repeated tension for these roles:

- Strong engagement and intensity during peak season (long hours, high pace)
- Risk of underutilisation or “downtime boredom” during off-peak
- Higher propensity for technical specialists to exit if off-peak work becomes less engaging for them (e.g. low-skilled or general labouring).

This links back to the preference for people with trade certificates over other formal qualifications. There is a hypothesis that those with trade certificates are more practical than those with other formal qualifications (e.g. engineering degree) and therefore may be more willing to switch to low-skilled and laborious activities to fill gaps during the off-season and encourage utilisation.

Technology and automation is adopted to varying degrees

The interviews clarified that post-harvest operations often span a spectrum from manual to fully automated grading lines, with added technology and automation to improve productivity. The majority of post-harvest facilities operate somewhere in the middle with semi-automated grading lines with, at a minimum, camera grading. The general theme was that incremental automation reduces the labour required per unit of throughput. However, it was neither linear nor consistent between post-harvest facilities. As automation increases, machine operation becomes more technically oriented, and permanent workforce requirements increasingly reflect this shift.

Automation elements adopted across post-harvest facilities to improve productivity, in order of frequency, include:

- Inline camera grading
- Packing and box filling
- Box making
- Pallet stacking

- Automated cool stores.

The spectrum of automation (from manual to fully automated) reflects a variation in labour productivity. At the lower end, facilities operating with a more manual configuration achieve around 40 to 45 trays per worker per hour, while highly automated operations sit closer to 110 trays per worker per hour. With this range in mind, and an estimated industry average of around 70 to 75 trays per worker per hour, the industry appears to be collectively around 40 to 50% of the way along the journey toward “full automation”.

Insights collected from the stakeholder interviews imply that 100% automation is unlikely to ever be achieved, even over the medium to long-term. Adoption constraints are substantial, and the economics of automation don't stack up uniformly across the industry. These constraints are discussed later in the report when assessing the levers available to address workforce pressure points and operational constraints.

The importance of a permanent workforce

A permanent workforce with high retention is important to the kiwifruit industry because it protects performance and reduces operational risk across on-orchard, maturity services, and post-harvest. Interviewees repeatedly framed permanency as about safeguarding long-run outcomes, maintaining control over quality and timing, embedding specialist capability and technical control, and providing stable leadership to train and supervise the seasonal scale-up required each year.

Crucially, interviewees also highlighted that these benefits are compounding and are only realised when retention is high and tenure accrues. When churn is high, the industry repeatedly “resets” capability and institutional knowledge, undermining the investment in training, weakening consistency, and increasing operational risk, especially in roles where expertise is difficult to rebuild or recruit each season. The shared constraint across all stages is year-round utilisation. If permanent staff cannot be meaningfully engaged across the year, retention and morale suffer, and the value of permanency is lost.

Chapter 2: The future workforce demand with industry growth

This chapter sets out how workforce demand is expected to change as the industry expands through additional hectares and larger fruit production volumes. It presents the modelled future demand outlook and explains how factors like seasonality, variety mix, and automation pathways shape where demand grows fastest.



Overview

This section sets out the future workforce demand from 2025 to 2035 for on-orchard, maturity services, and post-harvest facilities.

Our quantitative modelling indicates that the permanent workforce size may increase from 3,100 FTEs in 2025 to **3,700 in 2035**. This breaks down by supply component as:

- **On-orchard:** A permanent workforce demand increase from 1,100 FTEs to 1,400 in 2035 (27% increase)
- **Maturity services:** A permanent workforce demand increase from 42 FTEs to 45 FTEs in 2035 (6% increase).
- **Post-harvest:** A permanent workforce demand increase from 1,900 FTEs to 2,200 FTEs in 2035 (15% increase).

Table 4: Summary of permanent workforce demand forecasts 2025 – 2035.

	Permanent FTE demand 2025	Permanent FTE demand 2035	Percentage change
On-orchard	1,100	1,400	27% increase
Maturity services	42	45	6% increase
Post-harvest	1,900	2,200	15% increase

Growth-driven demand modelling

On-orchard forecast demand

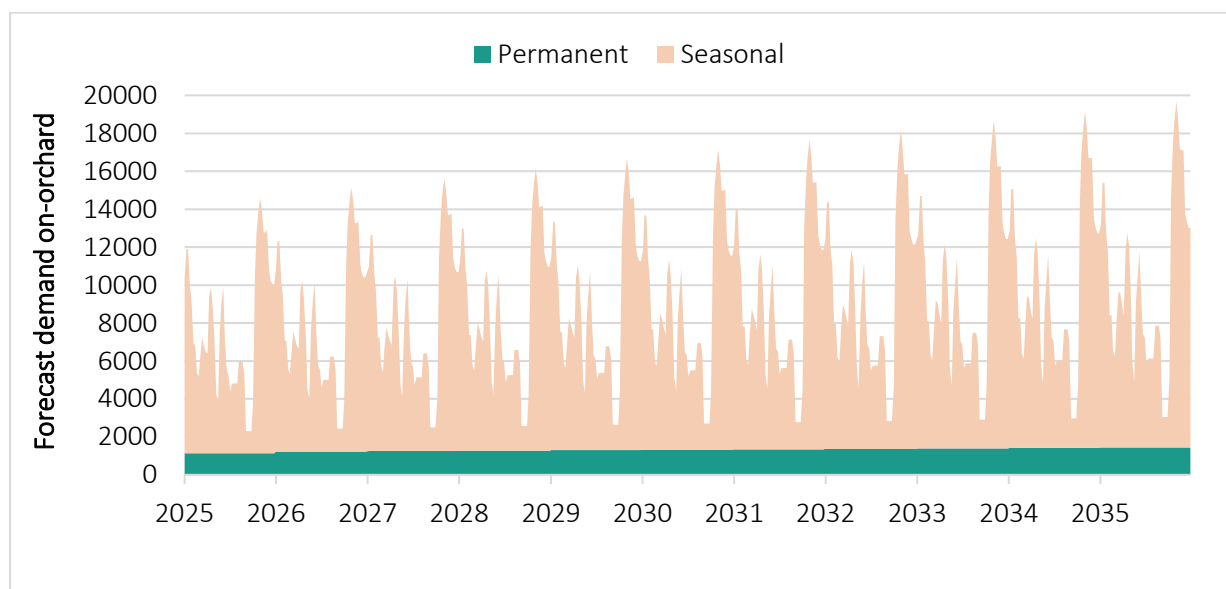
Modelling was used to forecast the size of the on-orchard workforce from 2025 to 2035. For the on-orchard workforce, future demand was primarily driven by hectares planted and associated fruit volumes/throughput requirements. This modelling drew on what we heard from the interviews. We heard that the permanent employment would become more viable as growers can solve the utilisation problem through:

- **Scale:** An indicative threshold around ~10ha was commonly mentioned as enabling permanent workforce utilisation, though this will differ by orchard.
- **Variety mix:** Growing red, green and gold on the same orchard offsets enables longer-term roles by offsetting seasonal needs.
- **Mixed enterprises:** Providing the ability to redeploy staff to other activities when not needed on the orchard.

Given this approach, the model estimated a steady increase in the size of both permanent and seasonal workforces over the next ten years – albeit more noticeably for seasonal workers.

- **Permanent workforce:** Increased from 1,100 to 1,400 (27% increase)
- **Seasonal workforce:** Increased at peak demand from 13,000 to 18,000 (36% increase).

Figure 5: Forecasted demand for on-orchard FTE (Scarlattti model)



Considerations for accommodating this growth

This will likely mean continued reliance on contractors / seasonal workers to meet peak bursts, even where a core permanent crew exists. Expansion of new varieties increases potential to lift the permanent component of the workforce (growers and contractors) by smoothing utilisation.

The following chapter will explore the additional labour supply that will be needed to fuel this growth, and any potential pinch points as a result.

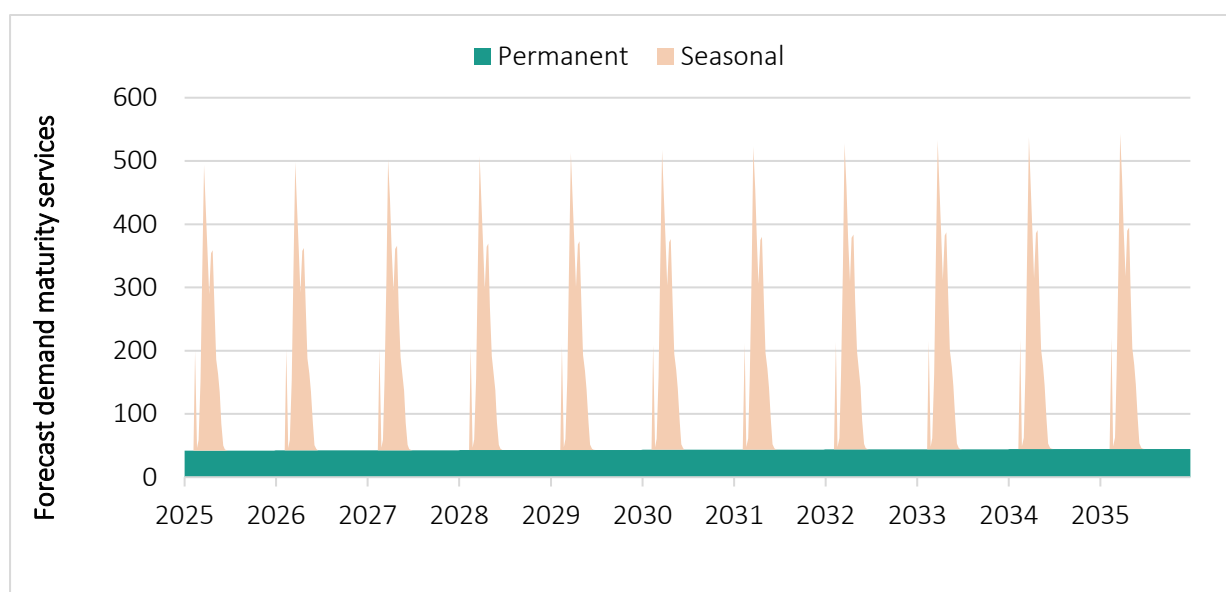
Maturity services forecast demand

Maturity services workforce is characterised by a short sharp peak – relying heavily on a seasonal workforce component. We have heard from industry that this operating season is increasingly getting closer to six months, supporting a stronger permanent core (although this is not quite reflected in a ten-year forecast timeframe). Future demand for maturity services is driven by the number of samples completed annually. This does not scale directly with the number of hectares planted nor with trays produced. Historic growth rates between 2021 and 2024 were about, on average, about 1% per year albeit growth rates were lumpy and seasonal fluctuation make a considerable difference. We have assumed that the year-on-year increase in the sample size continues growing at 1% per year. This may be a conservative estimate but for purposes of this work the overall impact of any error will not be material.

Given this approach, the model estimated a steady increase in the seasonal workforces over the next ten years.

- **Permanent workforce:** Increased from 42 to 45 (6% increase)
- **Seasonal workforce:** Increased from 450 to 500 (10% increase).

Figure 6: Forecast demand for maturity services FTE (Scarlati model)



Considerations for accommodating this growth

- This workforce should be able to accommodate this growth with minimal investment in new technology. Interviewees indicated additional capacity for about 20 – 30% more people without much hassle.
- If sample volumes increased by 50%, the seasonal workforce would need to scale accordingly, with more samplers and team leaders added in proportion to the increased workload.
- While the permanent team could handle some increase, interviewees noted that additional permanent staff would likely be justified to manage risk, especially as the season moves earlier and operational demands grow.

- The current ratio of team leaders to samplers (one team leader for about 20 staff) would need to be maintained, requiring more team leaders as the workforce expands.
- Increasing throughput would involve extending shift patterns and addressing bottlenecks in specific tests, such as colour testing, by adding more workstations as needed.

Post-harvest forecast demand

In this model, future demand for the post-harvest workforce was primarily driven by the required tray throughput (based on broader industry forecasts). This was assumed to be directly related to the number of producing hectares for each kiwifruit variety.

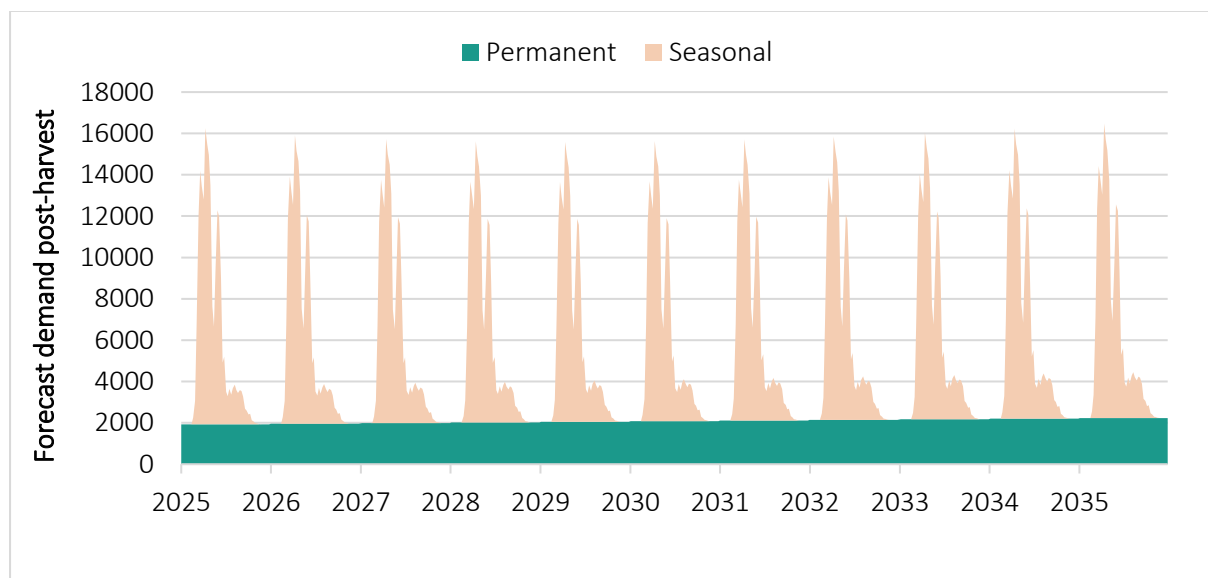
The key variable (driver of uncertainty) in these forecasts was the degree to which post-harvest facilities will adopt automation and technology. This could have two effects on the labour demands of this workforce:

1. Decreased demand for labour requirements for packing and re-packing activities
2. Increased demand for labour requirements for technical specialists – needed to implement and maintain automation technology.

Given this approach, the model estimated a slow increase in the seasonal workforces over the next ten years.

- **Permanent workforce:** Increased from 1,900 to 2,200 (15% increase)
- **Seasonal workforce:** 14,000 to 14,000 (no change).

Figure 7: Forecast demand for post-harvest services FTE (Scarlati model)



Considerations for accommodating this growth

- Although the quantity of additional labour is not of concern here, quality of finding skilled workers with the technical skills to work in post-harvest facilities is of high importance.

Changes in skills requirements

Understanding changing skills requirements was mainly explored through interviewing, and has been described in the section Current permanent workforce design. We have to some degree modelled the changing mix of roles required in packhouses and this has some bearing on the mixture of skills needed for the post-harvest workforce. We did not build an analogous model for either on-orchard or maturity services as neither is expected to undergo major changes in the mix of work needed in the next 10 years.

The effect that different volume growth and automation will have on the role mix within the post-harvest workforce are shown in Table 5. Perhaps surprisingly, the net impacts of growth and automation on the permanent workforce are not forecast to be large – the biggest impact is on seasonal roles. In part, this is because the effects of volume growth and automation cancel each other out, and in part because the permanent roles are able to absorb volume growth.

The main exception is in the technical specialist roles. However, the absolute number of people in these roles is small so the change in numbers needed is unlikely to be material to either the supply of people or the supply of training.

Table 5: How different automation adoption scenarios affect roles in post-harvest facilities

	2025	2035		
Role	Baseline	No further adoption	Full adoption	Expected automation
Operations: Permanent	930	1,100	1,100	1,100
Operations: Packing labour	14,000	18,000	12,000	14,000
Operations: Re-packing labour	1,500	1,800	1,800	1,800
Quality	210	240	240	240
Logistics and storage	210	240	240	240
Technical specialists	83	92	110	100
Business support	400	450	450	450
Leadership and management	99	110	110	110
Total	17,000	22,000	16,000	18,000

Chapter 3: Ways to support industry growth

This chapter outlines some of the available levers to respond to possible future increases in labour demand, including productivity improvements, increasing supply of labour, and increasing retention of existing labour.



Overview

This section explores the demand-supply gap for the kiwifruit workforce. As the industry grows it needs to explore whether the availability of labour may constrain growth.

The previous section indicated that demand for permanent workforce may increase by 20% by 2035. This corresponds to an expanded permanent workforce size from 3,100 FTE to 3,700 FTE, with increases for permanent operation roles in post-harvest services, and permanent on-orchard roles. The question now is how the sector can meet this demand in practice, and which constraints will limit the industry as it scales?

Automation can help meet the need for seasonal roles in post-harvest services – lifting productivity and changing ways of working. However, there is very limited opportunity for automation within permanent roles, or in the other components of the supply chain.

Two levers that could be considered are maintaining or increasing the number of migrants joining the workforce, or increasing wage rates to remain competitive to industry changers. However, these may be difficult to implement. Immigration rates are already quite high, with the percentage of permanent workers who are New Zealand citizens dropping from 77% in 2015, to 72% in 2024. Maintaining or increasing these high levels may prove difficult. Increasing pay may not prove attractive or feasible to industry, as without other interventions being considered wage rates may need to increase by 20%+, similar to changes seen during the COVID pandemic.

An alternative lever that could be considered is improving workforce retention – keeping experienced workers for longer and reducing the need to repeatedly build capability. This arose as a theme in both our qualitative and quantitative research.

This section brings together the opportunities, views and concerns raised by the industry across on-orchard, maturity services and post-harvest sectors, as well as quantitative evidence to indicate the likely size and limits of each lever.

Increasing productivity through automation and technology

Scope for automation on-orchard

Automation opportunities are limited and manual labour remains important

Speaking with those working on-orchard, we heard there is currently limited scope to automate most tasks. Manual labour was expected to remain essential for activities such as winter pruning and canopy management, where outcomes depended on skilled judgement and decision making that current technology cannot replicate.

There were also concerns around automating harvesting. The industry has noted unsuccessful trials of robotic pickers and alternative picking methods, further showcasing the importance workers have and will continue to have for key tasks even as other parts of on-orchard work become more automated.

Some opportunities exist through emerging technologies or to enhance decision making

One way the industry can adapt to increased production is by lifting productivity through automation and technology advances (assuming a constant workforce size). There are several emerging technologies including targeted nutrient application and autonomous mowers, that will allow some orchards to rely less on labour. However, roles like machinery operator may eventually be reduced but not eliminated due to the need for human oversight and maintenance.

The industry also emphasised the value of technology in better decision making through improved data collection. Tools such as scanning devices that assess flower, fruitlet, and fruit counts could generate heat maps for targeted thinning and improve crop estimation compared with manual methods. Similarly, weather station and sensors on orchards could collect extensive data on soil moisture, temperature, sunshine hours and other environmental factors. This type of information could inform decisions such as frost protection, timing of activities and the allocation of resources, rather than assigning tasks uniformly across a block because it is a certain time of year.

Automation is unlikely to shift the needle on labour demand

Feedback from the industry suggested the opportunity to automate on-orchard work is relatively limited. In many cases, the technologies being utilised will improve efficiency by optimising the timing of activities and improving decision making, rather than reducing labour needs. This is in contrast to post-harvest operations, where automation has significantly reduced labour needs.

The industry has responded to workforce challenges by focusing on improving productivity, including the timing of activities and exploring new growing structures. However, it is also recognised that profitability can reduce the urgency to invest in efficiency as it can be harder to justify the cost and risk of change.

These changes will require training for workers to be comfortable using new technologies, the workforce is generally receptive of, especially when framed in as working smarter not harder. Until the internal capability is met external contractors will need to continue support of more specialised tasks such as advanced imaging. The need for fundamental skills will remain important, even with new technologies. The industry will continue to rely on workers with a broad practical skill set and reliability, especially for roles involving equipment operation and detailed vine care.

Scope for automation in maturity services

Automation adoption is limited by the accuracy of current technologies

Industry feedback suggested there is some scope for automation in maturity services, particularly in lab-based tasks. Activities such as fruit weighing could be automated, and some companies have trialled non-destructive testing technologies. However, these tools are not yet market ready and are generally not as accurate as current methods, limiting the immediate potential for industry-wide adoption.

Even where technology is available, industry noted that testing new technology would require approval from Zespri to align with their clearance requirements. Adoption would also involve significant upfront investment in new equipment and a willingness to change established processes, making cost a major consideration.

Short term contracts and health and safety concerns limit viability

A key barrier raised by the industry is contract duration. Short term Zespri contracts reduce confidence that investment in automation can be recovered within a realistic timeframe. While automation in packhouses has helped offset staffing needs, short term contracts of up to three years make it difficult to justify large investments when future work is not guaranteed.

There may also be theoretical opportunities to speed up sampling, like using vehicles such as quadbikes. However, health and safety and practical concerns limit their use. This approach would require a different skill set for samplers, including using a quad bike safely as well as securing a quadbike on a trailer and towing a trailer. In addition to this, current technology such as near-infrared testing and satellite imaging is not yet viable for significant productivity gains.

Automation is unlikely to shift the needle on labour demand

Overall, the opportunity for automation to materially reduce labour need in maturity services appears to be small in the short term. Sampling roles remain labour intensive and require a high level of training to ensure samplers are prepared and capable of independent work. The recruitment process for this role is highly selective, with 1,100 applications for 55 sampling positions last year (according to one interviewee). In comparison, lab recruitment is far less intensive with more emphasis on attitude and reliability than specialist skills and experience.

Interviewees also suggested that workforce constraints have eased in recent years. In 2025, the employment market was competitive, and similar conditions were noted in the two years prior. Anecdotal feedback indicated that the acute labour shortages experienced around 2020-2022 have not continued, likely reflecting the standard economic cycles as well as the longer-term effect COVID-19 had on workforce and unemployment. This view was supported by post-harvest interviewees, who reported few challenges in recruiting due to a strong base of permanent workers, returning seasonal workers and favourable local recruitment conditions. The strong labour supply may weaken the case for investing in automation.

Scope for automation in post-harvest facilities

Automation opportunities are clear within packhouses

Post-harvest operations (packhouses) offer the clearest path for automation in the kiwifruit industry. Automation has already delivered operational benefits, and there is further scope to increase the intensity to grading lines overtime.

Automation has primarily reduced labour cost per tray and improved consistency, even where overall throughput is constrained by upstream processes. It has also shifted roles toward more technical machine operation, with skills largely developed on the job. One example is the use of robotic pallet trolleys (dollies) in cool stores, which improve pallet movement and reduce forklift damage risk, although these systems are relatively simple in operation and not integrated with inventory systems.

Looking ahead, interviewees identified camera grading as the largest remaining opportunity, with potential to further reduce manual grading. Full automation is most likely in new (greenfield) packhouses, while existing sites tend to replace equipment with automation capable systems and add functionality in stages.

Economics, replacement cycles, and workforce capability are barriers to adoption

Automation decisions are constrained by economics, timing and operational risk. A key limitation is the short kiwifruit season. It is harder to justify the high capital cost when equipment is only used extensively for a few months of the year. As a result, investment tends to be governed by ROI thresholds, with diminishing returns beyond a certain level of automation.

Adoption is also slowed by long asset lives and replacement cycles. Grading lines can last up to 30 years, however growth and capacity also influence when replacement occurs. This means automation uptake is gradual and lumpy rather than smooth year-on-year upgrades. Some interviewees noted that significant gains may require whole of line replacement rather than small incremental retrofits.

Workforce capability is another constraint. While basic operation does not require advanced qualifications, there is increasing demand for technical and engineering adjacent skills, and recruiting these capabilities locally can be challenging.

Automation will shift workforce requirements, rather than reduce total demand

Post-harvest automation can materially improve productivity and reduce labour intensity, but it is unlikely to remove the need for people. Interviewees suggested the industry is currently around 40-60% towards a fully automated grading line, with around 80% believed to be a realistic ceiling due to diminishing returns and increased costs.

The main impact was expected to be a reduction in labour-per-tray and reduced peak season pressure, rather than a large reduction in total workforce demand. The workforce mix is also likely to shift towards specialist roles and a stronger line leadership, with the permanent workforce increasingly supervising and supporting seasonal teams. Seasonal labour remains important even in more automated environments.

The impact on the workforce is reflected by the automation adoption scenarios. Scenarios with anticipated automation adoption – reaching 75% adoption in 2035 – have peak 2035 labour reduced by 3,300 FTEs (15%) compared to scenarios with no further automation adoption. This difference is primarily due to a reduction in seasonal packing labour requirements. However, compared to demand in 2025 demand, there is no significant difference (less than 500 FTEs) due to increases in required

throughput counteracting productivity increases. And across the whole supply chain, we still expect to see a 10% increase in demand for labour.

Interviewees emphasised that Return on Investment (ROI) and throughput are the primary drivers of automation investment, rather than current labour shortages. This suggests adoption will continue, but mainly in larger packhouses and green builds while smaller packhouses may rationally remain less automated.

Automation is shifting demand toward technical skills

As automation in post-harvest facilities increases, roles are expected to shift towards being more specialised and technical. While automation may reduce the amount of manual labour required in some parts of the process, interviewees anticipated a growing need for workers with stronger IT and problem-solving skills. These skills are needed to operate and manage the more complex systems.

The industry has also highlighted how capability is not always recognised and translated into recruitment pathways. This is particularly relevant for overseas workers coming in on visa and resident pathways. Additionally, interviewees noted that experience and orchard-specific capability take time to build, which limits how fast supply can scale in practice even when there is strong demand.

Packhouses have expressed they are willing to hire for attitude and aptitude and then train staff on-site specific systems and processes. This approach is most effective when retention is stabilised, as it allows skills to accumulate rather than being lost each season. The importance of developing seasonal leaders who can supervise teams, support training and problem solve in more complex environments increases as operations scale and automation is layered onto existing lines.

As packhouses adopt more technology, the constraint is increasingly not just finding workers but building the technical capability to operate and maintain new systems. Partnering with equipment suppliers to create clearer pathways into technical roles without requiring overly narrow kiwifruit specific qualifications. Practical options include supplier-led demos and site visits, structured internships and short micro-credential style training that bridges vocational learning to packhouse contexts. This also benefits suppliers as if technology cannot be reliably staffed and maintained, adoption will slow.

This partnership approach is most applicable for roles such as line leads, maintenance technicians and automation operators. Capability in these roles comes from having confidence and experience with technologies and preventative maintenance knowledge. Supplier-led training can ensure that the skills required are standardised across sites. Packhouses and suppliers would benefit from ensuring new systems can be reliably operated and maintained, and could result in faster fault resolution, less external callouts and improved retention in technical roles.

Increasing staff retention and utilisation

Year-round utilisation is a key constraint in permanent and specialist roles

A key constraint across the kiwifruit workforce is year-round utilisation, particularly for permanent and specialist roles. While peak season demand can be met through seasonal labour, building and retaining capability depends on whether businesses can offer enough meaningful work in the off-peak period to sustain ongoing employment.

This constraint showed differently across the supply chain components. On orchard, the main risk to growing permanent crews is off peak underutilisation, which makes it difficult to justify carrying staff year-round and limits the accumulation of orchard specific capability. In packhouses, the off-peak drop is most severe for specialist roles such as technology support where demand drops sharply outside the packing window.

Possible ways to smooth workloads by spreading key activities across the year include:

- Mixed task role design,
- Contractor models that span multiple orchards and packhouses,
- Greater fruit variety diversification.

This increased utilisation can in turn, lead to increased industry retention.

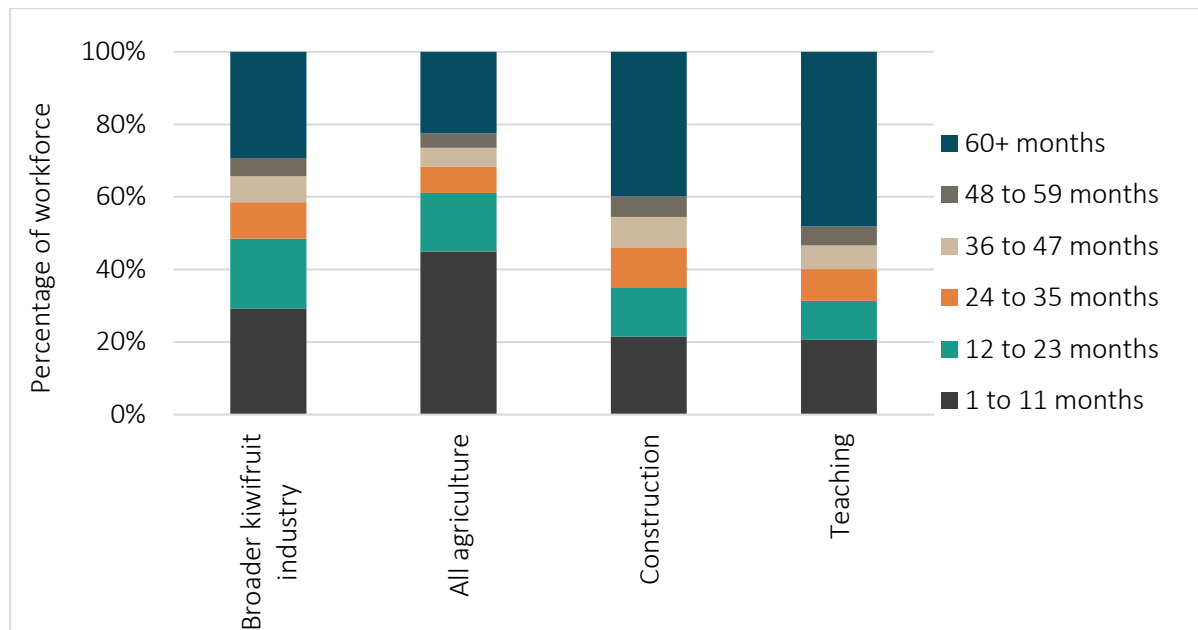
Increasing retention on orchard

On-orchard, it has been highlighted that retaining more permanent employees can increase long-term productivity, because capability accumulates over time. Historically, this has been difficult given the challenges in year-round utilisation. This is becoming less of a constraint as orchard owners diversify the varieties planted in their orchards which can help smooth workloads and support more continuous employment. Retention risks were also raised for more specialist roles across the sector. Interviewees described a pattern of very high engagement in the peak season followed by a lower skill level and engagement in the off-peak season, leading to disengagement and exits. High turnover then undermines the return on investment in training and creates repeated cycles of recruiting, onboarding and rebuilding capabilities.

Permanent workers have lower tenure than in other sectors

Figure 8 below shows the tenure profile of the broader kiwifruit growing workforce (combining kiwifruit growing with other agriculture support services) in the Bay of Plenty, compared to some other benchmark industries. This tenure profile breaks down the current workforce (in 2025) by how long each worker had been in the industry to date (accumulated months). We see that approximately 30% of the workforce had less than one year of accumulated tenure. Just 29% have 60+ accumulated months of tenure, which is lower than industries like construction (40%) and teaching (48%) – one data point showing an opportunity to increase industry retention.

Figure 8: Accumulated months³ tenure profile of permanent *broader* kiwifruit workforce in *Bay of Plenty* (combined tenure in 'Kiwifruit growing' and 'Other agriculture support services' industries) compared to other industries complete workforces⁴ (Stats NZ IDI)



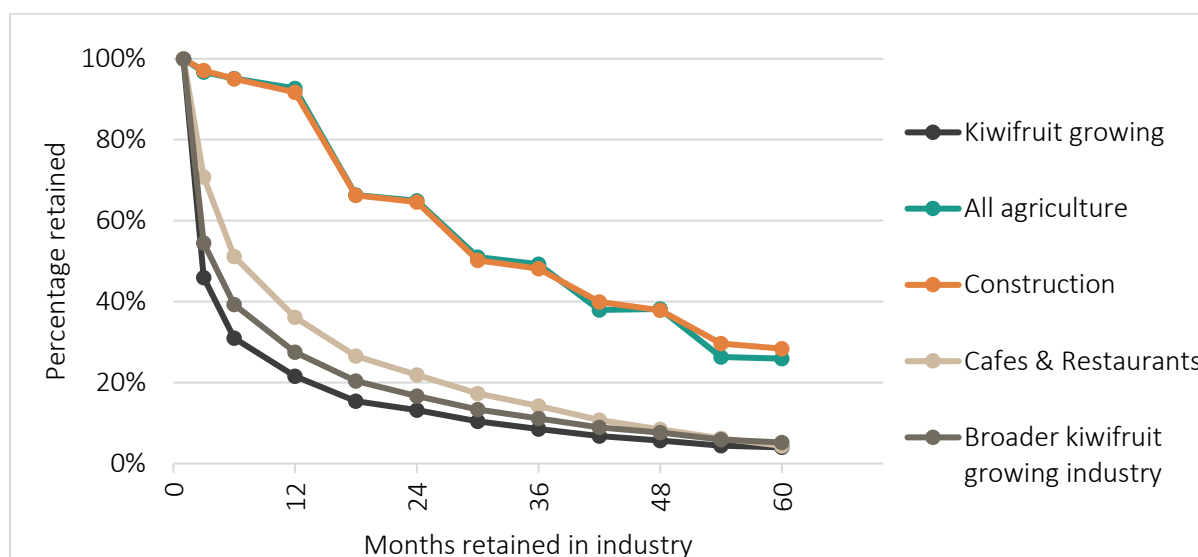
Improving retention of new workers is possible

Figure 9 shows the retention curve of new entrants to the industry in 2019. That is, how many months we observe tax returns in the given industry for (between 2019 and 2025), noting that these months do not have to be consecutive. Kiwifruit growing shows lower retention than the comparison industries, with just 22% remaining after a year. This is not surprising, given the seasonal nature of the work. The broader kiwifruit industry (combined kiwifruit growing and other agriculture support services) performs slightly better with about 28% remaining after one year. This analysis benchmarks kiwifruit against other similar industries with higher retention, albeit with less seasonality than kiwifruit, and shows what is possible with increased efforts to retain the existing workforce. The results indicate that early exits are common and that improving retention of new workers remains an important challenge.

³ Note that accumulated months tenure working in an industry do not need to be consecutive months. For example, someone may only work 4 months a year, for two years, a total of 8 months – and fall into the '1 to 11 months' bracket.

⁴ This analysis captures tenure for the comparison industries total workforce – not just the permanent workforce. It captures all employment statuses, not just employees. The broader kiwifruit industry is based on the permanent workforce.

Figure 9: Retention rate of new workers, 2019 starting cohorts⁵ (Stats NZ IDI)

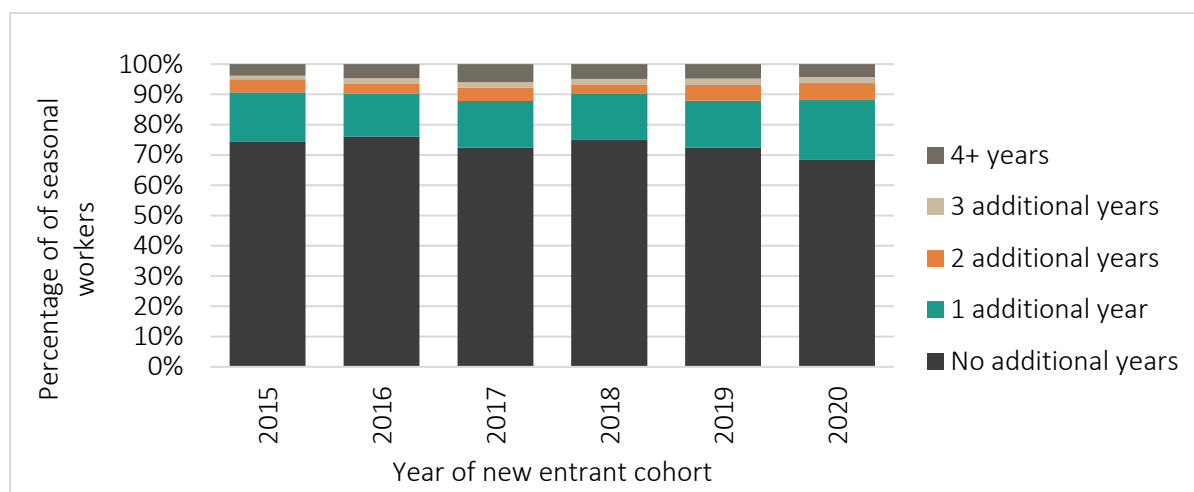


Returning rate of seasonal workers

Seasonal workforces are most sustainable when workers return for repeat seasons, reducing the need to recruit and train a new workforce each year. Figure 10 shows the proportion of new seasonal workers who return for employment in subsequent, distinct years. Note that for this analysis, we can only analyse up to a 2020 starting new entrant cohort, in order to have a forward-looking window large enough to observe those who return to the industry for 4+ years (i.e. between 2020 – 2024).

This analysis suggests that about 30% of seasonal new entrants return to the industry for an additional year in kiwifruit (2 seasons in total). About 10% of new seasonal workers return for 2 additional years (3 seasons in total). These patterns have remained relatively stable between 2015 and 2020.

Figure 10: Percentage of new entrant seasonal workers retained in the kiwifruit growing industry, by number of years they return⁶ (Stats NZ IDI)



⁵ The annual steps present for construction and cafes and restaurants are likely due to a high proportion of self-employed individuals, who only have annual data available.

⁶ Due to the 2025 data horizon, seasonal worker retention statistics are limited for recent years and should be interpreted with caution.

Increasing supply of labour

To help support industry growth, the industry may look to source additional workers to meet the forecast increase in demand.

Sources of labour

There are multiple pipelines of new entrant workers the kiwifruit industry can source additional workers from. Figure 11 and Figure 12 show the sources of permanent and seasonal worker new entrants respectively. The sources of permanent workers is notably different to that of seasonal, with fewer migrants, however industry changers remains the largest source across both groups.

In the years since the COVID lockdown, migrants have become a larger component of the permanent workforce supply – 20% of permanent new entrants in 2023 originated from the migrant pathway.

Industry changers tend to come from across the services sector and food and fibre sector. Notably, from the agriculture sector, packaging services, labour supply services, and cafés and restaurants. As expected, we see a greater percentage of new seasonal workers coming directly from overseas (about 27%) compared to coming into permanent roles (12%).

Importantly, the migrant proportion in these charts only shows migrants that enter the kiwifruit workforce directly after entering the country. Migrants that come to the industry from another workforce are shown as industry changers. Segmentation by visa type provides a different view – see next.

Figure 11: Sources of kiwifruit growing permanent new workers (Stats NZ IDI)

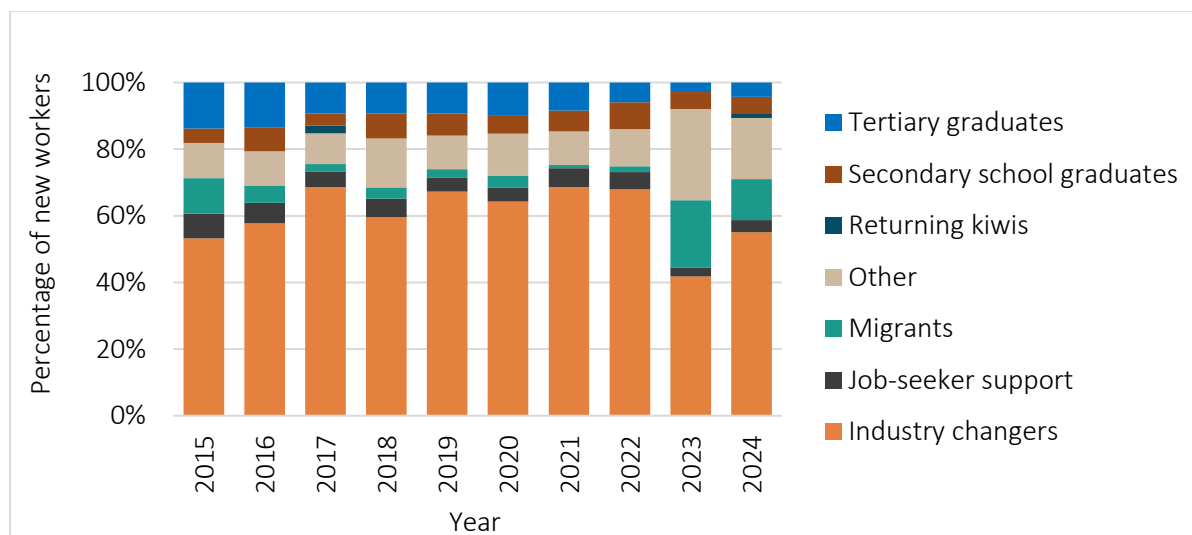
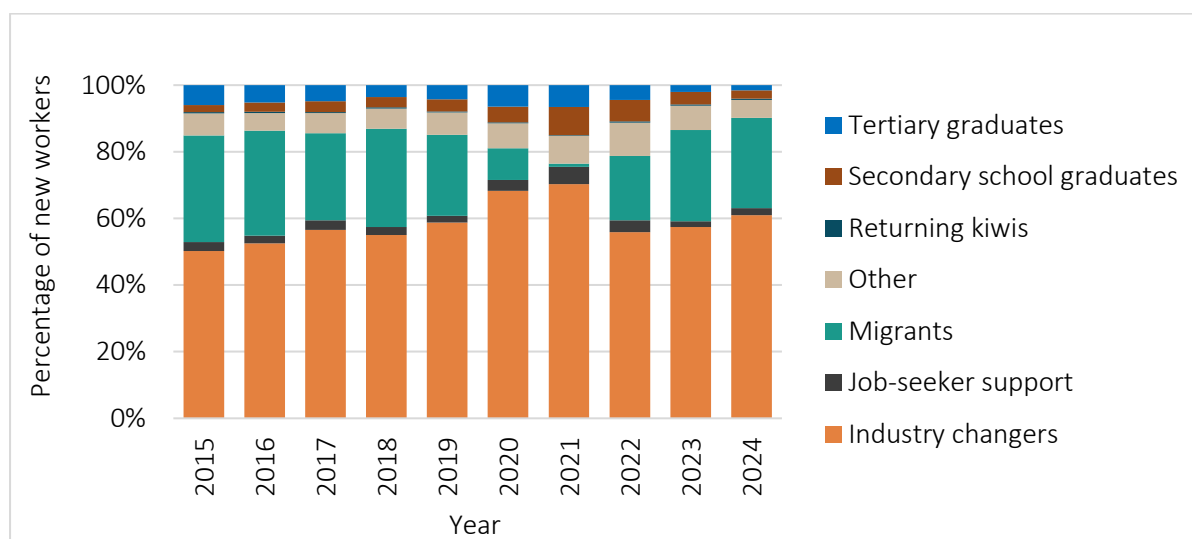


Figure 12: Sources of kiwifruit growing *seasonal* new workers (Stats NZ IDI)



The visa status can also provide insight into the changing dynamics and origins of the kiwifruit industry. It can also provide an indication of who entered with the intention of being seasonal (e.g. working holiday visas), and who potentially entered with the hope of becoming permanent (skilled work visas).

Figure 13 shows that migrants account for roughly 30% of the permanent kiwifruit workforce, and up to 70% of the seasonal workforce. Over time, reliance has shifted away from working holiday visas and towards recognised seasonal worker visas, which has increased over the last 10 years. Notably, the percentage of permanent workers which are NZ citizens has declined over the last few years.

We see in Figure 14 below the strong effect that border closures relating to COVID-19 had on the seasonal workforce during 2021 and 2022. During this time, the kiwifruit sector became heavily reliant on local labour to meet demand – 60% seasonal workers were NZ citizens in 2021. In recent years this has more than bounced back, with only 26% of seasonal workers in 2025 being NZ citizen, as opposed to 45% during the pre-COVID period.

Figure 13: Visa breakdown of distinct kiwifruit growing *permanent* workers by year (Stats NZ IDI)

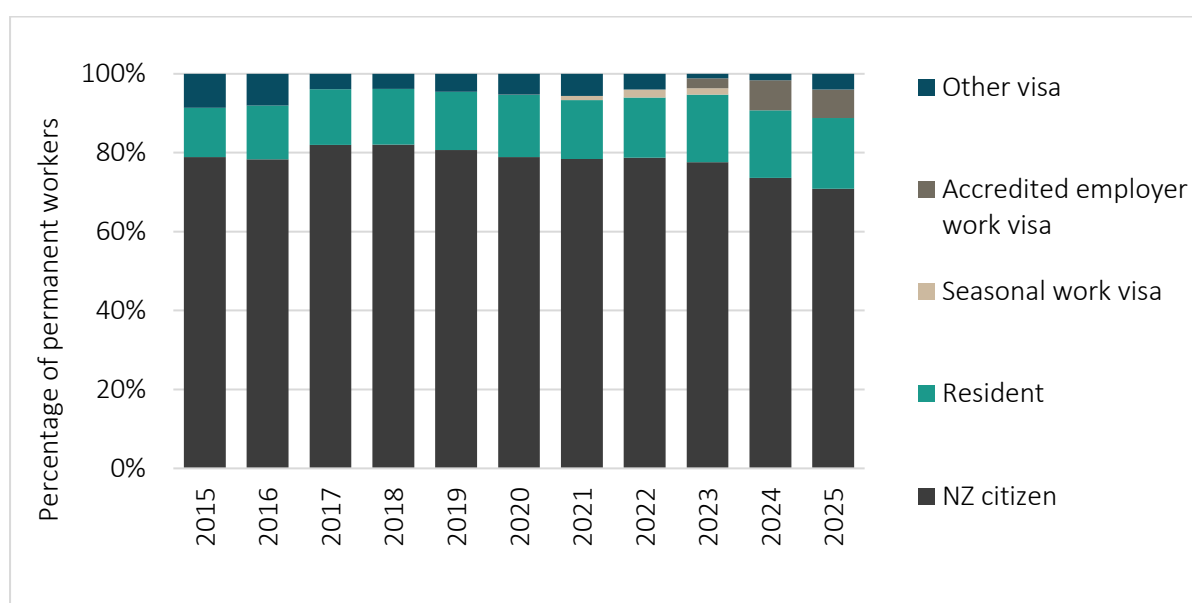
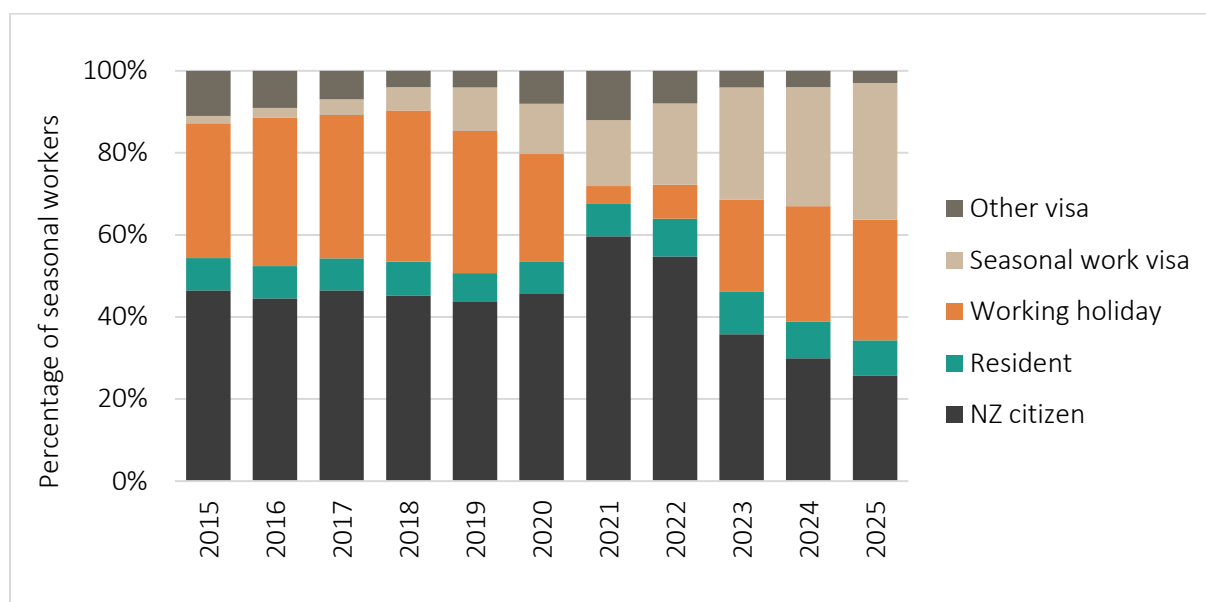


Figure 14: Visa breakdown of distinct kiwifruit growing *seasonal* workers by year (Stats NZ IDI)



Competitive wage rates

One of the ways an industry obtains the labour supply needed to meet demand is by setting competitive wage rates to attract the people it needs from other workforces. In the absence of major shifts in automation or improvements in workforce retention this becomes in effect, the default response. Note that wage rates primarily affect supply for short-term and seasonal labour – the permanent workforce is small enough that industry growth is unlikely to put significant pressure on workforce supply and wage rates.

The COVID-19 pandemic and the resulting border closures and lockdowns provided a ‘natural experiment’ regarding what happens to the seasonal kiwifruit workforce when labour supply and demand become unbalanced. In the years prior to COVID-19, migrants made up 25-30% of the workforce but almost none of these workers were available in 2021 – this shortfall is of a similar order to the 20% increase in demand for labour that this report projects for 2035.

This shortfall had a notable effect on wages in real terms – as shown in Figure 15 below. The national Labour Cost Index (LCI) increased by 15% between 2020 and 2024. In comparison, the wage rate for unskilled packhouse labour increased by 33% and picking gold average wage rates increased by 27% between 2020-22 in particular before declining in 2023-24. This indicates a dramatic increase in wages, far outpacing inflation or growth of wages in other sectors.

A further cost to the events of 2021 was a cost in fruit quality. Although data on this are not publicly available, interviewees noted that these were considerable.

If other interventions/ strategies are not successful in increasing supply, this suggests that the kiwifruit industry *may* need to increase wage rates to meet labour demand increases. Note that forecast workforce increases are likely to be more gradual in nature compared the response needed to COVID-19 border closures, so the impacts are unlikely to be as severe.

Figure 15: Indexed wage rate increases⁷ between 2020 – 2024 compared to Labour Cost Index⁸ (LCI) (all indexed to 2020 = 100).

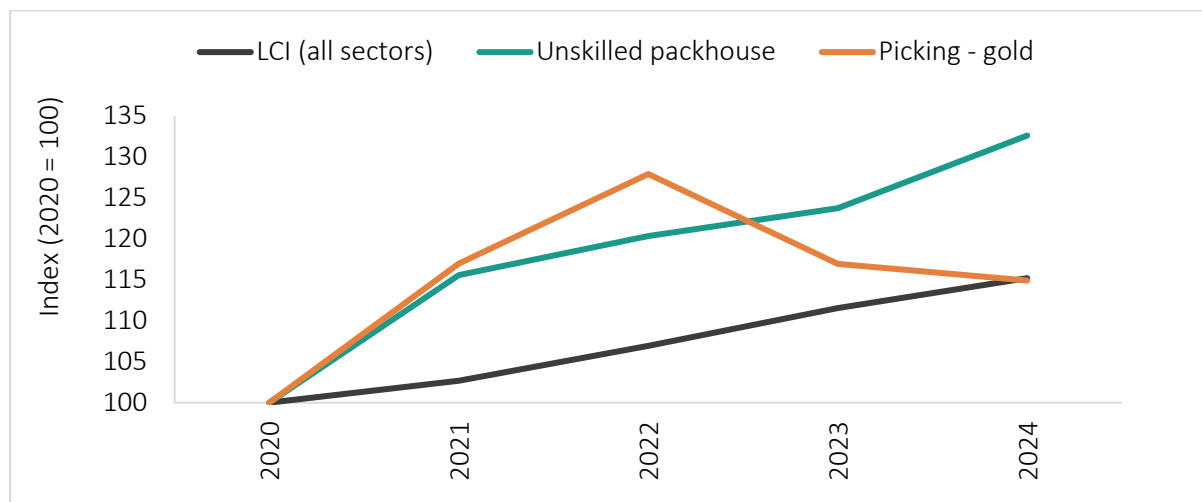


Table 6: Indexed wage rate increases between 2020 – 2024 compared to LCI

Year	Labour Cost Index (LCI)		Packhouse (unskilled)		Picking (gold)	
	Dec qtr. index	Indexed to 2020	Average \$/hr	Indexed to 2020	Average \$/hr	Indexed to 2020
2020	1228	100.00	\$19.16	100.00	\$25.32	100.00
2021	1261	102.67	\$22.14	115.55	\$29.61	116.94
2022	1313	106.92	\$23.05	120.30	\$32.38	127.88
2023	1370	111.52	\$23.70	123.70	\$29.60	116.90
2024	1415	115.18	\$25.40	132.57	\$29.09	114.89

⁷ The wage rates informing this analysis were sources from the following reports:

2020: <https://www.nzkgi.org.nz/wp-content/uploads/2021/10/NZKGI-Labour-Report-for-the-2020-season.pdf>
 2021: <https://www.nzkgi.org.nz/wp-content/uploads/2022/08/Final-NZKGI-Labour-Doc2021-Update-web.pdf>
 2022: https://www.nzkgi.org.nz/wp-content/uploads/2022/11/NZKGI-2022-Seasonal-Labour-Report_Final.pdf
 2023: <https://www.nzkgi.org.nz/wp-content/uploads/2023/11/NZKGI-Seasonal-Labour-Report-2023-FINAL.pdf>
 2024: <https://www.nzkgi.org.nz/wp-content/uploads/2025/07/NZKGI-Pre-Harvest-Survey-Report.pdf>

⁸ <https://www.stats.govt.nz/information-releases/labour-market-statistics-december-2025-quarter/>

Size of the labour pools

The total workforce of the Bay of Plenty's is unlikely to grow fast enough to support a larger kiwifruit industry on its own

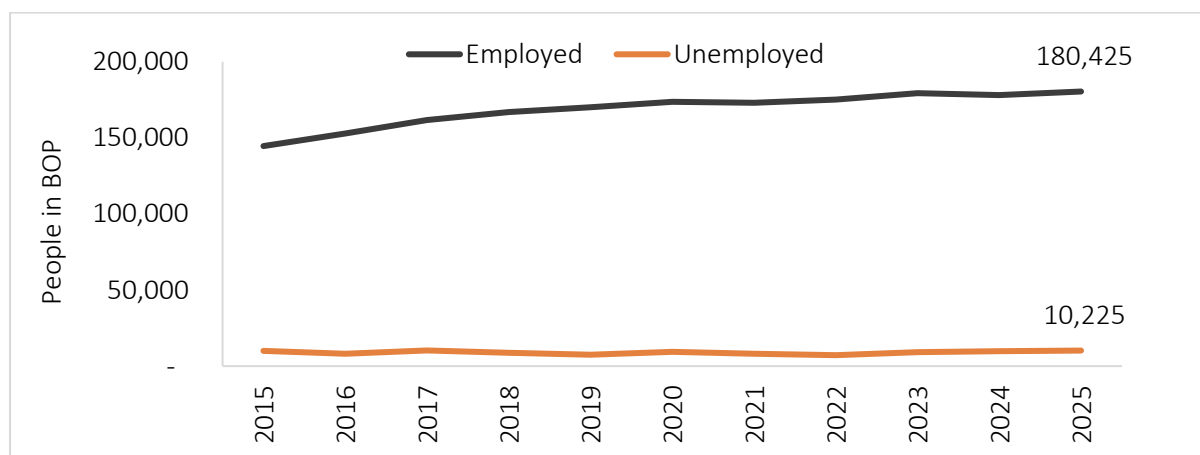
As the Bay of Plenty region accounts for more than 80% of the kiwifruit industry's production, it is particularly important to ensure sufficient labour supply in that region.

The total number of people employed in the Bay of Plenty has increased by about 25% in the last 10 years – now at approximately 180,000 (about 139,000 in a full-time capacity as at the 2023 Census). Our forecasting suggests that the rate of industry growth may be double – an important challenge for the region to be thinking about.

Below we set out some possible strategies to increase supply from particular source points. What isn't covered here, but could potentially be of importance in future years – is supply of labour from other regions of the country to meet demand (particularly from other regions to the Bay of Plenty).

We also see in Figure 16 below over 10,000 unemployed in the Bay of Plenty region⁹ – another labour pool to be utilising more in the medium term.

Figure 16: Bay of Plenty total employed and unemployed workforce (Household Labour Force survey, annual average)¹⁰



Kiwifruit growing attracts industry changers from a wide variety of industries

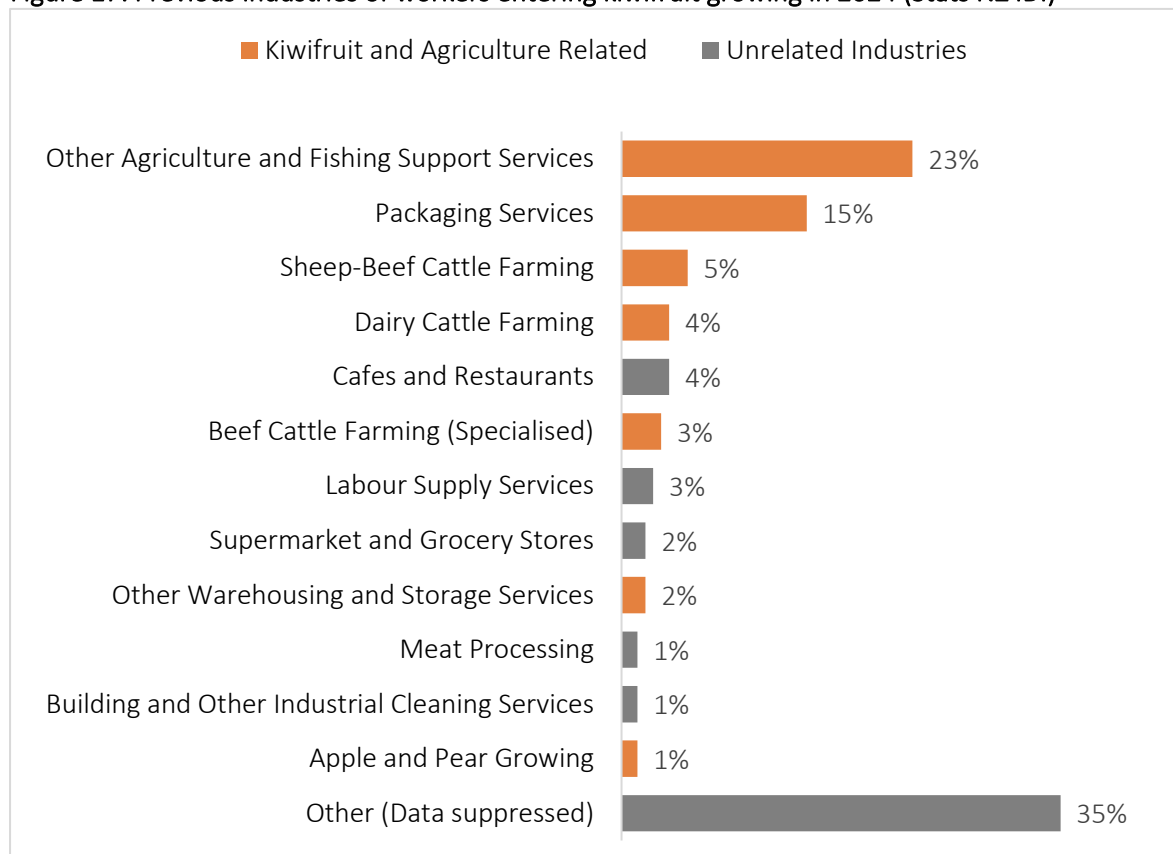
Analysis using the IDI indicated that of the 180,000 people employed in the Bay of Plenty, between 20,000 - 30,000 of them will change industries¹¹ at least once in a given year (about 10 - 15%). As shown in Figure 17, a significant number of them (54%) are transferring from elsewhere within the broader agriculture sector, some of whom may have already been working within the sector as contractors, or in other parts of the supply chain.

⁹ Unemployed: all people in the working-age population who during the reference week, were without a paid job, available for work, and had either actively sought work in the past four weeks or had a new job to start within the next four weeks.

¹⁰ <https://figure.nz/chart/TAKpbKd3tm7C8Udc-Dnrdd8bbDH6mcXUP>

¹¹ Industries here is defined as ANZSIC06 industries. Someone could move between the 'Kiwifruit growing' industry and 'Other Agriculture support services' industry, and be counted as an industry changer.

Figure 17: Previous industries of workers entering kiwifruit growing in 2024 (Stats NZ IDI)



The permanent and seasonal workforce supply may be sensitive to changes in immigration

Migrants and international workers are a valuable source of labour to the kiwifruit industry. As seen in Figure 11, Figure 13, and Figure 18, this talent pool has been accounting for an increasing number of permanent workers. This is particularly the case for residents.

This trend is not just contained to kiwifruit. Figure 20 shows the national story: New Zealand has been seeing a dramatic increase in recent residents since 2022, though the rate of increase has slowed down recently.

These results indicate an increased reliance on this talent pool. Although the workforce may not be particularly constrained by labour supply at present, a drop in the number of new residents migrating to New Zealand, or changes in immigration policy, could create constraints that may make it difficult for the industry to meet the expected increase in demand.

Figure 18: Number of distinct workers on any visa type, in the 'Kiwifruit growing' or 'Other agriculture support services' industry in the Bay of Plenty region¹² (Stats NZ IDI)

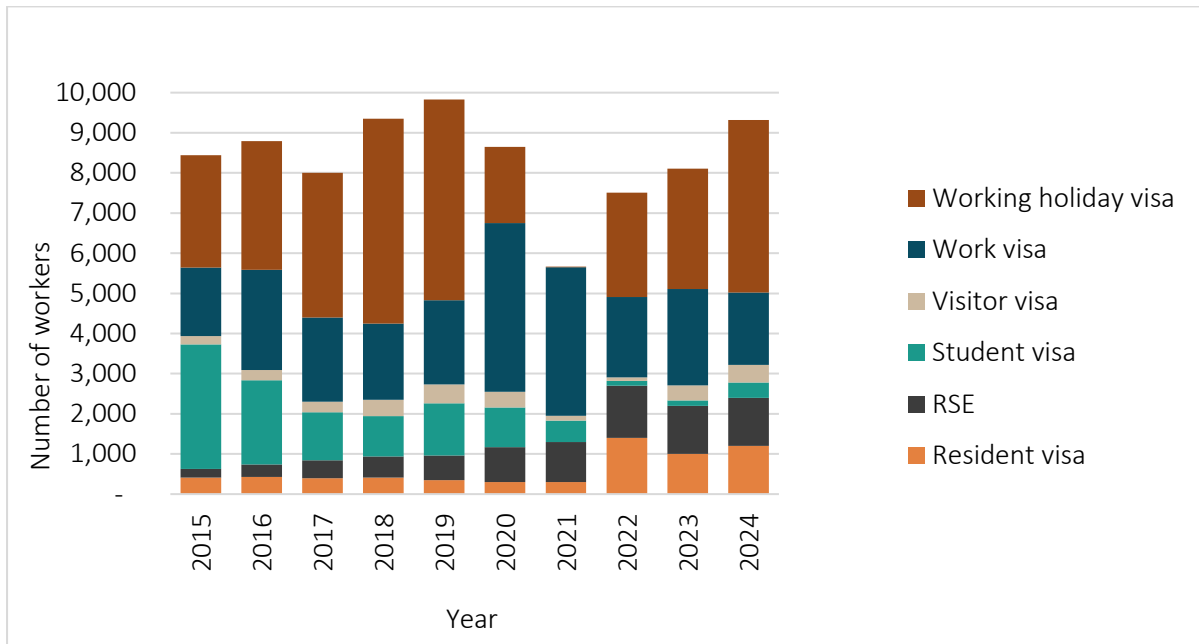
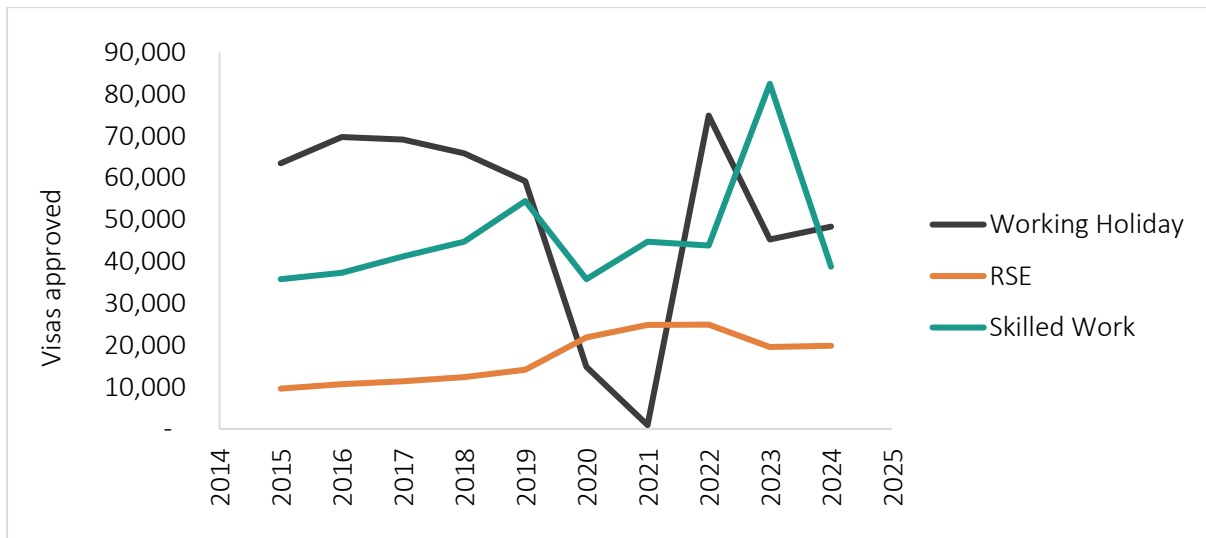


Figure 19: Visas approved in New Zealand by application criteria: Working Holiday Scheme, Recognised Seasonal Employer (RSE) and Skilled Work visa¹³ (Immigration New Zealand)

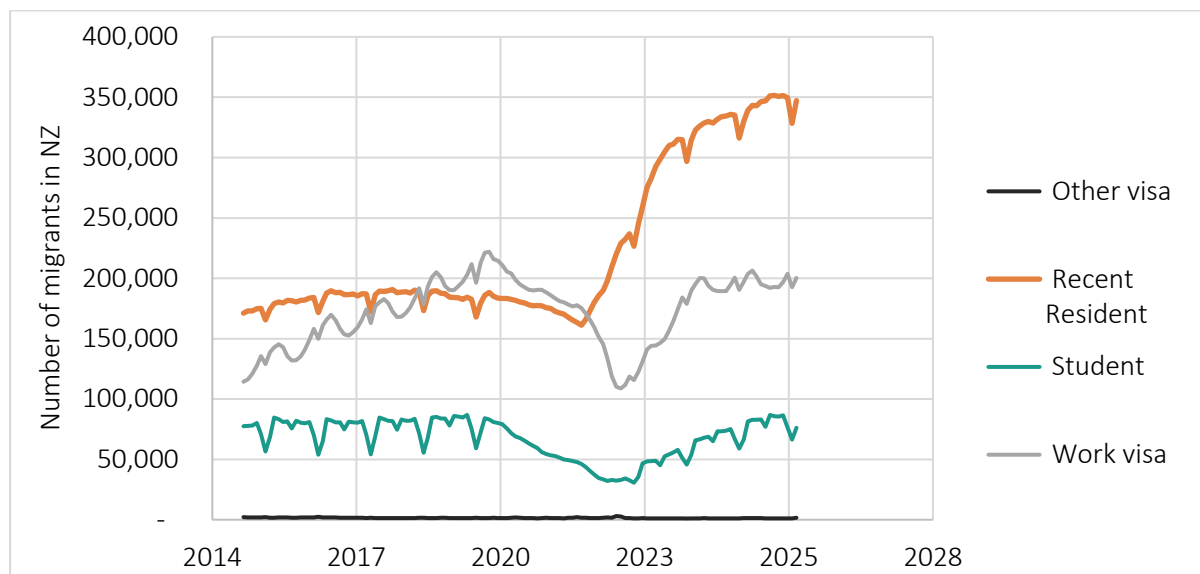


¹² Note that this analysis includes 'Other agriculture support services', as Kiwifruit is the primary crop grown in the Bay of Plenty region, so combined, these two industries give a good indication of the workers working in kiwifruit-related roles.

Note also that although the absolute numbers may not be an accurate representation of the kiwifruit industry, it is the trends here that are noteworthy.

¹³ <https://figure.nz/chart/XiAyD2LiuU82BMpD>
<https://figure.nz/chart/JMNZ7XCF5DJEr585>
<https://figure.nz/chart/fWaRYlqj77ICPTQn>

Figure 20: The number of migrants in New Zealand, by visa type (MBIE Migration data explorer, extracted 5th of March 2026)



Tertiary graduates are a small but important supply source for the future

Based on the last ten years, this is a small percentage of the total supply of new workers to the kiwifruit workforce (4 – 9% of permanent workers). However, this cohort are those likely going into high-skilled and leadership roles in the sector. This cohort will become increasingly important as automation and technology is adopted – particularly in packhouse facilities. However, we note that qualifications are not the only factor, in previous sections interviewees indicated the importance of other factors such as

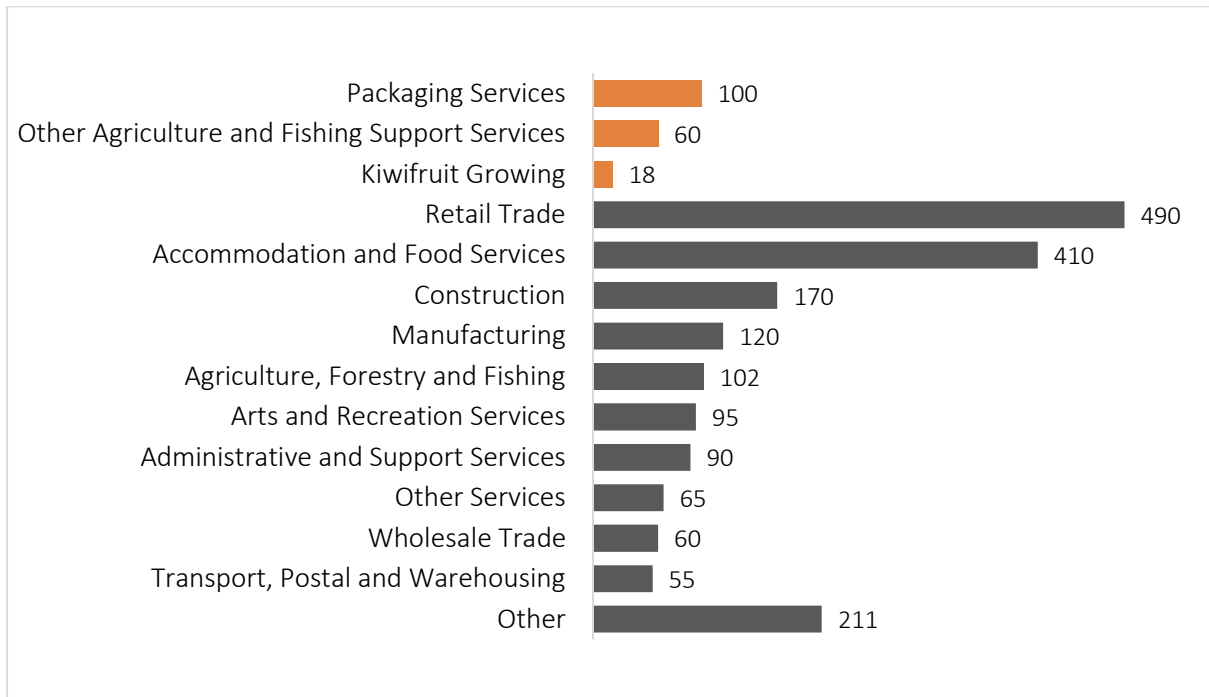
School leavers are not a typical pathway, but are an important pool to train for the future

This is currently not a typical pathway for kiwifruit, only a small number go directly from school to working in the industry. For example, of the 2,000 school leavers in the Bay of Plenty in 2023, only 100 went into packaging services (which includes some non-kiwifruit industries), 60 went into ‘Other Agriculture and Fishing Support Services’ (which includes some non-kiwifruit industries), and 18 went into Kiwifruit Growing, as seen in Figure 21¹⁴. Note that these numbers exclude those who have already been working in these industries during school.

Rather than recruiting more school leavers directly, the kiwifruit industry may benefit more from investing in training up school leavers to meet future skill needs. As mentioned in the section on Increasing productivity through automation and technology, more the industry would benefit from a larger supply pool of technically skilled workers. Workplace-based training, such as apprenticeships, may be an attractive option for getting learners’ hands-on experience. As outlined on page 24, interviewees from post-harvest facilities indicated that practical capability may be more desirable than traditional qualification pathways.

¹⁴ This number has been subject to rounding to meet confidentiality requirements.

Figure 21: Industry of employment of school leavers after leaving school in the Bay of Plenty (2023 school leavers, 2024 employment) – only a small number enter kiwifruit growing (Stats NZ IDI)



Chapter 4: Conclusions

This chapter summarizes the findings from this work and provides some final key takeaways for NZKGI and industry to consider when planning for the kiwifruit industry's growth.



Current and future workforce demand

The kiwifruit industry has seen significant growth in recent years – in both production and workforce size. A combination of modelling, interviews, and quantitative analysis using the StatsNZ IDI was undertaken to understand the current and future demand for the permanent kiwifruit workforce.

In 2025, we estimate there was demand for 3,100 permanent FTEs in the kiwifruit workforce

Modelling was undertaken to estimate the size of the kiwifruit workforce using a bottom-up approach. That is, how many people were needed to complete the tasks required to meet production outputs in 2025. Based on this approach, we estimated:

- 1,100 permanent FTEs on-orchard
- 42 permanent FTEs in maturity services
- 1,900 permanent FTEs in post-harvest facilities.

Labour demands are currently being met with a supply of overseas workers

Approximately 30% of the permanent workforce kiwifruit industry are on a visa (including residents), up from 23% in 2015 – indicating an increasing reliance on international labour to meet demand.

Model forecasts suggest the permanent workforce will grow by 20% by 2035

Modelling estimates that by 2035, the size of the permanent workforce will be:

- 1,400 permanent FTEs on-orchard (increase of 27%)
- 45 permanent FTEs in maturity services (increase of 6%)
- 2,200 permanent FTEs in post-harvest facilities (increase of 15%).

There is no silver bullet to ensuring future demands are met by labour supply

Interviewees felt that the permanent workforce is being managed reasonably well, but the big lever is the reliability of field labour and the continuing dependence on immigration to meet demand. Interviewees noted that a reliable field workforce is what makes the permanent workforce's job much easier.

Modelling estimates that on average an additional 60 new permanent FTEs will be required each year to keep up with demand by 2035. There is no one single strategy that should be depended on to meet this demand. Rather, a combination of strategies could be utilised to support industry growth.

Strategies identified include:

1. Increasing productivity through
 - a. automation and technology
 - b. increased skills
2. Increasing labour supply
3. Increased staff retention and utilisation.

Opportunity for productivity gains from automation

Productivity gains from automation on-orchard are likely marginal in the medium-term

Industry engagement found that there is marginal benefit to be gained in the medium-term on-orchard. Although there is some time-saving with minor tasks, technology gains with picking and pruning are likely not to be realised in the next ten years.

The largest opportunity for productivity gains from automation is in post-harvest activities

In comparison, industry is optimistic about the gains to be had in post-harvest facilities. Modelling indicates that this could result in a 9% to 50% productivity gain by 2035, depending on the degree of adoption from packhouses. Increased automation will increase demand for a small number of new specialist roles.

Opportunity for increased labour supply, utilisation and retention

The workforce is increasingly drawing on international supply of labour and should increase efforts to attract industry changers

Approximately 30% of the permanent workforce kiwifruit industry are on a visa (including residents), up from 23% in 2015 – indicating an increasing reliance on international labour to meet demand. Another key source of new workers to the industry is industry changers – in particular those coming from other parts of the food and fibre sector (bringing with them relevant, practical skills).

Medium-term recruitment should focus on roles which have low labour elasticity

Interviewees felt that immigration will be continued to meet demand. Industry should instead focus on those roles in the sector that have low labour elasticity (requiring longer to train for, high skill). Ensuring sufficient supply of these skills over the medium-term (next ten years) through the development from secondary school and tertiary training. In particular, the skills needed to facilitate post-harvest facility adoption of automation and technology.

Increasing retention has the potential to be the strongest lever

78% of new workers that enter the kiwifruit workforce leave before accruing 12 months' worth of experience. This is not unusual, given the seasonal nature of the industry. However, this presents a significant number of people coming in contact with the industry that could be converted into a permanent capacity if the demand is there. Note however, that although the *quantity* of people is there, that does not mean the *quality* necessarily is. We also note that investing in skills and training increases the likelihood of retention.

Future demand for seasonal labour may require competitive wage rates

COVID-19 and the resulting lockdowns provided a 'natural experiment' regarding what happens to the kiwifruit workforce when labour supply is limited – in this case that of working visa holders. What we find is that the industry finds the labour it needs, at a cost. Wage rates are raised to compete for the available labour (significantly more so than the Labour Cost Index for New Zealand, as we find). Ideally, this solution is not the preferred – but may be needed in the medium term to meet demand - particularly to fill seasonal labour needs).

Future skills needs

Understanding future skills needs was mainly undertaken through interviews and to a lesser extent through modelling. One key finding, perhaps surprisingly, is that there are unlikely to be significant shifts in the skills needed over the next 5 to 10 years.

On-orchard

On-orchard, the scope for automation is limited, meaning that there are unlikely to be transformative changes in the types of activities undertaken and therefore few major changes in the types of technical capabilities needed. That is not to say, however, that there will not be ongoing evolutionary change with the consequent need to refresh existing qualifications and training programmes.

Interviews did highlight a need for applied development in orchard supervision, orchard management, and data-enabled decision-making, with a stronger emphasis on soft skills and industry mentoring.

Maturity services

In maturity services, the need is for more formalised technical capability in lab, quality, and compliance roles, supported by stronger entry pathways for seasonal staff.

Post-harvest

The increase in automation in packhouses will result in more people being needed in technical roles but in absolute numbers this change is small – from approximately 80 roles to approximately 100. And while there is likely to be more automation, the types of technologies that are likely to be adopted are largely already in use in some parts of the post-harvest sector. Again, this implies that the types of technical skills needed are not likely to change dramatically over the next 5-10 years.

From interviews we heard that packhouses valued trades and practical skills, and possibly a willingness to work in more operational roles at quiet times of the year, over advanced engineering or other pre-employment qualifications.

However, the feedback from packhouses also implies that there is an opportunity for training providers to deliver *on-the-job training* relating to the automation technologies that trade and practical workers will need to work with in a packhouse environment. Short-form training, including micro-credentials are likely to be preferred over longer qualifications. That said, the size of this opportunity from the perspective of a training provider may be constrained by the small employee pool. Assuming a typical industry workforce turnover rate of about 15%, and an employee pool of about 100 people, the potential market size for such training is probably limited to about 15 people per year. For this to be viable will probably require a high level of co-investment by employers alongside government investment through the Tertiary Education Commission.

Chapter 5: Appendices

This chapter presents additional information and details to support the content presented throughout this report.



Appendix 1: Model details

Modelling *future* workforce demand (2035)

Once the 2025 workforce demand is established as the baseline, we then forecast demand for future years in line with the industry's anticipated growth. Rather than rerunning the full activity and volume-based models for every future scenario, we use a simpler scaling approach that draws from the logic of the baseline model to test a range of growth and productivity scenarios.

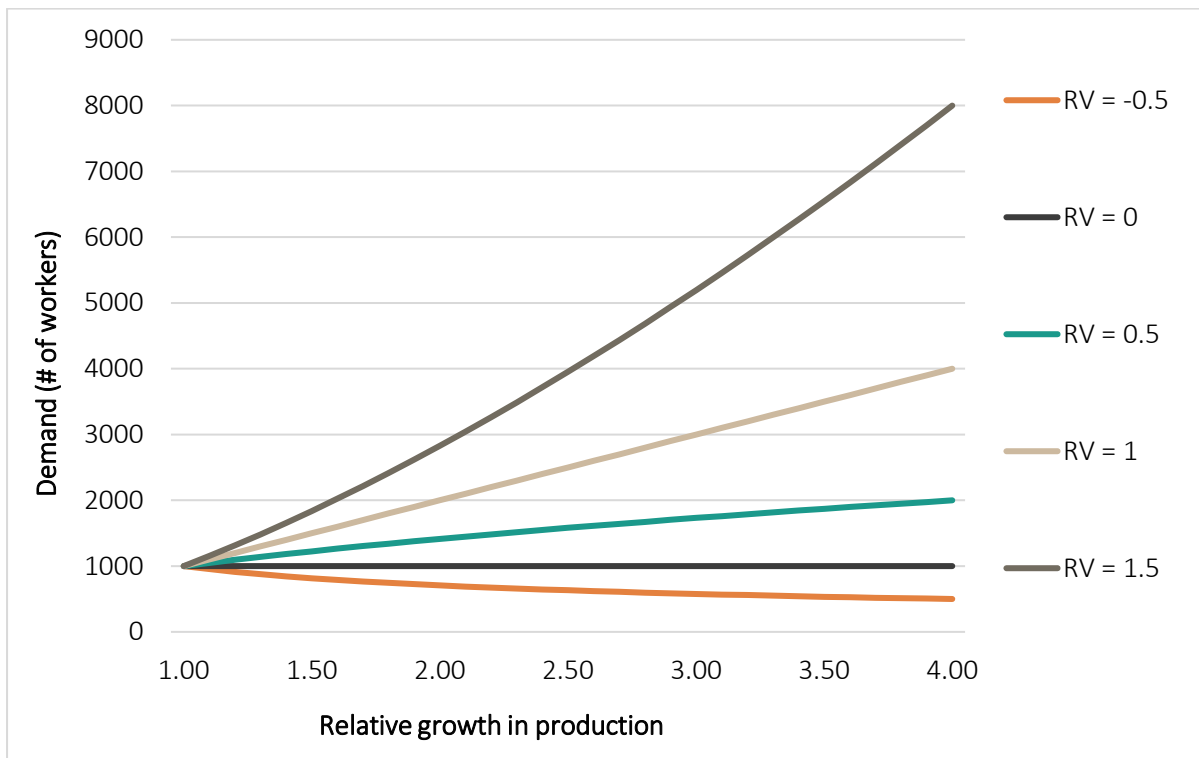
The scaling method works because most on-orchard, maturity services, and post-harvest roles have a predictable relationship with industry growth. Demand for some roles grows proportionately (e.g. more planted hectares require more on-orchard labour to manage more canopy area), while demand for other roles grows more slowly because they can absorb additional production volumes before more people are required (e.g. a coolstore manager).

We capture these relationships by giving each role a “responsiveness value” (RV), which describes how strongly a role reacts to industry growth. The value sits on a scale from 0 to 1:

- **Highly responsive (>1).** Roles with a value greater than 1 grow faster than the industry itself. For example, roles where extra volume creates disproportionately more work, or where manual processes cannot easily stretch across larger operations. These roles may also reflect areas where bottlenecks form quickly as production rises.
- **Proportional responsiveness (1).** A value of 1 means the role grows at the same rate as the industry. If production increases by 20%, demand for these roles also increases by about 20%. These roles are closely tied to the amount of fruit being grown and are manual or hands-on by nature.
- **Moderate responsiveness (between 0 and 1).** A value between 0 and 1 indicates that demand does not grow at the same rate as the industry. These slow growing roles can typically absorb additional work before more people are needed. For example, slow growing roles could include coolstore managers or quality assurance roles.
- **No responsiveness (0).** A value of 0 means the role does not meaningfully change with industry growth. These roles tend to be organisational, supervisory or professional by nature, where one person or a small team can continue to support the industry as it grows.
- **Negative responsiveness (<0).** Negative values represent roles where demand declines as the industry grows. This can occur where larger scale production enables efficiency gains or where technology reduces labour needs. These roles shrink gradually over time as productivity improves.

Using these responsiveness values, we start with the 2025 baseline demand for each role and adjust it in future according to how much the industry grows and how strongly that role is expected to respond to that growth. Figure 22 shows how this approach works in practice; every line begins at the same starting point (a hypothetical 2025 demand of 1,000 workers), but the paths diverge for different responsiveness values.

Figure 22: Workforce demand forecast model



This approach creates a forecasting method that is simple, scalable and flexible to test how future workforce demand changes in response to productivity efficiencies from innovative solutions. The responsiveness values given to each role for this analysis are presented in Table 7.

Table 7: Responsiveness values for roles

Supply chain segment	Role	Responsiveness value (primary demand driver)	Responsiveness value (automation)
On-orchard	Orchard management / administration	0.6 (0.45 to 0.75)	-
	Canopy crews: Permanent	1.0	-
	Canopy crews: Seasonal	1.0	-
Maturity services	Leadership and operations management	0.3 (0.15 to 0.4)	-
	Sampling and field operations management	0.6 (0.4 to 0.8)	-
	Laboratory operations and management	0.7 (0.5 to 0.8)	-
	Quality, compliance, and technical governance	0.5 (0.3 to 0.65)	-
	Planning, logistics, and sample intake	0.75 (0.6 to 0.9)	-
	Health, safety, and workforce capability	0.4 (0.25 to 0.6)	-
	Specialist analytical capability (optional)	0.7 (0.4 to 0.9)	-
	Laboratory labour - Supervisor	1.0	-
	Laboratory labour - Testers	1.0	-
	Sampling labour - Supervisor	1.0	-
	Sampling labour - Samplers	1.0	-
Post-harvest	Leadership and management	0.3 (0.2 to 0.4)	-
	Operations: Permanent	0.7 (0.5 to 0.9)	-
	Operations: Packing labour	1.0	-1.0

	Operations: Re-packing labour	1.0	-
	Quality	0.7 (0.5 to 0.9)	-
	Logistics and storage	0.6 (0.4 to 0.8)	-
	Technical specialists	0.4 (0.3 to 0.5)	0.6 (0.4 to 0.8) ¹⁵
	Business support	0.6 (0.3 to 0.75)	-

Automation is modelled with a smooth S-curve

The model estimates future demand as a function of industry growth and automation adoption. Productivity gains from automation adoption are only likely to be seen in the seasonal packing operations. Here, activities such as box making, grading, and packing are the most immediate and impactful opportunity. As seen in the interviews, there is currently limited opportunity for extensive automation adoption in the on-orchard and maturity services supply chain components; our model does not increase automation adoption for these industries.

Within the model, productivity of packing operations is expressed as the number of trays a person can process per hour. As an illustrative example:

- A fully manual activity (0% technology adoption) may achieve 40 trays per person per hour, while
- A fully automated activity (100% technology adoption) may achieve 110 trays per person per hour.

Using these reference points for this hypothetical activity, we estimate adoption of the automation using Adopt by CSIRO¹⁶. This model estimates adoption using an S-curve, where adoption slows down as we approach maximum practical adoption. This is illustrated in Figure 23. Note that automation adoption is already underway, so the current state of the industry is part way along the curve. As can be seen on the graph, at present (2025) automation adoption is 50%, corresponding to a productivity of 75 trays per person-hour. By 2030 the automation adoption has reached 70%, increasing productivity to 89 trays per person-hour, and by 2035 these values are 77% and 94 trays per person-hour respectively.

Meanwhile, increased automation adoption is likely to cause demand for technical specialists to increase due to increased management and maintenance requirements. Figure 24 shows how demand for packing labour and technical specialists changes due to adoption of automation. The changes plotted here are relative to 2025 demand and only reflect changes in demand due to increases in productivity. Increases in demand due to higher required fruit throughput are not included in this chart. Note that due to the differing responsiveness values, the two roles move in opposite directions, and by different magnitudes.

¹⁵ The responsiveness value for technical specialists is estimated assuming a steady state of operation. It does not account for the increased labour required for installation and initial training.

¹⁶ See <https://adopt.csiro.au/>

Figure 23: The adoption S-curve for automation adoption in post-harvest operations.

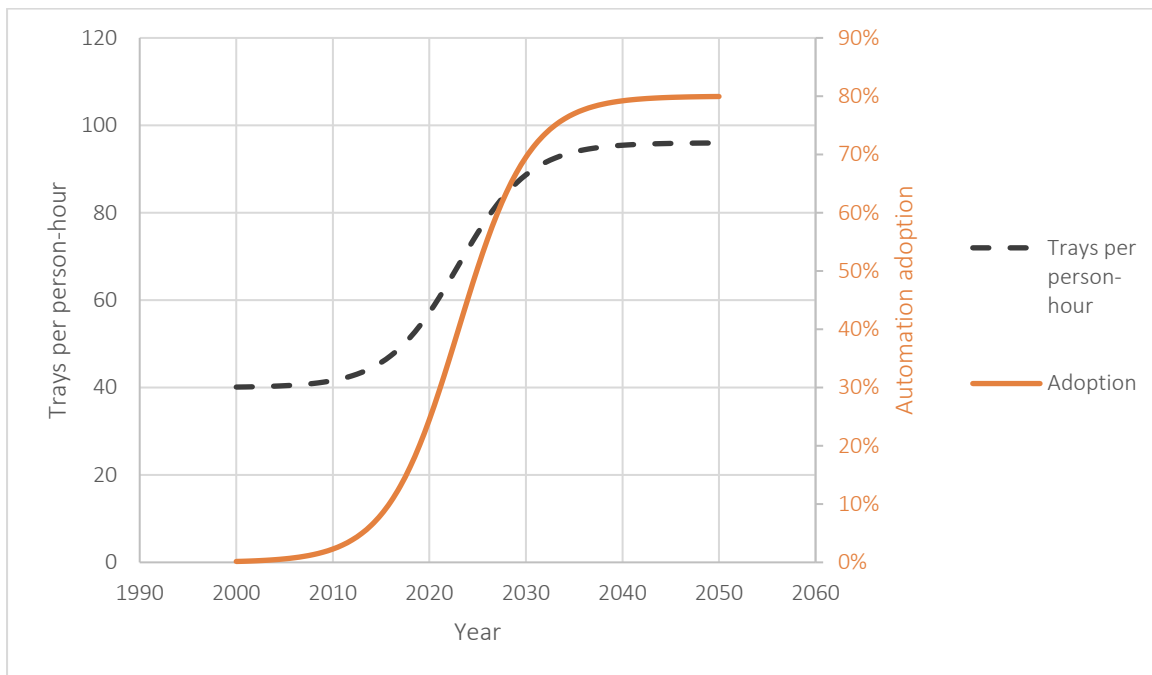
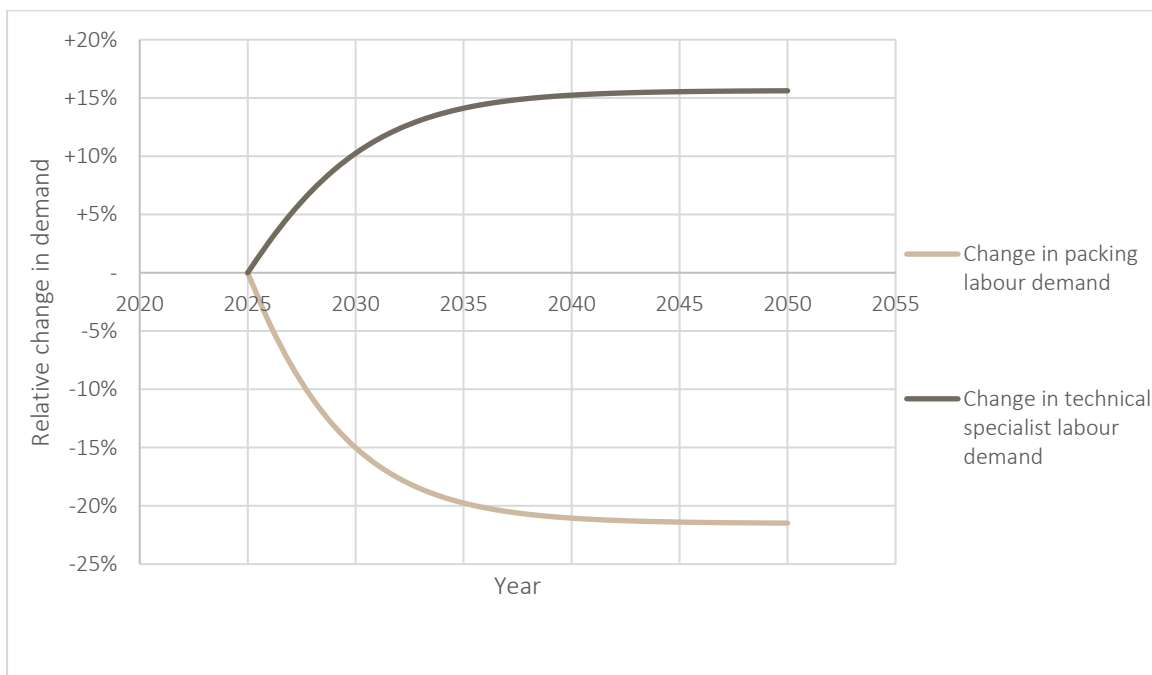


Figure 24: Change in demand for packing labour compared to demand for technical specialist labour - as the result of changes in automation adoption only.



This model has caveats to be aware of

As with all models, this is a useful but imperfect representation of reality. There are several important caveats that should guide interpretation.

Firstly, interviewees indicated that adoption in individual packhouses will be notably more stepwise as individual pieces of equipment are implemented or replaced. The smooth S-curve represented here

models an industry average, and is useful to identify long term trends, but short-term projections are much more prone to error.

Secondly, we have assumed a responsiveness value that increases demand for technical specialists as automation increases. Interviewees indicated that much of the demand for maintenance and support is contracted out, with only a small number being employed in house. Overall, the demand for in-house technical specialists will increase, however they make up a small proportion of the workforce, and those packhouses which contract out all maintenance and technological support may see an increase cost through demand for these services, rather than needing in-house technicians.

And finally, implementing automation may not increase the total throughput of the throughput of the packing line – for example, chokepoints in other parts of the line may result in new automation not significantly changing the total trays packed per hour. However, productivity in terms of trays per person-hour may still increase due to the reduction in labour costs needed to operate the line.

Appendix 2: IDI workforce definition details

Defining the seasonal workforce in the IDI

While the focus of this work is on the industry's permanent workforce, we model the seasonal workforce as a pathway towards understanding the permanent workforce.

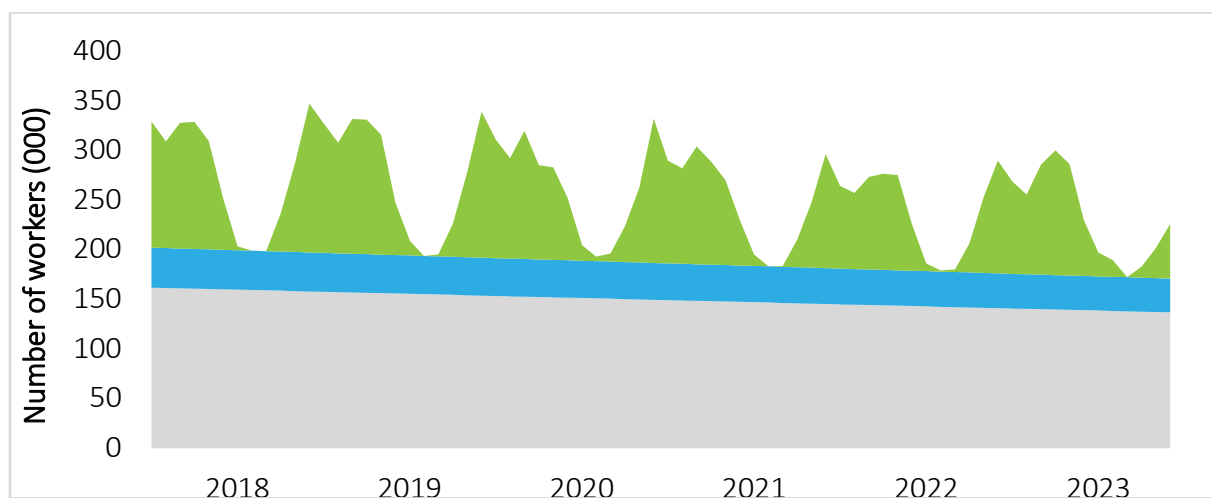
IDI data allows us to identify seasonal patterns of employment over the course of the year, including the peaks and troughs seen in Figure 25. It is tempting to define the seasonal workforce as the numbers in the (green shaded) fluctuating part of the pattern between the peak and troughs. While this works at an aggregate level, individual workers' spans of employment do not always align with this seasonal variation. For example, a seasonal worker may join the workforce shortly after a seasonal peak in demand but stay on beyond the trough. For this work, we want to be able to identify individual workers so that we can analyse attributes at the individual level. Consequently, we need an alternative definition to classify individual workers as being in either a seasonal or a non-seasonal role.

In this work, a worker is classified as seasonal if they meet any of the following criteria¹⁷:

- **Employment pattern.** They worked in the industry for 9 months or less, with repeating employment in the year before or after
- **Visa status.** They held a visa associated with temporary seasonal work (such as RSE or working holiday) for the duration of their employment
- **Short-term employment with income threshold.** They worked for 6 months or less at a time and earned more than the equivalent of 4 hours at the minimum wage over the employment period.

Using this definition means that the seasonal workforce looks more like the area shaded in blue as well as green. This definition is the primary one used in this report. However, we also use an alternative view, in which we consider only the fluctuating (green) part when we explore inter-sector synergies within regions.

Figure 25: Hypothetical workforce size over time (*Grey area = permanent workforce component, blue area = seasonal workforce component year-round, green area = seasonal workforce above the troughs*)



¹⁷ We have reconciled to a definition used by the Ministry for Primary Industries in other work

The insights collected from the IDI with respect to how large the blue bar should be to reflect the true size of the seasonal workforce will be used as a key input to the Excel-based demand modelling (above).

Limitations of this approach

The approach that we have taken to defining the seasonal workforce has some limitations. These include:

- People that enter the sector with an intent to work in the non-seasonal workforce, but leave quickly for reasons unrelated to work seasonality, appear similar in the IDI data to people that intend to work only seasonally. This may mean our analysis overstates the number of seasonal workers.
- Many seasonal workers are employed by labour contracting firms, or similar intermediaries, that are not classified by the industry codes (ANZSIC codes) of the sectors that they supply workers to. This may mean our analysis understates the number of seasonal workers (albeit many do appear in a cross-sector ANZSIC code).

These limitations mean that the charts that follow do not provide a reliable baseline for workforce numbers in their own right. However, they do provide a point of reference for model calibration and an indication of seasonality patterns.

IDI workforce counts – Total New Zealand

Figure 26: Workforce size – Kiwifruit growing industry – total NZ (StatsNZ IDI)

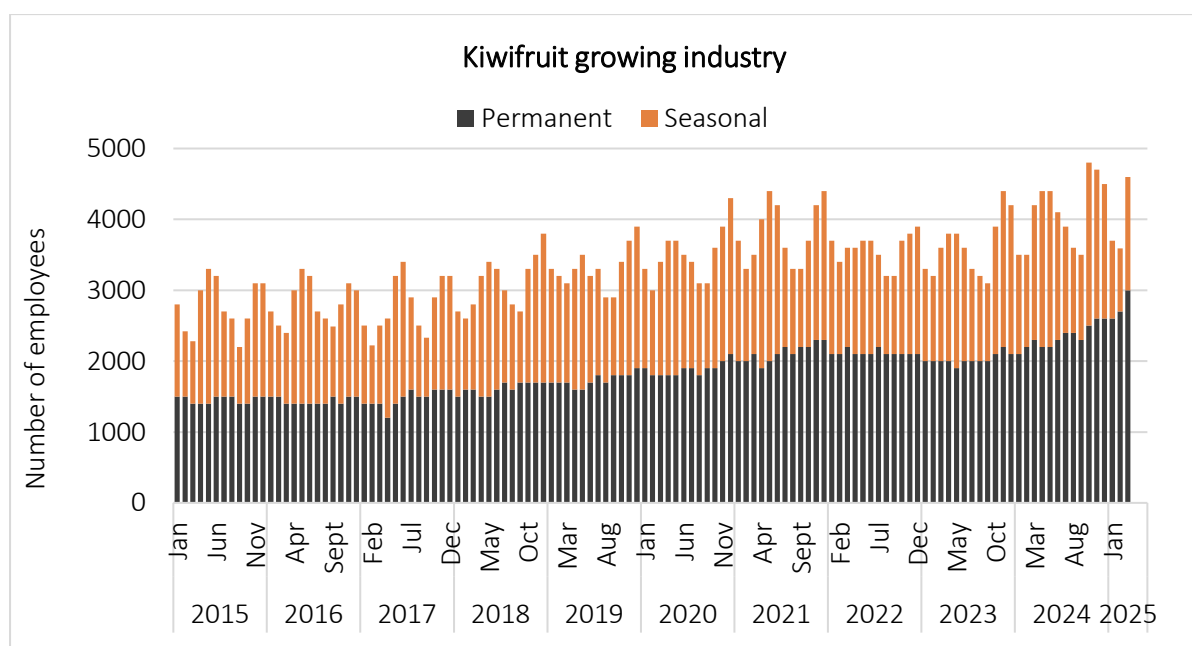
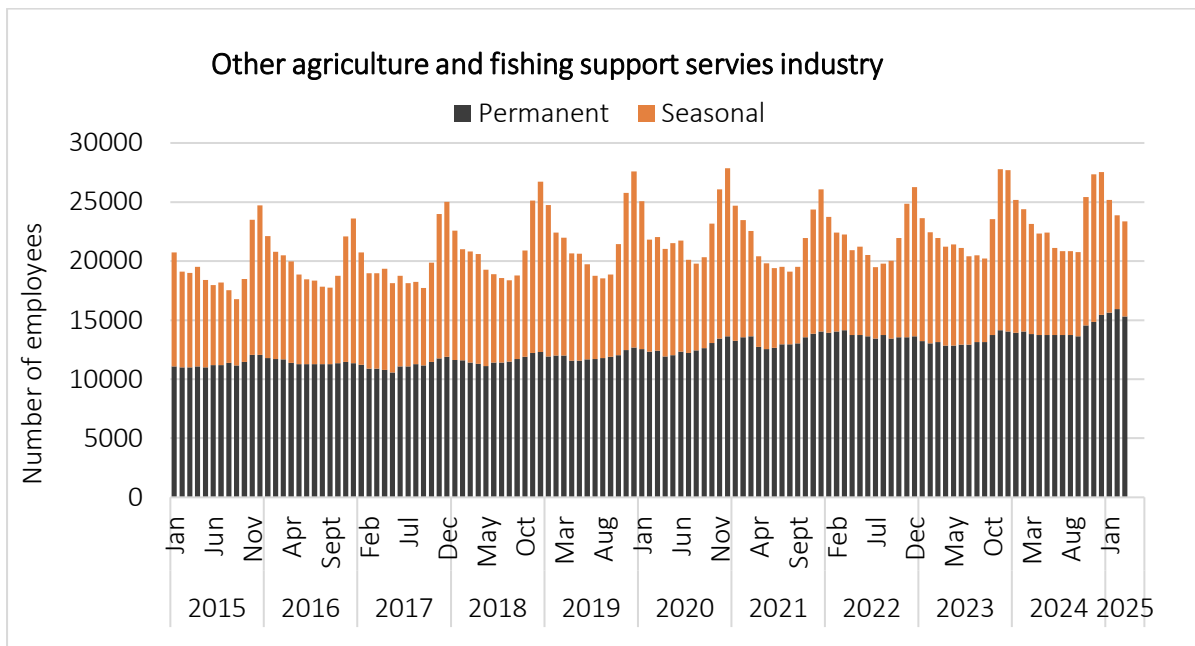


Figure 27: Workforce size – Other agriculture and fishing support services – total NZ (StatsNZ IDI)



IDI workforce counts – Bay of Plenty only

Figure 28: Workforce size – Kiwifruit growing – Bay of Plenty only (StatsNZ IDI)

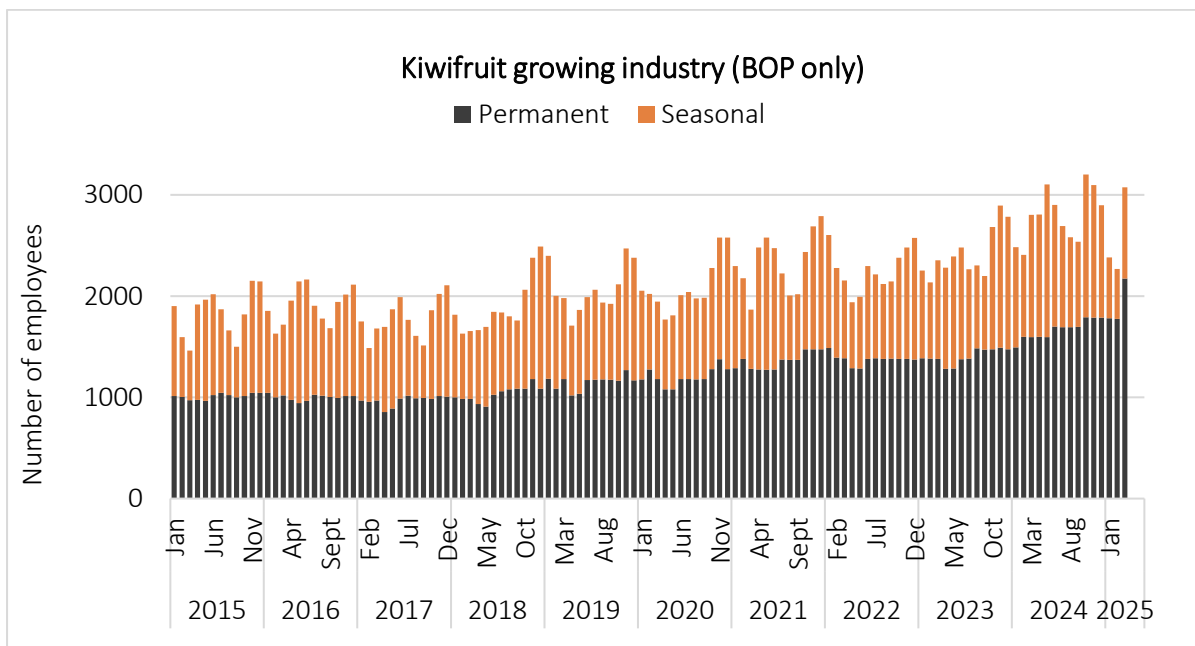


Figure 29: Workforce size – Other agriculture and fishing support services – Bay of Plenty only (StatsNZ IDI)

