Victorian Skills Authority

Victorian Skills Plan

Agriculture, Forestry and Fishing Industry Insight

October 2022

VICTORIA State Government | Education and Training

Contents

Introduction

This report on the Agriculture, Forestry and Fishing industry forms part of the 2022 Victorian Skills Plan and outlines demand for occupations, education and training directed to meeting the demand and current workforce issues facing the industry.

This report has been prepared by the Victorian Skills Authority (VSA). The VSA was formed in July 2021 in response to the review *Future Skills for Victoria: Driving collaboration and innovation in post-secondary education and training* (known as the Macklin Review). The VSA is charged with preparing an annual Victorian Skills Plan (the Skills Plan) to guide decision-making on skills and training, by the Government, education and training providers, industry and communities.

The Victorian Skills Plan

The annual Skills Plan sets out Victoria's skills needs for 2022 to 2025 by drawing on data, evidence and insights from a range of system-wide and local sources.

The Government in conjunction with industry, communities and education and training partners brings collaborative action through the Skills Plan which:

- **defines skill needs** with clear statements of required skills and capabilities (current and emerging)
- **sets priorities** for post-school education and training in Victoria
- **communicates to the community** the opportunities education and training can provide to offer careers for individuals that also meet the workforce needs of industry
- **aligns action** across industry and government to support improved outcomes for all Victorians.

The Skills Plan consists of:

- a summary report – the Victorian Skills Plan
- the industry needs of the Victorian economy segmented into 13 insight reports, each comprising like industries – of which this report is one
- profiles of industry and occupations in the regional areas of Victoria which outline priorities for skills development – either as snapshots or Regional Skills Demand Profiles
- current employment and forecast demand to 2025 across Victoria – a user-driven dashboard.

About Industry Insight Reports

Each industry insight is based on robust research, qualitative and quantitative data collection and analysis and extensive consultation with the Government's Industry Advisory Groups, partners and stakeholders over a period of six months. Each report sets out to:

- profile the **industry outlook**, taking into account sector trends and key drivers of demand
- detail the **workforce and skilling implications** of the industry based on forecasting
- set **industry priorities** in responding to current and future workforce challenges
- provide initial guidance for an **education and training response** to these challenges.

The industries reflected in each report are defined according to their classification within *1292.0 - Australian and New Zealand Standard Industrial Classification (ANZSIC) 2006*, prepared by the Australian Bureau of Statistics. Occupations within industries have been defined using the *Australian and New Zealand Standard Classification of Occupations (ANZSCO)*.

Each industry insight contributes to the conclusions and recommendations of the Skills Plan, focusing on actions for implementation over a three-year period.

The VSA acknowledges and extends sincere thanks to the individuals and organisations that participated in the consultations and contributed to these materials.

Using this report

This is a point-in-time report on the agriculture, forestry and fishing industry in Victoria and the associated skills and workforce issues.

This report, along with the Skills Plan, has been prepared for industry and provider partners as a summary of demand for occupations and workforce issues. In addition to being used by the Victorian Government to consider responses as a public document, it is available to industry and education and training partners to form actions and responses.

The report does not represent the full picture of workforce issues in the industry. Opportunities associated with skills and workforce are longstanding. The information in the report, however, provides the basis for ongoing work on skills demand and responses, including by the VSA and through the Industry Advisory Groups.

Feedback

Feedback on this report, and others, is welcome and can be provided to SkillsPlan@education.vic.gov.au. Feedback will contribute to developing insights and actions.

Report coverage

This report focuses on the agriculture, forestry and fishing industry as defined under ANZSIC and the occupations relevant to the industry, classified according to ANZSCO. It covers activities such as agriculture, aquaculture, forestry and logging, fishing, hunting, and trapping and agriculture, forestry and fishing support services.

Statistics about an industry and its sub-sectors are collated by the Australian Bureau of Statistics (ABS) from the activity of businesses. Each business is classified to an industry based on their primary activities. Where an individual works for multiple businesses, their main job is used.

Industry classifications rarely encompass the full nature of the work (and therefore skills) associated with a given industry. ABS definitions of industries or sectors may not align with the definitions used by an industry association, while the allocation of businesses on primary activity can result in businesses that perform similar services but with a different emphasis being classified across different industries.

Report coverage is limited to employment in the industry and sectors as defined by ABS, noting some occupations are almost exclusively associated with an industry, such as a farm hand in agriculture, while others, such as accountants and electricians, are associated with many industries. Occupational demand for Victoria is the total of occupational demand for all industries.

Table 1 sets out activities that may occur within the agriculture, forestry and fishing industry but are reported formally under other industries. The relevant Industry Insight report is listed.

Table 1 | Scope of related industry activities and insights related industries

Activities	Industry insight
• Gardening services, lawn care services and the maintenance of plants and shrubs in buildings	Administrative and Support Services
• Landscape construction, constructing fences or clearing land	Construction
• Investing in forestry	Financial and Insurance Services
• Forest fire fighting services	Public Administration and Safety
• Horse and dog racing activities • Maintenance of nature reserves and conservation parks • Pest control for industrial or domestic purposes • Providing domestic pet boarding services • Retailing of garden supplies or nursery goods • Wholesaling fresh or frozen rock lobsters, prawns, and finfish • Zoological and botanical gardens operation	Services

Activities	Industry insight
- Distilling eucalyptus oil - Log sawmilling or woodchopping - Manufacturing honey - Manufacturing olive oil - Manufacturing wine - Processing or crushing grapes - Processing poultry meat - Processing vegetables, including freezing, dehydrating or canning	Manufacturing

Executive summary

Industry outlook

The agriculture, forestry, and fishing industry is essential for Victoria's social and economic prosperity. It provides food for local populations and drives significant export value both interstate and internationally. Victoria's gross value of agricultural product (GVAP) was $17.8 billion in 2019-2020.[1]

Over 68,800 people are employed at all skill levels across agriculture, aquaculture, forestry and logging, fishing, hunting, trapping and their related support services, with higher employment in regional areas.[2]

Despite significant disruption to business operations due to the COVID-19 pandemic, droughts, bushfires, and trade restrictions, the industry outlook remains strong. Shifting consumer demand and implementation of technology to boost productivity and automation along with expected population growth are key drivers of demand.

Workforce and skilling implications

On average, across all industries total employment is expected to grow by an additional 211,900 workers to 2025, from 3,538,900 workers in 2022, an annual growth rate of 1.97 per cent[a].[3,4] In comparison between 2017 and 2020 employment grew by 2.68 per cent[b] annually.[5]

In the agriculture, forestry and fishing industry, employment is expected to decline by 1,100 workers to 2025, from 68,800 workers in 2022, a decline in the annual growth rate of 0.53 per cent[c] which is below the overall Victorian average across all industries.[6,7] In comparison between 2017 and 2020 employment across this industry grew by 1.5 per cent[d] annually.[8]

According to forecasts, by 2025, an estimated 3,000 new workers are needed.[9] This includes a likely contraction in employment of 1,100 jobs and the replacement of 4,100 retirees.[10,11] However, industry representatives believe the industry is more likely to maintain or grow overall employment over this period.

Table 2 identifies the top ten occupations in demand across the industry to 2025.[12] Of these, none of the occupations are expected to experience employment growth at a rate above the overall Victorian average between 2022 and 2025.

Table 2 | Occupations in demand in the agriculture, forestry, and fishing industry to 2025[e,13,14]

Occupation	Current employment	Employment growth (2022–25)		Retirements (2022–25)	New workers needed (2022–25)
		Number	**Per cent**		
Livestock farmers	21,600	Less than 50	-0.01%	1,350	1,350
Crop farmers	6,700	100	0.51%	400	500
Mixed crop and livestock farmers	6,650	-100	-0.61%	350	250

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[a] 3-year compound annual growth rate
[b] Computed for 2017 to 2020 employment growth for pre-COVID comparison
[c] 3-year compound annual growth rate
[d] Computed for 2017 to 2020 employment growth for pre-COVID comparison
[e] Due to rounding, some totals may not correspond with the sum of the separate figures

Agricultural, forestry and horticultural plant operators	1,050	50	0.68%	200	250
Crop farm workers	5,300	-50	-0.49%	200	150
Livestock farm workers	6,550	-200	-1.10%	350	150
Packers	1,350	-50	-0.75%	100	50
Production managers	200	Less than 50	0.82%	50	50
General clerks	550	Less than 50	0.03%	50	50
Meat, poultry and seafood process workers	150	Less than 50	1.41%	Less than 50	50

Significant technological advancements are driving demand for new job roles which require a higher level of skills, including scientists, agronomists, various technicians, and primary production supervisors and specialists.

Meeting this demand will be challenging. Occupation shortages already exist across the industry. To realise growth, an ageing workforce and a dependence on seasonal and casual employment need to be addressed.

Industry has also identified changing skills needs. Workers will need to keep pace with the changes in how businesses operate as more jobs become technology related. Skills in sustainability, business management, strategy, and data analysis are needed to develop techniques for increasing productivity and planning for the management of the land among many other skills specific to each sub-sector.

Workforce priorities

Three priorities are identified to address workforce and skilling needs for the agriculture, forestry, and fishing industry:

1. Secure a sustainable approach to meet seasonal needs of industry – focus is required to re-position the industry as one that provides attractive work opportunities.

2. Attract and retain individuals through career pathway opportunities to meet core ongoing needs – enhanced professional development and pathway opportunities can lift attraction and retention and strengthen business operations.

3. Build capability to meet demand for critical roles, particularly in regional areas – a coordinated workforce development strategy can help address occupational shortages.

Agriculture, forestry, and fishing pipeline and workforce response

Pathways to employment in the industry are split across Higher Education and Vocational Education and Training (VET) with 12 per cent of workers holding a degree or above as their highest level of education and 35 per cent holding a VET level qualification as their highest level of education.[15] There were 9,400 enrolments in relevant VET qualifications in 2020 and 1,100 equivalent full-time study load (EFSTL) in higher education in 2019 as an indication of the pipeline to draw on.[16,17]

Key entry points to the industry include the Certificate II and III in Horticulture, the Certificate II and III in Agriculture and the Certificate III in Equine Studies.[18] While activity is high is some courses, many courses feature low enrolment numbers and there is scope to better respond to identified priorities.

Meeting workforce demand is critical. Lifting local awareness of employment opportunities is needed to reduce dependence on migrant workers and ease the pressure on meeting seasonal needs.

Meeting changing skills needs and improving retention is also key. Industry indicated a preference for skills development on-the-job. New delivery approaches and partnerships that leverage in-house training or the co-location of trainers with specialist equipment can reach a greater proportion of the workforce, ensuring learners keep pace with new skills needs. Exploring opportunities for redesigning full qualifications as skill sets can support training to be more responsive to industry need. Government also has a role to support continuity of the industry in the event of natural disasters, particularly for small businesses. In addition, the transition away from native timber in the forestry industry requires effective government, industry and education collaborations to transition workers at the right time.

Finally, without consideration of the value proposition for working in these roles, the industry will likely continue to be at a disadvantage in securing the required workforce.

Table 3 highlights actions that can be adopted by education, industry, and government to meet workforce demand.

Table 3 | Actions for consideration for education, industry, and government

- Strengthen collaboration between industry and education providers to improve workers skills acquired through training.
- Explore the potential for micro-credentials to support training and upskilling in the industry, where appropriate, through continued engagement with the Resources Industry Advisory Group.
- Make use of existing infrastructure in regions (e.g., SmartFarms, private businesses) to better support training in local areas, especially in areas of thin markets.
- Industry, to strengthen the value proposition for working in the industry, specifically around job design and working conditions, supported by occupational and industry demand insights from the Victorian Skills Authority.

Industry outlook

The agriculture, forestry and fishing industry supports many other industries and is a major employer in several Victorian regions

Agriculture, forestry, and fishing is a critical regional industry for the future of Victoria and will need a skilled workforce to sustain it. The industry is engaged in growing crops, raising animals, growing and harvesting timber, and harvesting fish and other animals from farms or their natural habitats.[19] Businesses also include support services to the production activities mentioned above, such as shearing and aerial crop spraying.

Victoria's gross value of agricultural product (GVAP) was $17.8 billion in 2019-2020 and the State remains a crucial exporter of products both interstate and internationally.[20] The State's food and fibre exports account for 27 per cent of Australian food and fibre exports and was valued at $14 billion in 2020-2021.[21] Despite the challenges of the COVID-19 pandemic, food and fibre exports are expected to reach $20 billion by 2030.[22] Victoria is also Australia's largest national exporter of dairy (73 per cent of total exports). Meat is Victoria's largest value export at $3.3 billion in 2020-2021.[23]

This industry is critical for economic resilience in regional towns, especially in places where there are few alternative industries and where it can alleviate dependence on large sectors and companies. The industry is a major employer in several Victorian regions – it is the top employing sector in Wimmera Southern Mallee and Great South Coast.[24,25] The industry interacts with, supports, and has flow-on effects for nearly all other industries as it remains responsible for producing the products which are then sold and transported to other areas. This includes a broad range of jobs in production, a diversity of business types that provide inputs into production, and the various post-harvest businesses, including those jobs associated with transport, processing, wholesaling, and retailing Victorian products.
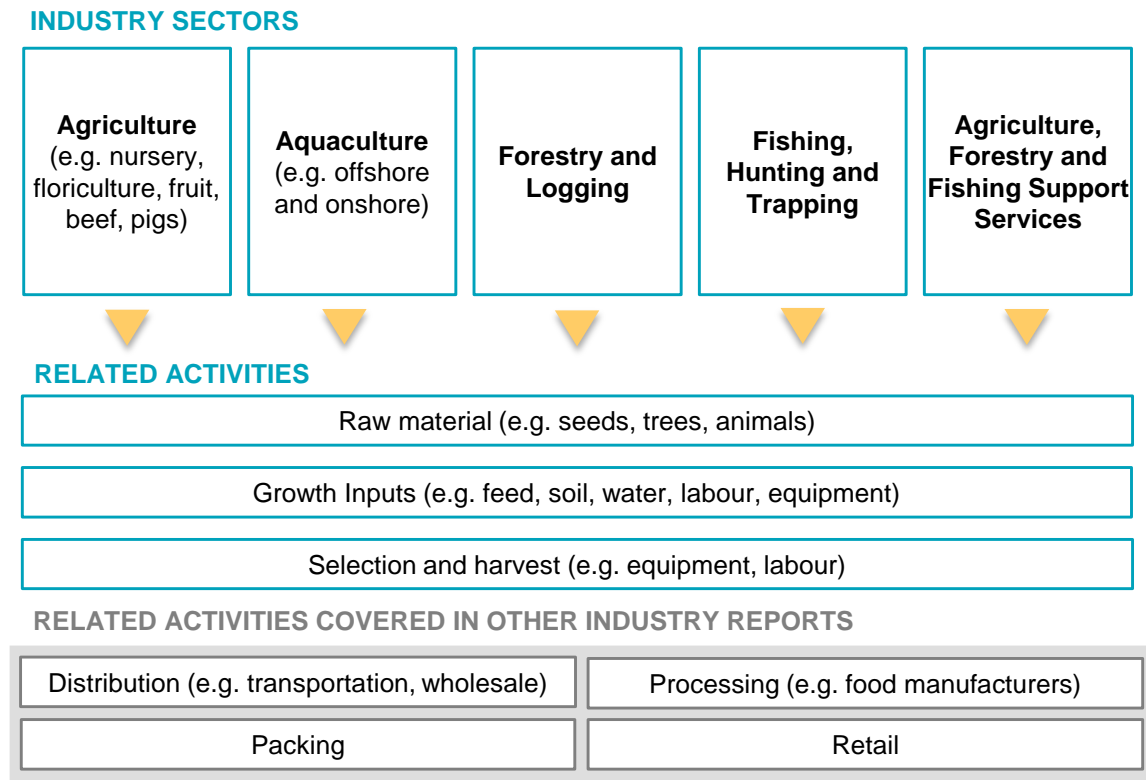
The agriculture, forestry and fishing industry directly employs 1.9 per cent of the total Victorian workforce (68,800 workers).[26] The share of total Victorian employment has declined since the 1990s, while the industry's output has grown due to strong productivity gains over the same period.[27] However, this figure does not capture the number of people running farms as part of a family business which may not necessarily be their main occupation. More than half of the national workforce in this sector are self-employed.[28]

Across the industry, 32.5 per cent of workers are female, lower than the Victorian average of 47.2 per cent, and 49.5 per cent of workers are aged over 50, significantly higher than the Victorian average of 29 per cent.[29,30]. Over half of employment within the industry is concentrated in the livestock farmer and crop farmer occupations.[31]

The COVID-19 pandemic impacted all sectors of the Victorian agriculture, forestry, and fishing industry. The pandemic highlighted how crucial this industry is to food security and associated supply chains.[32] Demand grew significantly in some sectors, such as nursery and floriculture production, due to growth in home gardening activities during the pandemic.[33] However, the share of temporary visa holders and temporary working holiday makers in this industry is above the Victorian average, and therefore has been significantly impacted by the border closures.[34] As a result, employers have faced challenges filling entry-level roles to replace backpackers, seasonal and visa workforces, particularly in agriculture.[35] The industry has also seen challenges in providing mentoring and leadership for younger workers as COVID-19 has accelerated the rate of people exiting the industry, against the backdrop of an existing ageing workforce.[36] Overall, employers are likely to experience permanent changes to their business models as a result of the pandemic.

The industry comprises five sub-sectors sectors - agriculture; aquaculture; fishing, hunting and trapping; forestry and logging; and support services (see Figure 1). Further segmentation of these sectors relates to the type of processes undertaken and all sectors are supported by a variety of support services.

Figure 1 | Key sectors within the agriculture, forestry and fishing industry

INDUSTRY SECTORS

Agriculture (e.g. nursery, floriculture, fruit, beef, pigs)	**Aquaculture** (e.g. offshore and onshore)	**Forestry and Logging**	**Fishing, Hunting and Trapping**	**Agriculture, Forestry and Fishing Support Services**

RELATED ACTIVITIES

Raw material (e.g. seeds, trees, animals)

Growth Inputs (e.g. feed, soil, water, labour, equipment)

Selection and harvest (e.g. equipment, labour)

RELATED ACTIVITIES COVERED IN OTHER INDUSTRY REPORTS

Distribution (e.g. transportation, wholesale)	Processing (e.g. food manufacturers)
Packing	Retail

Agriculture

In Victoria, the agriculture sector employs the largest proportion of workers in the industry, totalling over 57,700 people (85 per cent).[37] Agriculture refers to both the growing and cultivation of horticultural and other crops (excluding forestry), and the controlled breeding, raising or farming of animals (excluding aquaculture).[38] Primary activities include nursery and floriculture production, turf growing, mushroom and vegetable growing, fruit and tree nut growing, sheep, beef cattle and grain farming, dairy cattle farming, poultry farming, eggs, deer farming and other livestock and crops.[39] Victorian dairy farms are concentrated in Northern Victoria (32 per cent), South-West Victoria (33 per cent) and Gippsland (35 per cent), while Victoria's beef production occurs predominantly in the Western District, Gippsland, Ovens Murray and Goulburn regions.[40,41] Major horticulture areas include the Mallee and Goulburn Valley regions.[42]

Aquaculture

Aquaculture refers to the controlled breeding, raising or farming of fish, molluscs and crustaceans[f].[43] Victorian marine aquaculture businesses are located mainly in Port Phillip Bay and Western Port. The sector includes:

- offshore farming of molluscs (such as mussels and oysters) and seaweed using longlines (rope) or racks,
- offshore farming of finfish using cages, such as salmon and trout, and
- farming finfish, crustaceans, molluscs in tanks or ponds, such as fish hatchery prawns and yabbies.[44]

Victoria's aquaculture industry consists of eight industry sectors with 92 license holders, with finfish, ornamental finfish, crustaceans and shellfish as key products.[45] The industry requires a highly

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[f] No accurate figures are provided for the current employment size of the Victorian Aquaculture industry

specialised skill set to work in it, but also provides entry-level jobs, supporting those facing geographical or other barriers into work.[46]

Fishing, hunting and trapping

In Victoria, the fishing, hunting and trapping sector employs the smallest proportion of workers in the industry, totalling approximately 500 people (0.7 per cent).[47] Fishing, hunting and trapping includes gathering or catching marine life such as fish or shellfish, or other animals, from their uncontrolled natural environments in water or on land.[48] Examples include rock lobster and crab potting, prawn fishing, line fishing, and fish trawling, seining and netting.[49] Hunting and trapping involves hunting, trapping or taking animals, bird or reptiles in the wild for commercial, population control or pest control purposes including bird trapping, culling of wild animals, deer hunting and snake catching.[50] In Victoria, it is permitted to hunt a selection of duck, pheasant, partridge, deer, quail and pest animals.[51] Businesses must hold a Victorian Game License that is endorsed for the types of game they wish to hunt.[52]

Forestry and logging

In Victoria, the forestry and logging sector employs over 2,100 people (or 3.1 per cent of the industry).[53] Forestry and logging refers to growing, maintaining and harvesting forests, as well as gathering forest products.[54] Victoria's forest and wood products industry is Australia's largest, accounting for 27.5 per cent of Australia's log harvest volume and is harvested from plantations and native forest on public and private land.[55] Plantations exist predominantly in Southern Victoria, including Gippsland, Barwon, Central Highlands and Great South Coast. Through sustainable forest management, the industry has the potential to make a significant contribution to Victoria's smart, low-carbon economy of the future.[56] Forestry involves growing standing timber in native or plantation forests, or timber tracts, for commercial benefit.[57] Logging native or plantation forests involves activities such as felling, cutting and/or roughly hewing logs into products such as railway sleepers or posts, alongside cutting trees and scrubs for firewood.[58]

Agriculture, forestry, and fishing support services

In Victoria, the agriculture, forestry, and fishing support services sector employs approximately 7,700 people (or 11.3 per cent of the industry).[59] The industry includes support services to the sectors listed above. Primary support activities within forestry include forest conservation services, forest nursery operations, forest pest control services, forest planting, silviculture and reafforestation services, among others.[60] Agricultural and fishing support services such as shearing, cotton ginning, aerial crop spraying, crop harvesting, farm irrigation and fertiliser spreading are also included.[61]

Business consolidation and automation of some roles is shifting workforce trends

The agriculture, forestry and fishing industry has experienced significant disruption over recent years as it continues to deal with the impact of COVID-19, drought, bushfires, and trade restrictions.[62] Farm consolidation is also driving change across the sector.[63] The industry outlook is driven by a range of factors, set out in Table 4.[64] Factors listed have implications for the sector and related support services.

Table 4 | Drivers of demand in the agriculture, forestry, and fishing industry

Driver		Agriculture	Aquaculture	Forestry and logging	Fishing, hunting and trapping
Policy	Government investment to drive the competitiveness, growth and resilience of the industry.	High	Medium	High	Low
Policy	The closure of state, territory and international borders impacting the supply of backpacker, seasonal and visa workforces in entry-level roles.	High	Low	Low	Low
Economic	Economies of scale driving consolidation of smaller businesses.	High	Medium	Medium	Medium
Economic	Trade sanctions impacting export capability, while also driving a shift towards greater market diversification.	High	High	Low	Medium
Social	An ageing workforce, leaving fewer workers to provide mentoring and leadership to help develop the next generation.	High	High	Medium	Medium
Social	Limited affordable housing and transport creating challenges attracting and retaining new individuals to regional areas.	High	Medium	Medium	Medium
Technological	Research, development and implementation of robotic technology to boost productivity and growth and automating some roles (e.g., robo-weeders).	High	High	High	High
Environmental	Ongoing exposure to key risks disrupting food supply and quality (e.g., bushfires, climate change, disease, biological hazards, varroa mite etc).	High	High	High	Medium

Driver		Agriculture	Aquaculture	Forestry and logging	Fishing, hunting and trapping
	Increasing consumer demand for clean, 'green' products creating the need to develop more sustainable practices and products.	Medium	Medium	Medium	Medium

Drivers are expected to impact sectors differently across the industry over the next three to five years. Further detail is provided in Appendix A.

Agriculture

Steady growth is expected across the industry, with strong growth in nursery, dairy and grape production. Dairy production is expected to be high, based on improvements in farming technology allowing for intensification and a strong outlook for the global dairy market.[65] Grape production is expected to be strong with the expansion of agritourism and gourmet food and wine experiences.[66]

The agriculture sector will continue to adapt to climate change and increasing competition for water in a drying climate. For example, the Primary Production Climate Change Adaptation Action Plan 2022-2026 will support industry to continue to innovate and provide for Victorians.[67]

It is predicted that the nursery sector workforce will double in the next 10 years, equivalent to seven per cent per annum, due to increased demand from development of public parks and garden, housing and increased demand for fruit and vegetables.[68] Environmental policies to mitigate climate change include the City of Melbourne's climate change adaptation program which delivers the planting of 3,000 trees per year, to increase canopy cover on public land from 24 to 40 per cent[69], and the Department of Environment, Land, Water and Planning's BushBank program which will revegetate 20,000ha of Victoria over 15 years. This will lead to increased demand in the nursery and seed sector.[70]

However, growth in the agriculture sector is expected to be constrained by farm size and a shortage of seasonal workers.[71] The Australian Agriculture Visa has recently been announced to supplement the existing Pacific Australia Labour Mobility Scheme (PALM Scheme) as the primary route for meeting workforce shortages.[72] The program will support the recruitment of employees across a range of agriculture sectors, including horticulture, dairy, wool, grains, fisheries (including aquaculture) and forestry, including support services and primary processing.[73] The project is starting as a pilot and will expand from 2022.[74]

There continues to be significant investment and attention from both the Australian and Victorian Government to support the industry to recover from COVID-19, attract people to the industry and modernise for the future. Example programs include the National Agricultural Workforce Strategy, the Ag2030 Plan and Agriculture College Modernisation Program.[75,76] Other initiatives to support growth and innovation in the sector include AgTech Start-ups and the On-Farm Internet of Things Trial (see Appendix A). Recent developments have indicated the presence of Japanese encephalitis at piggeries in regional Victoria.[77] The extent of the impact of this disease on the industry is yet to be determined.[78] Several stakeholders consulted for the Skills Plan highlighted their concern at the recent announcements and its potential impact on the industry.

Aquaculture

Victoria's population growth is likely to drive continued increases in demand for both imported and locally produced seafood. Victoria will remain a key exporter of abalone, trout and mussels to seafood markets and restaurants internationally via Melbourne International Airport.[79] The sector is expected to shift towards greater market diversification due to trade restrictions and the impact of COVID-19.[80]

Fishing, hunting, and trapping

In March 2022, the Victorian Government placed a ban on commercial net fishing in Port Phillip Bay to improve recreational fishing in Victoria.[81] Other actions include removing nets from Gippsland Lakes, building a new native fish hatchery at Arcadia, making all boat ramps free and delivering a boat ramp revitalisation program, all driving growth in recreational fishing.[82] The sector will continue to adapt to climate change to respond to projected changes in resources and ecosystems.[83] This will require workers to upskill in areas of environmental sustainability.[84] In addition, increasing requirements for strong biosecurity and traceability will drive the sector to invest in digital platforms that provide real-time supply chain monitoring and validation.[85]

Forestry and logging

Demand for the sector will continue as businesses seek to capitalise on the value of wood for its renewable and carbon storage attributes, alongside uses of biomass for energy and other purposes.[86] This has been accentuated by government investment in construction and housing (e.g., HomeBuilder).[87]

However, the sector is expected to be heavily constrained by the growth of wood resource utilisation, locally and internationally, and the availability of resources.[88] Recent bushfires and environmental protections in production areas have also severely impacted the supply of timber and wood products.[89] The Victorian Government plans to transition away from native timber to a future based on plantation supply.[90] The Victorian Forestry Plan provides more than $200 million to support workers, businesses and communities through their transition away from the native timber industry ahead of commercial timber harvesting ending in 2030.[91] Industry commented that this will have a significant impact on the industry moving forward and expressed concern about the supply of timber in Victoria for key products into the future.

Agriculture, forestry, and fishing support services

Each individual support service is expected to grow in line with the corresponding sector noted above.

Workforce and skilling implications

An estimated 3,000 new workers are required to meet projected demand over the next 3 years

On average, across all industries total employment is expected to grow by an additional 211,900 workers to 2025, from 3,538,900 workers in 2022, an annual growth rate of 1.97 per cent[g].[92,93] In comparison between 2017 and 2020 employment grew by 2.68 per cent[h] annually.[94]

In the agriculture, forestry and fishing industry, employment is expected to decline by 1,100 workers to 2025, from 68,800 workers in 2022, a decline in the annual growth rate of 0.53 per cent[i] which is below the overall Victorian average across all industries.[95,96] In comparison between 2017 and 2020 employment across this industry grew by 1.5 per cent[j] annually.[97]

The demand for agriculture, forestry, and fishing workers in Victoria is expected to grow by an estimated 3,000 individuals between 2022 and 2025.[98] This includes the replacement of 4,100 workers expected to retire and a reduction in the total workforce by 1,100 jobs. It should be noted that many industry representatives believe the industry is more likely to maintain or grow overall employment over this period.

Table 5 identifies the top ten occupations in demand based on employment growth and replacing retirees. [99] Of these, none of the occupations are expected to experience employment growth at a rate above the overall Victorian average between 2022 and 2025. These figures are estimates but it is important to note that they may be under-estimated as they do not account for existing vacancies nor take account of changes in the rate of workers leaving the industry.

Table 5 | Occupations in demand for the agriculture, fishing, and forestry industry[k,100,101]

Occupation	Current employment	Employment growth (2022–25)		Retirements (2022–25)	New workers needed (2022–25)
		Number	**Per cent**		
Livestock farmers	21,600	Less than 50	-0.01%	1,350	1,350
Crop farmers	6,700	100	0.51%	400	500
Mixed crop and livestock farmers	6,650	-100	-0.61%	350	250
Agricultural, forestry and horticultural plant operators	1,050	50	0.68%	200	250
Crop farm workers	5,300	-50	-0.49%	200	150
Livestock farm workers	6,550	-200	-1.10%	350	150
Packers	1,350	-50	-0.75%	100	50
Production managers	200	Less than 50	0.82%	50	50

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[g] 3-year compound annual growth rate
[h] Computed for 2017 to 2020 employment growth for pre-COVID comparison
[i] 3-year compound annual growth rate
[j] Computed for 2017 to 2020 employment growth for pre-COVID comparison
[k] Due to rounding, some totals may not correspond with the sum of the separate figures

General clerks	550	Less than 50	0.03%	50	50
Meat, poultry and seafood process workers	150	Less than 50	1.41%	Less than 50	50

Increasing reliance on new technologies and processes are driving productivity gains, alongside demand for new and emerging jobs detailed in Table 6. Emerging occupations are defined as new, frequently advertised jobs which are substantially different to occupations already defined in the ANZSCO.[102]

Emerging occupations also often relate to roles in skills shortage due to the lag between demand and workers developing the new skills (see Table 6).[103] This lag comes firstly from the delay in demand becoming widespread enough that the workforce has time to respond, and then in the time taken to train and develop the relevant skills.[104]

Table 6 | Emerging occupations in the agriculture, forestry, and fishing industry

Emerging occupations	
• Agricultural and agritech technician	• Agricultural research scientist
• Agronomist	• Animal husbandry technician
• Aquaculture or fisheries technician	• Aquaculture or fisheries scientist
• Irrigation designer	• Irrigation technician

Existing occupation shortages span a variety of roles

Current occupation shortages need to be addressed to meet projected demand. Employers have identified several reasons for shortages, including poor perceptions of the industry by some due to the nature and hours of work, a high proportion of family-owned businesses and dependence on seasonal and casual employment leading to restricted career pathways.

Since 2012, the share of temporary visa holders in the industry has trended upwards and is now above the Victorian average. This shortage has been accentuated by the closure of state, territory, and international borders, particularly in fruit-growing regions in northern Victoria where seasonal workers are typically employed.

A shortage exists when employers are unable to fill or have considerable difficulty filling vacancies for an occupation at current levels of remuneration and conditions of employment, and in reasonably accessible locations. In some instances, shortages in a specialisation within an occupation will show the occupation in shortage.

A list of current occupation shortages related to agriculture, forestry and fishing is shown in Table 7.

Table 7 | Occupation shortages in the agriculture, forestry, and fishing industry

Occupation shortages	
• Agricultural and forestry scientists[105]	• Agricultural, forestry and horticultural Plant operators[106]
• Agricultural technicians[107]	• Crop farm workers[108]

• Livestock farmers[109]	• Livestock farm workers in some regions[110]
• Mixed crop farmers[111]	• Nurserypersons[112]
• Primary production supervisors and specialists	• Senior livestock farm workers
• Shearers and woolclassers[113]	• Skilled technical growers[114]
• Sports turf trades workers	• Sports turf managers
Additional occupations as part of the National Skills Commission's updated Skills Priority List released on 06 October 2022[115]	
• Apiarist	• Horse trainer
• Logging plant operator	

Some skills are in immediate shortage, while others will increase in demand

Key general skills to work in the agriculture, forestry and fishing industry include communication, being detail oriented, physical strength, planning and organisational skills.[116] Some roles also require a deep understanding of science, technology, engineering, and mathematics associated with the relevant sector.[117] The skills in Table 8 are identified as in shortage across the industry. Some of these skills are required immediately while others will be required increasingly in the future (see Table 9).

Table 8 | Skill shortages facing the agriculture, forestry, and fishing industry

Skill shortages	
• Ability to plan, organise, control and coordinate farming operations and performance to grow crops[118]	• General management and supervisory skills[119]
• High-level financial, middle management and information and communication technology (ICT) skills in forestry and logging[120]	• Knowledge of the science and technology associated with soil management and crop production (agronomy)[121]
• People development and staff supervision in the nursery and garden sector[122]	• Problem solving (e.g., for natural weather events)[123]

The industry is being transformed by new technologies that are changing how businesses operate, with more jobs becoming increasingly technology dependent.[124] This will have implications for the existing workforce which will be required to upskill in areas such as digital literacy, data, automation, and environmental sustainability, detailed in Table 9.[125] Some workers may already have these skills while others may be in shortage.

Table 9 | Emerging skills in the agriculture, forestry, and fishing industry

Emerging skills	
• Advise farmers, rural industries and government on aspects of farming, develop techniques for increasing productivity, and study and develop plans and policies for the management of land[126]	• Business management skills as farm diversification to enhance income from other sources to reduce risk becomes increasingly important[127]
• Business strategy, marketing and promoting (including sales) and logistics in the nursery and garden sector[128]	• Data analysis skills to monitor the health life of crops in real-time, create predictive analysis and make resource management decisions[129]

Emerging skills	
• Diagnostic tools for agricultural machinery and vehicles	• Environment land care[130]
• Farm forestry skills[131]	• Knowledge of environmental sustainability and animal welfare[132]
• Operation of aquatic technology, including aquabotics and FishTech[133]	• Perform tests and experiments, and provide technical support in areas such as research, production, servicing and marketing[134]
• Skills in digital maps, including map creation software[135]	• Skills in Internet of Things (IoT), new production materials and sustainability / waste management / circular economy in the nursery and garden sector[136]
• Skills in robotics, data mining and sensor technology[137,138]	• Understanding of biosecurity and traceability requirements[139]
• Understanding of plant genomes and biomass[140,141]	

Education and training pipeline

There were around 9,400 enrolments in agriculture, forestry, and fishing related VET qualifications in 2020 and 1,100 relevant enrolments in Higher Education in 2019.[142,143] This should translate to close to 6,270[I] students entering the workforce each year with relevant qualifications, suggesting that projected demand should be met, although some will seek employment in other industries. For further detail, see the collaborative response toward the end of this report.

VET will continue as a primary pathway into and through the agriculture, forestry, and fishing industry

The agriculture, forestry and fishing industry provides many employment opportunities for people with no-post school qualification. Around 53 per cent of the industry do not hold a post-school qualification, as many skills are learned on-the-job.[145] The industry is popular for young people looking for their first job, people of all ages looking for seasonal or short-term opportunities, workers from overseas and people working in their family business. Key occupations include livestock farmer, crop farmer, agricultural, forestry and horticultural plant operator, aquaculture worker and garden and nursery labourers.

> In 2020, there were approximately 2,120 enrolments in agriculture, forestry and fishing related VET qualifications by students who were already employed.[144]

VET will continue as a popular preparation for the industry, with 35 per cent of the workforce holding a VET level qualification as their highest level of education.[146] VET-level study is required for occupations including nurserypersons, shearers and horticulturalists among many others. Education and training activity also supports endorsed industry requirements (EIR) for the industry. Five out of the 41 qualifications and courses used by industry on the Victorian Funded Course List (FCL) support these requirements.[147] Recognising bodies include the Australian Beekeeping Traineeship Program, Shearing Contractors Association of Australia and the Horticulture Training Council.

This industry prefers skills development on an as needed basis, with many employers offering training for existing employees during employment when necessary (e.g., upskilling in new technology). Training is often conducted in-house by experienced employees, and workers may be required to obtain additional licences to attend and perform certain types of work on-site.

In 2020, there were 3 skill sets of relevance to the industry delivered through VET in Victoria, accounting for around 103 enrolments.[148] These were the Agricultural Chemical Skill Set to be undertaken while employed to transport and handle chemicals across a range of agriculture related areas. The Basic Tree Worker Skill Set and Course in Introductory Shearing are designed for gaining initial employment or as a pathway to further study. There are many other skill sets not part of the Victorian FCL delivered by individual employers not captured in Table 10.

VET Activity

People enrol in VET courses for one of three main reasons:

- to prepare for employment
- to support current employment

[I] This number is determined by taking the total number of VET enrolments in courses undertaken prior to employment, combined with 1/3 of the total number of HE enrolments in AQF 5-8 courses (as these courses are traditionally undertaken prior to employment and the average Bachelor degree is three years, so therefore only those in their final year of study will enter the workforce the following year).

• to progress their careers within the industry.

This equates to training categorised as prior to employment; with employment (as an apprenticeship or traineeship) and upskilling once qualified as shown in Table 10. The table shows the enrolments in 2020 in VET courses on the Victorian FCL and the Victorian Funded Skill Set List (FSSL).[149,150] related to this industry and against each category. The enrolment numbers are drawn from Total VET activity (TVA) which comprises enrolments supported by public funding or by private contribution.

As part of preparing this report, industry representatives have provided their perspectives on the purpose of these qualifications, which is summarised in Figure 2 and helps to read Table 10.

Figure 2 | VET pipeline key

1. 'AT' indicates a classroom-based course is also available as an apprenticeship or traineeship option

2. 'Q' indicates industry values the course as a qualification

3. 'SS' indicates industry values the course as a skill set

4. 'EIR' indicates it is an Endorsed Industry Requirement as noted by industry

5. 'OL' indicates the course leads to an Occupational License as noted by industry

Note: Industry has not provided feedback on all qualifications and where indicated; each value assignment can be reviewed in the future.

Table 10 | Victorian VET pipeline for agriculture, forestry, and fishing [m]

Prior to employment	
Qualifications (5,917 TVA enrolments 2020, 103 Skill Set enrolments 2020)	
Certificate I	**10**
Certificate I in Maritime Operations (Coxswain Grade 2 Near Coastal) (Q,OL)	10
Certificate II	**3,356**
Certificate II in Agriculture (SS,AT)	1,087
Certificate II in Aquaculture (Q)	-
Certificate II in Arboriculture (Q)	-
Certificate II in Horticulture (Q,AT)	1,868
Certificate II in Nursery Operations (Q)	14
Certificate II in Parks and Gardens (Q,AT)	<5
Certificate II in Production Horticulture (Q,AT)	-
Certificate II in Racing Industry (Q,SS,AT,OL)	106
Certificate II in Rural Operations (Q,SS)	216
Certificate II in Shearing (Q,AT,EIR)	44
Certificate II in Wool Handling (Q,AT)	18
Certificate III	**2,551**
Certificate III in Agriculture (Q,SS,AT)	396
Certificate III in Aquaculture (Q,AT)	-

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[m] VET courses can support a range of occupations across a range of industries, and occupations can also support a range of industries. To present the likely VET trained employment pipeline by industry, enrolments for a course have been assigned to the most common industry in which people seek employment.

Certificate III in Arboriculture (SS,AT)	180
Certificate III in Beekeeping (Q,EIR)	<5
Certificate III in Dairy Production (Q,AT)	19
Certificate III in Equine Studies (Q)	384
Certificate III in Horse Breeding (Q,SS,AT)	<5
Certificate III in Horticulture (Q,SS,AT)	1,337
Certificate III in Irrigation Technology (Q,AT)	25
Certificate III in Nursery Operations (Q,SS,AT)	-
Certificate III in Parks and Gardens (Q,AT)	22
Certificate III in Pork Production (SS,AT)	32
Certificate III in Poultry Production (Q,SS,AT)	50
Certificate III in Production Horticulture (Q,AT)	40
Certificate III in Rural Operations (Q,SS,AT)	59
Skill Set	**103**
Agricultural Chemical Skill Set (SS)	<5
Course in Introductory Shearing (Q,SS)	99
Basic Tree Worker Skill Set (SS)	n/a
With employment (apprenticeship and traineeship)	
Qualifications (2,120 TVA enrolments 2020)	
Certificate II	**548**
Certificate II in Agriculture (SS)	176
Certificate II in Horticulture (Q)	227
Certificate II in Parks and Gardens (Q)	116
Certificate II in Racing Industry (Q,SS,OL)	29
Certificate III	**1,451**
Certificate III in Agriculture (Q,SS)	424
Certificate III in Arboriculture (SS)	261
Certificate III in Dairy Production (Q)	69
Certificate III in Horticulture (Q,SS)	211
Certificate III in Irrigation Technology (Q)	<5
Certificate III in Nursery Operations (Q,SS)	80
Certificate III in Parks and Gardens (Q)	348
Certificate III in Pork Production (SS)	29
Certificate III in Poultry Production (Q,SS)	9
Certificate III in Production Horticulture (Q)	11
Certificate III in Rural Operations (Q,SS)	<5
Certificate III in Shearing (Q,EIR)	<5
Certificate IV	**121**
Certificate IV in Agribusiness (Q,SS)	<5
Certificate IV in Agriculture (Q,SS)	67
Certificate IV in Farriery (Q,EIR)	36
Certificate IV in Horticulture (Q,SS,EIR)	10
Certificate IV in Wool Classing (Q)	6
Upskilling once qualified	
Qualifications (1,262 TVA enrolments 2020)	
Advanced Diploma	**70**
Advanced Diploma of Agribusiness Management (Q)	70

Certificate III	**21**
Certificate III in Shearing (Q,AT,EIR)	21
Certificate IV	**703**
Certificate IV in Agribusiness (Q,SS,AT)	65
Certificate IV in Agriculture (Q,SS,AT)	243
Certificate IV in Farriery (Q,AT,EIR)	<5
Certificate IV in Horticulture (Q,SS,AT,EIR)	164
Certificate IV in Production Horticulture (Q,AT)	-
Certificate IV in Wool Classing (Q,AT)	229
Diploma	**468**
Diploma of Agriculture (Q,SS)	82
Diploma of Arboriculture (Q)	141
Diploma of Horticulture (Q,SS)	206
Diploma of Production Horticulture (Q)	12
Diploma of Viticulture (Q)	27

Note: Enrolment figures in the table above are as reported by NCVER, Total VET student and courses 2020: program enrolment. There may be instances where program enrolments are not reported by providers to NCVER and therefore not included in the enrolment figures in the total VET training activity data. Total VET activity for 2021 is expected to be released in August 2022.

Notably, the agriculture, forestry and fishing industry indicated two qualifications that contain skill sets valued by the industry. These two qualifications were the Certificate II in Agriculture and the Certificate III in Pork Production. For these qualifications, industry indicated a preference to make these qualifications available as skill sets rather than qualifications.

Further, stakeholders identified 14 additional qualifications currently available that are also utilised to provide skill sets for the industry. Further consultation and review can determine appropriate changes moving forward.

The number of workers with a university degree in this industry has been growing

Higher education also supports a small number of pathways into the agriculture, forestry and fishing industry, with 12 per cent of workers holding a degree or above as their highest level of education.[151] Key occupations requiring a higher education qualification include agricultural and forestry scientists, agricultural technicians, and agronomists.[152] In 2019, there were over 1,100 equivalent full-time study load (EFTSL) across agriculture, forestry and fishing related higher education courses in Victoria that directly build the pipeline of workers in this industry.[153] There are also many general higher education pathways that support people to work in the industry among others due to transferrable nature of skills. This includes workers who attain a higher education qualification in another area of study before returning to work on their family farm. Examples of the higher education pipeline for this industry is shown in Table 11.

Table 11 | Higher Education pipeline for agriculture, forestry, and fishing in Victoria, according to narrow field of study[154]

Agriculture (993 EFTSL, Victoria, 2019)	
AQF 9+ (e.g., Master and above) *(283 EFTSL)* Examples include: • Master of Agricultural Sciences (133) • Doctor of Philosophy – Agricultural Sciences (94)	**AQF 5-8 (e.g., Diploma, Bachelor, Hons)** *(710 EFTSL)* Examples include: • Bachelor of Agriculture (531) • Bachelor of Agricultural Sciences (102)

	• Bachelor of Agriculture and Technology (62)
Fisheries Studies (less than 5 EFTSL, Victoria, 2019)	
AQF 9+ (e.g., Master and above) *(0 EFTSL)* n/a	**AQF 5-8 (e.g., Diploma, Bachelor, Hons)** *(less than 5 EFTSL)* Examples include: • Bachelor of Fisheries and Aquaculture (less than 5)
Forestry Studies (24 EFTSL, Victoria, 2019)	
AQF 9+ (e.g., Master and above) *(24 EFTSL)* • Master of Ecosystem Management and Conservation (12) • Master of Forest Ecosystem Science (12)	**AQF 5-8 (e.g., Diploma, Bachelor, Hons)** *(0 EFTSL)* n/a
Horticulture and Viticulture (86 EFTSL, Victoria, 2019)	
AQF 9+ (e.g., Master and above) *(53 EFTSL)* • Master of Urban Horticulture (53)	**AQF 5-8 (e.g., Diploma, Bachelor, Hons)** *(33 EFTSL)* Examples include: • Graduate Certificate in Arboriculture (13) • Associate Degree in Urban Horticulture (12) • Graduate Diploma in Urban Horticulture (16)

Note: A course may be allocated to different narrow field of educations by different higher education providers based on the primary purpose of the course. Higher education enrolments reported against a course under a specified narrow field of education reflect only the portion of enrolment allocated to the narrow field of education and are not reflective of the total enrolment for the course.

Workforce priorities

Growing the supply of entry-level workers and retaining them in the industry is a key priority

There are key challenges to addressing the supply and skill of labour. Some challenges extend beyond the remit of the Skills Plan, such as the industry's ongoing exposure to key risks including trade restrictions, bushfires, climate change and visa restrictions. Other challenges relate to a lack of attraction to the industry for younger workers, an ageing workforce and the rapid pace of technology adoption requiring new skills and knowledge for existing workers.

The Skills Plan identifies three key priorities for the agriculture, forestry and fishing industry detailed below. Responsibility for delivering on these priorities lies with many stakeholders, however education and training has a key role to play.

Secure a sustainable approach to meet seasonal needs of the industry

The industry provides many opportunities for entry-level workers who do not have prior experience or qualifications. However, the ability of employers to attract a sustainable workforce is the biggest barrier to training as competition for workers continues to grow, particularly during peak periods. This has been further accentuated by the lack of access to migrant and visa workers because of the pandemic. There is opportunity to re-position the industry as one that provides attractive work opportunities, particularly for younger workers.

Table 12 | Issues to address to secure a sustainable approach to meeting seasonal needs of the industry

- Industry reliance on temporary visa holders has led to significant shortages due to travel restrictions.
- There has not been enough focus in attracting local and transient workers.
- Some employers have reported difficulties in accommodating seasonal workforce peaks

"We need flexibility for different cohorts (vulnerable cohorts and culturally and linguistically diverse cohorts), being able to access training and help with broader settlement."

Skills Plan Consultation, March 2022

Attract and retain individuals through career pathways that meet core ongoing needs

The agriculture, forestry and fishing industry consists of a higher proportion of family businesses and self-employment relative to other industries. Stakeholders noted an increasing trend toward younger workers moving away to study qualifications with more stable employment, as the pathway to owning a business in the sector is becoming increasingly difficult. As the industry faces an ageing workforce and is struggling to attract the next generation of workers, the perceived importance of professional development and pathway opportunities will be enhanced as succession planning becomes increasingly vital for the continuation of operations.

Table 13 | Issues to address to attract and retain individuals through career pathways

- Industry has an ageing workforce with a high number of children who grew up on farms moving away to more stable career pathways.
- Lack of affordable housing and transport options in regional areas detracts from attractiveness and retention.
- The pathway to owning a business is increasingly difficult, although corporatisation offers new opportunities.

"Kids of family businesses go away to uni to get a degree and then return to work on the family farm, they have then missed 10 to 15 years of farming experience"

Skills Plan Consultation, March 2022

Build capability to meet demand for critical roles, particularly in regional areas

The agriculture, forestry and fishing industry workforce is highly dispersed across the State. This presents an ongoing challenge in coordinated workforce development at scale. As new technologies and processes drive productivity gains, demand for specialist roles increases. Despite this, occupational shortages are present, with agricultural and forestry scientists, agricultural technicians and skilled technical growers all in critical need. Compounding this challenge are difficulties accessing training in thin, regionally dispersed markets. Industry maintains that low numbers of enrolments do not indicate an absence of training need, and with many employers preferring on the job training, there is opportunity to re-evaluate the most appropriate delivery model.

Table 14 | Issues to be addressed to build capability for critical roles

- A dispersed workforce creates barriers to coordinated workforce development at scale.
- Some employers do not see the value of formal training as proportionate to the time away from industry to undertake the qualification.
- There is insufficient succession planning on an employer and industry basis for specialist roles.

Collaborative response

There is an opportunity to redefine training pathways that are better suited to industry needs

The education and training response has a key role to play in helping to address the three key workforce issues for the industry:

1. Secure a sustainable approach to meet seasonal needs of the industry

2. Attract and retain individuals through career pathway opportunities to meet core ongoing needs

3. Build capability to meet demand for critical roles, particularly in regional areas.

The education and training response can focus on addressing challenges associated with delivering courses for critical roles in thin markets. Consultation highlighted that too often the education and training system fails to recognise, understand and deal with costs, issues and problems associated with thin markets, regional delivery and specialised industries. Examples include VET-level forest and wood products training packages and university-level qualifications in horticulture where small enrolment numbers may not meet the threshold to be financially viable for training providers.

This industry prefers skills development on-the-job, with many employers providing the opportunity for formal training on an as needed basis once employed. Industry indicated that some employers do not see the value of formal training as proportionate to the time away from industry to undertake the qualification. However, those consulted highlighted successful examples of training where providers have delivered courses on-site. This approach helps to reduce the burden for employees travelling to participate in training from rural and remote locations. This feedback presents an opportunity for the education and training response to further explore new delivery approaches and partnerships which better align with the needs of the industry, such as in-house training options. Overall, this will ensure workers gain the necessary practical skills and help secure a highly capable workforce that keeps pace with new skills. The availability of this option can also be better communicated to industry.

> *"Instances where the registered training organisation has come to the farm to conduct the exam has worked well for people with limited experience of completing exams. Many people (employers and employees) aren't aware this is an option available to them."*
>
> Skills Plan Consultation, March 2022

There are several pathways into the agriculture, forestry and fishing industry that are highly valued. However, industry indicated there is a lack of availability of micro-credentials, particularly for individuals looking to transition back into working on their family farm after a period not working in the industry. In response, there is an opportunity for the education and training system to consider the type of courses offered and determine if some qualifications can be offered as skill sets. Examples noted by industry to date include the Certificate II in Agriculture and the Certificate III in Pork Production which would be valued as a skill set rather than qualification. There were also many other courses where industry indicated a skill set would be valuable in addition to a qualification (Table 10). This is consistent with the preference to build skills on the job. Further consultation with industry can determine appropriate changes moving forward.

The agriculture, forestry and fishing workforce is highly dispersed across Victoria. This presents a challenge for education providers to deliver training in thin markets, particularly when it requires the use of specialist equipment. Currently, vendors are responsible for delivering training on the latest technologies and equipment. However, this creates a barrier for some smaller businesses and employees who are unable to readily access the training. To address this challenge, industry highlighted examples where the co-location of trainers and specialist equipment has proved beneficial in training cohorts across Victoria (see Case Study). This presents an opportunity for the education

and training response to look at expanding this model of training to reach a greater proportion of the workforce.

> **Case Study | SmartFarms**
>
> Agriculture Victoria has partnered with industry, agribusiness, the education sector and communities to develop SmartFarms in key regional centres across Victoria. The aim of SmartFarms is to bring together technologies and research for the purpose of innovation across Victoria's major agriculture industries. There are five farms located across Victoria each with a different focus: Mildura and Tatura (Horticulture), Horsham (Grains), Hamilton (High-Rainfall Zone) and Ellinbank (Dairy). Each SmartFarm is connected to each other and AgriBio, the Centre for AgriBioscience, in Bundoora. SmartFarms allow universities and other providers to use their facilities to teach new technologies and productive practices (e.g., digestion technology). The pilot program is looking to expand training to students at all levels from school through to university.

Industry and government can provide additional support and benefits to attract workers

The education and training response will also need support from industry and government to improve how the agriculture, forestry and fishing industry attracts, develops and utilises talent. Government and industry can work together to meet current and future workforce demand. Opportunities for action from industry include strengthening the value proposition for working in the industry, in parallel to the government continuing to monitor and provide targeted support for natural disasters that affect the industry.

The agriculture, forestry and fishing industry provides many opportunities for employment for those with no post-school qualification, making it an attractive option for young people looking for their first job or people of all ages looking for seasonal or casual employment opportunities. However, industry noted ongoing difficulties attracting people to the industry. This is made more difficult by a lack of affordable housing and transport in regional Victoria deterring people from relocating. Employers also have a key role. Industry can lead key reforms focused on job design while investments in technology and changed work practices can reduce demand for seasonal and low skilled workforces. Efforts are already underway to lift the profile of the industry through marketing campaigns.

> *"The difficulty is actually getting students to take up an apprenticeship, young people can get paid much better elsewhere which will continue unless we can offer them something more than a 'lifestyle' choice."*
>
> Skills Plan Consultation, December 2021

Beyond the immediate workforce, government has a key role in providing targeted support in the event of natural disasters to ensure continuous employment and support, particularly for small businesses. The agriculture, forestry and fishing industry has experienced significant disruption over recent years as it increasingly faces bushfires, drought, and trade restrictions. For example, the 2019-2020 summer impacted 29 per cent of multiple-use public native forests and 6 per cent of private native forests.[155] This has also led to stricter conditions that apply when harvesting fire-affected forests.[156] In response, the Victorian Government has prepared Adaptation Action Plan across 7 systems to ensure Victorian's climate resilience, now and in the future.[157]

The transition away from the native timber industry to a future based on plantation supply while protecting as many jobs as possible will require careful management. In 2020, total Victorian grown and harvested log volumes were 13 per cent native hardwood, 33 per cent plantation hardwood, and 54 per cent softwood (plantation).[158] The Victorian Forestry Plan has flagged a transition package for affected mill workers and harvest and haulage businesses which includes training and re-training programs; case management, specialist employment and career assistance; additional support

through the Back to Work program, relocation support, top-ups to worker redundancy payments and tailored mental health and wellbeing support.[159]

Consultation also highlighted significant concerns regarding the future supply of key materials that serve Victoria (e.g., cardboard packaging). This reinforces the importance of both worker and business support components of the Victorian Forestry Plan. The sector is important to the Victorian economy and is further explained in the related manufacturing industry insight report.

Actions for consideration for education, industry, and government

- Strengthen collaboration between industry and education providers to improve workers skills acquired through training.

- Explore the potential for micro-credentials to support training and upskilling in the industry, where appropriate, through continued engagement with the Resources Industry Advisory Group.

- Make use of existing infrastructure in regions (e.g., SmartFarms, private businesses) to better support training in local areas, especially in areas of thin markets.

- Industry, to strengthen the value proposition for working in the industry, specifically around job design and working conditions, supported by occupational and industry demand insights from the Victorian Skills Authority.

Appendix A Drivers of demand

Driver	Industry / Sector
Policy	**Agriculture** • $129 million invested by the Victorian Government for regional development and agriculture investments to strengthen agriculture in Victoria.[160] • $850 million invested by the Australian Government to drive the competitiveness, growth and resilience of the agriculture industry nationally.[161] • Victorian Government 2021/22 budget providing $56.5 million to enhance and modernise farm operations, including specific support for Traditional Owners.[162] • $50 million Agriculture College Modernisation Program to support students to get the skills and training they need to boost agriculture jobs.[163] • Due to the closure of state, territory and international borders, the effectives of workforce assistance programs, such as the Australian Government's Pacific Labour Scheme and the Seasonal Worker Programme are being negatively impacted.[164] As a result, employers have and continue to struggle to fill many available positions, and there is an urgent need to replace backpacker, seasonal and visa workforces in entry-level roles.[165] • The National Agricultural Workforce Strategy and Ag2030 Plan have been released, and include 37 recommendations to modernise agriculture's image, attract and keep workers, embrace innovation, build skills for modern agriculture and to treat workers ethically.[166] It also supports the delivery of the Ag2030 Plan, which positions Australia's farmers, fishers and foresters to recover from COVID-19 and build toward the National Farmers' Federation (NFF) vision for a $100 billion industry by 2030.[167] • In early November 2021, the Fair Work Commission ruled to vary the Horticulture Award (clause 15.2) which deals with pieceworker rates and introduce a minimum wage floor.[168] This will impact all employers who employ workers under the Horticulture Award. Employers may be less likely to hire an unskilled worker, and instead hire a skilled worker who can pick more for productivity.[169] • The Australian Agriculture Visa has recently been announced to supplement the existing Pacific Australia Labour Mobility Scheme (Palm Scheme) as the primary route for meeting workforce shortages.[170] The program will support the recruitment of employees across a range of agriculture sectors, including horticulture, dairy, wool, grains, fisheries (including aquaculture) and forestry, including support services and primary processing.[171] The project is starting as a pilot and will expand from 2022.[172] • Actions to improve water security, including modernising irrigation, recycled water, and upgrades to Victoria's emergency water network.[173] **Aquaculture** • Victorian Higher Education $350 million state investment fund to support universities with applied research and research partnerships focused on boosting Victoria's productivity (e.g., aquaculture research and water sustainability project by Deakin University).[174,175] **Forestry and Logging** • Victorian Forest Plan providing more than $200 million for workers, communities and businesses impacted by the 2024 step-down from native timber harvesting, which will include opt out packages and increased redundancy payments.[176] • $15 million invested in the recovery of burnt timber to support the industry to return to previous output prior the 2019-20 bushfires.[177] • Victorian Government's prioritisation of green infrastructure to enhance urban amenity and quality, improve landscape connectivity and build resilience to climate change (e.g., Greening the West, Living Melbourne; City of Melbourne's planting of 3,000 trees per year).[178,179]
Economic	• Increasing requirements for strong biosecurity and traceability to access markets.[180] • China's trade sanctions impacting some sectors' export capability, while opening other sectors to new markets.[181] Many businesses have sought alternative markets for their projects outside China

and have reported increased market activity.[182] This diversification has enabled some sectors' relative recovery and reduced the risk of over-relying on any one market.[183]

- Competition within regions for workers, with some industries being able to pay more (e.g., windfarms are able to pay workers more than meat processing).

Agriculture

- Victoria's farm numbers have declined by 4 per cent per annum in the past decade, falling from 32,400 in 2010–11 to 21,700 in 2019–20.[184]

- A removal of butchers from major supermarkets. This has required upskilling workers on the meat processing industry by local butchers (e.g., meat selection).

- Economies of scale driving industry consolidation for many agricultural commodities.[185]

- Large retailers are expected to gradually reduce the number of suppliers they purchase wholesale plants from, which will concentrate production in large nurseries.[186]

- A high proportion of family-owned and operated farms with an ageing workforce.[187]

Forestry and logging

- The number of non-employing businesses and small (1 to 19 employees) forestry businesses has declined. This is the result of consolidation within the industry, which has seen a doubling in the number of large businesses (200+ employees).[188]

Aquaculture

- There is growing potential for a high-tech and high-value seaweed industry due to its possible uses, including for animal feed, fertiliser, pharmaceuticals and nutraceuticals, as well as mitigating livestock emissions.[189] It is estimated that, by 2025, the industry will employ 1,200 people, which could rise to 9,000 by 2040 across Australia.[190]

- Longer term, business-level responses to COVID-19 are expected to include greater emphasis on risk mitigation, including a shift towards greater market diversification, and an increased ability to adjust the market segments being targeted.[191] This will require flexible supply chains to allow efficient pivoting between domestic and international markets, within domestic markets and across different international markets.[192]

Social	
	- Increase efforts to ensure workplaces are as safe as possible, particularly in remote areas.

- Increasing consumer demand for clean, 'green' products creating the need to develop more sustainable practices and products.[193]

- It has been challenging retaining and replacing workers with experience in mentoring and leadership, particularly as COVID-19 has accelerated the rate of people exiting industries, leaving fewer workers to help develop the next generation.[194]

Agriculture

- While women contribute to and hold leadership roles in organisations that have a local focus, they are largely absent as elected board members in agricultural and industry organisations.[195] Many farm businesswomen want to be leaders, but they are constrained by factors such as the lack of recognition of their roles in farm businesses.

- More people are spending a greater proportion of time at home as a result of COVID-19, impacting their use of domestic space, notably gardens.[196] This has had a significant impact on nurseries, and gardening is predicted to maintain its current surge in popularity due to associated economic, recreational, health and environmental benefits.

- Limited affordable housing and transport creating challenges attracting and retaining new individuals to regional areas.[197] Recent investment and reform from the Victorian Government to address the issue includes an amendment to the Victorian Planning Provision that exempts farm businesses from requiring a planning permit for on-farm accommodation for up to 10 people.[198] This is part of a $84 million package to support the industry to meet seasonal workforce challenges.[199] Also included in the package is the $6 million Seasonal Workforce Accommodation Program (SWAP) for 13 projects to boost accommodation options, pastoral care and transport services for 2,000 workers in key horticulture areas.[200]

- A growing trend towards younger workers moving away from family farms to study formal qualifications in more stable professions, such as accounting and IT due to the unpredictable nature of farming. This has implications for succession planning in family businesses to continue operations.

	• Increasing awareness of the productivity benefits of green life, including growing your own food, providing habitats, and reducing impacts through climate change has led to greater household demand for products.[201]
Technological	• Exploring new ways to reduce plastic food packaging to minimise the amount of waste, reduce the use of valuable resources and production of harmful emissions associated with manufacturing packaging (e.g., producing packaging from potatoes and egg whites).[202] • Digital platforms, such as block chain, prove real-time supply chain monitoring and validation.[203] Other innovations like smart packages will also significantly change supply chains increasing biosecurity and food safety.[204] **Agriculture** • Rapid advances in agricultural robotisation, data mining and sensor technology, robo-weeders, automated strawberry pickers and now vertical farms are reducing the demand for labour.[205] • Research, development and implementation of new technologies in the industry to boost productivity and economic growth. Examples in the nursery and floriculture include robotic transplanting devices, plant sensors, and automatic closed greenhouse systems.[206] Meanwhile drones in the agriculture sector have had a significant impact on photo capturing technology, data and monitoring, pesticide and fertiliser distribution, irrigation and planning.[207] • The Victorian Government has recently invested $45 million to improve digital technology and infrastructure across regional Victoria. As part of this, Agriculture Victoria will partner with 600 farms to trial on-farm IoT technology and evaluate the impact these technologies can have on farm performance.[208] This digital technology seeks to provide the agricultural industry with the tools, data and knowledge to make better informed and timely on-farm decisions and improve productivity and sustainability, which in turn can fill key skills gaps in the sector. • Agriculture Victoria has partnered with LaunchVic to support the Victorian Government's ten-year Agriculture Strategy and the commitment to modernise agriculture and invest in innovation.[209] Under the *Victorian AgTech Entrepreneurs' Initiative,* three companies will each receive $600,000 to deliver pre-accelerator programs for start-ups.[210] • $11.7 million to modernise agriculture traceability systems – supporting farmers, producers and jobs across the state.[211] **Aquaculture** • New underwater technologies, such as Remotely Operated Vehicles (ROVs), underwater drones and biosensors, are changing the nature of work.[212] Previously, tasks that were done manually can now be done remotely, including monitoring fish health and environmental conditions, to inspecting and repairing nets.[213] These developments will require skills, such as aquatic technology induction, aquabotics and aquatic environmental audit.[214] • Increased use of FishTech and Aquabotics in aquaculture is creating efficiencies in operations.[215] **Forestry and logging** • Technological developments, including drones, scanners, laser scanners, cutters and finishing systems, plant genomes, block-chain applications and big data analytics.[216] • New technologies such as digital maps, forest operation plans, and new harvesting.[217]
Environmental	• Ongoing exposure to key risks including bushfires and climate change is disrupting food availability and affecting food quality.[218] **Agriculture** • Some technologies and practices being adopted include improved animal genetics and husbandry practices to reduce emissions intensity (per unit of meat produced).[219] • Movement towards regeneration of denuded areas to create more liveable and resilient landscapes, especially within urban centres has increased demand for nursery and floriculture production.[220] • Recent risks, especially for almond growers have arisen from the beehive shortage for pollination due to the varroa mite outbreak. • Consumers are increasingly embracing meat alternatives and/or taking steps to reduce per capita consumption as decision-making becomes more influenced by climate change.[221] This presents an opportunity for the sector in the areas of sustainability, animal welfare and food safety. Some

technologies and practices already being adopted include improved animal genetics and husbandry practices to reduce emissions intensity (per unit of meat produced).[222]

Aquaculture

- For Victorian fisheries to remain productive and sustainable (environmentally and commercially), there is a need to incorporate climate change considerations into management and planning, and to implement planned climate adaptation options.[223]

Forestry and logging

- Climate change is driving a push for planting more trees, as well as less carbon intensive construction methods, and novel uses of biomass for energy and other purposes.[224]

- Bushfires, and the increased risk of bushfires, are impacting the industry in both the resources available to the industry and new training challenges posed.[225] The bushfire season also highlighted the importance of the industry in supporting future prevention and clean-up of bushfires.[226] This will require more workers to have awareness of hazards associated with recovery activities into the future.[227]

Appendix B: Data methodology

VSA Employment Model overview

The VSA Employment Model produces estimates of:

- projected employment growth between 2022 and 2025

- projected retirements between 2022 and 2025

- projected total new workers needed between 2022 and 2025.

Table 15 further defines the model outputs and identifies the primary source for each output.

Table 15 | Employment model outputs

	Employment growth 2022-25	Retirements 2022-25	New workers needed 2022-25
Definition	Change in the number of workers employed from 2022 to 2025	Workers expected to permanently leave the workforce from 2022 to 2025	Workers needed from 2022 to 2025 to meet demand from growing employment and to replace retirees
Primary source	Benchmarked to the NSC Employment Projections	Derived from retirement rates from Australian Census Longitudinal Dataset	The sum of employment growth and retirements

All outputs are modelled at the occupation, industry and region level:

- occupations are defined by 4-digit occupation unit groups in the Australian and New Zealand Standard Classification of Occupations (ANZSCO)

- industries are defined by 1-digit industry divisions in the Australian and New Zealand Standard Industrial Classification (ANZSIC)

- regions are defined by the nine Regional Partnerships of Victoria as outlined by the Victorian Department of Jobs, Precincts and Regions.

Benchmark data from the NSC give estimates of projected employment growth. Using an approach called iterative proportional fitting, the detailed occupation, industry and region breakdowns are generated by applying the distribution of employment in ABS Census and other data to the benchmark projections.

The model was developed by the VSA with the support of Nous and Deloitte Access Economics (DAE). The sections further below describe how the key outputs were modelled.

> The VSA Employment Model gives a best estimate of employment by industry, occupation and region. It provides an indication but does not, and cannot, tell the full story of the region's economy.

Employment growth, 2022-25

Source: VSA and Nous (2022), modelling of NSC (2022) Employment Projections

This modelling takes the NSC Employment Projections as the benchmark data for 2022-25 and breaks it down into occupation by industry by region tables.

The benchmark data sources provide 'control totals' for occupation, industry and region breakdowns independently. However, they do not provide the interaction between each of the variables. For example, they do not give the breakdown of occupations within industries.

Iterative proportion fitting uses a detailed 'seed' data table with the necessary breakdowns from a representative dataset and scales that distribution to control totals in the new dataset. Over many iterations, the seed data is transformed to sum up to the occupation, industry and region control totals.

The seed data comes from the ABS Census 2016. The control totals for occupation and industry come from the NSC's Employment Projections, and the control totals for region come from the NSC's Small Area Labour Markets data. Table 16 describes the inputs in detail.

The modelling results in:

- iindustry and occupation projections that align with the NSC Employment Projections

- regional data that matches the distribution across NSC Small Area Labour Markets

- industry by occupation by region data tables that approximate the distribution within the ABS Census 2016.

Table 16 | Data sources used to model employment growth from 2022 to 2025

Type	Data	Source
Seed	Employment x 3-digit industry (ANZSIC3) x 4-digit occupation (ANZSCO4) x Statistical Area Level 2 (SA2)	ABS, *Census of Population and Housing*, place of usual residence data
Control total	Employment x SA2	NSC, *Small Area Labour Markets*, 'SALM smoothed SA2 Datafiles (ASGS 2016) - March quarter 2022'.
Control total	Employment x ANZSIC1	NSC, *Employment Projections,* 2020-25
Control total	Employment x ANZSCO4	NSC, *Employment Projections,* 2021-26

Notes:

1. *Following the modelling, SA2 data is aggregated up to Regional Partnership region. Where an SA2 spans multiple regions, the estimates have been apportioned based on geographic area.*

2. *The NSC industry projection is often not available until some months after the occupation projections. As at May 2022, there were no 2021 to 2026 ANZSIC1 by state forecasts available. The previous release of 2020 to 2025 ANZSIC1 by state forecasts were used and scaled up to match the Australian total employment numbers in the ANZSCO4 forecasts.*

Retirements, 2022-25

Source: *VSA, Deloitte Access Economics (DAE) and Nous (2022), Retirement projections 2022-2025*

Retirements are estimated by applying occupation-specific retirement rates to the employment projections.

Using the Australian Census Longitudinal Dataset, an estimate of the size of the labour force aged 50 and over in 2016 was taken and compared to the size of the labour force aged 45 and over in 2011. After adjusting for migration, the gap is an estimate of retirements between 2011 and 2016. The relative age structures of occupations in the Census 2011 were then used to estimate retirements at the detailed occupation level (ANZSCO4).

The outputs were used to estimate an occupation-specific retirement rate, calculated as:

Retirement rate = retirements between periods t and t+1 / employment at t

The retirement rates were applied to the employment projections to estimate the number of retirements between 2022 and 2025 at the region (Regional Partnerships), industry (ANZSIC1) and occupation (ANZSCO4) level.

New workers needed, 2022-25

New workers needed is the simple sum of employment growth and retirements. It is calculated at the region (Regional Partnerships), industry (ANZSIC1) and occupation (ANZSCO4) level.

New workers needed is an estimate of demand for workers to join an industry, occupation or region. In this model, demand comes from growth in employment (as business, government and other employers expand their operations) and the need to replace retirees who leave the workforce.[n]

New workers needed is not an estimate of skills shortage. In the VSA Employment Model, demand is always met by supply of new workers who enter the work force from study, unemployment, migration, a change in industry or occupation, or other avenues.

This means that the VSA Employment Model is not suitable for identifying current or future skill shortages. The Victorian Skills Plan draws on the National Skills Commission's Skills Priority List and stakeholder feedback to identify skills shortages within industries and across Victoria.

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[n] This will generally underestimate demand as it does not account for the need to replace workers who leave a job for other reasons, such as switching occupations or migrating out of Victoria.

Appendix C: Victorian VET pipeline methodology

Enrolment numbers

Sources:
National Centre for Vocational Education Research (NCVER) (2021), Total VET students and courses 2020, available here.
Victorian Department of Education and Training (2022), Funded Course List, available here.
Victorian Department of Education and Training (2022), Funded Skill Set List, available here.

The Victorian VET pipeline table estimates the number of enrolments in each qualification and skill set for the 2020 academic year in Victoria. The NCVER total VET students and courses is used as the dataset. Only courses on the Victorian Funded Course List (FCL) and the Victorian Funded Skill Set List (FSSL) are included.

The following steps were taken to develop the table:

1. Each course was reviewed by IAG members and allocated to **only one** of three main reasons for studying: to prepare for employment; to support current employment (apprenticeship or traineeship); and to progress their career. Each course is then listed under their respective allocation.

2. The numbers of students who enrolled in that course in 2020 is then noted in the VET pipeline table.

3. For courses that provide **an apprenticeship and traineeship option and a classroom-based option**, these courses are duplicated twice in the table, with enrolment numbers split across the other two options: the number of apprentice and trainee enrolments are reported under the header 'with employment (apprenticeship and traineeship); the number of classroom-based enrolments is shown under the purpose for completing the classroom-based option (either to prepare for enrolment or to progress their career). An (^{AT}) is noted next to these duplicated classroom-based courses to indicate they are also delivered as an apprenticeship or traineeship.

4. Where industry has provided feedback on the value of qualification or skill set, a (^{Q}) indicates it is valued as a qualification, while a (^{SS}) indicates it is valued as a skill set. A (^{EIR}) indicates it is an Endorsed Industry Requirement and (^{OL}) indicates it is an Occupational Licence. Industry has not provided feedback on all qualifications and where indicated; and each value assignment can be reviewed in the future.

5. Numbers are then totalled in their respective headers above. For the Skills Plan, the number of enrolments 'prior to employment' is a key focus for industry as it indicates how many students are being trained but are not yet employed.

> The 2020 enrolment figures are a best estimate of the pipeline of workers for industry to draw on. The 2020 figures were the latest dataset available from the NCVER at the time of developing the Skills Plan and will be updated in future iterations of this document. They intend to provide an indication of the pipeline but do not and cannot tell the full story of workforce supply. Factors such as completion rates and the COVID-19 pandemic during 2020 are also likely to impact the availability of the future workforce.

Appendix D: Stakeholder engagement process

Stakeholder engagements allowed VSA to test, update and validate the content of the Agriculture, Forestry and Fishing Industry Insight Report. Stakeholders from organisations in government, education and industry were engaged to provide input to the report and the Skills Plan more broadly. Specifically, stakeholders provided insight on economic outlook, workforce and skilling challenges and an education and training response across three rounds of consultations. Engagements guided initial thinking and research, as well as opportunities to test and revise the insights. We would like to thank the following organisations for their participation in the stakeholder engagement process. Table 17 lists the organisations involved.

Table 17 | Consultation participants

Organisation
Arboriculture Australia Ltd
Australian and New Zealand Pulp and Paper Industry
Australian Forest Contractors Association
Australian Meat Industry Employers Unions (AMIEU) - Victoria
Bendigo Kangan Institute
Construction Forestry Maritime Mining & Energy Union
Food Processing Victoria
ForestWorks
Frame and Truss Manufacturers Association
Gippsland Institute of TAFE
MGA/Timber Merchants Association
National Meat Industry Training Advisory Council MINTRAC
Naturelinks Landscape Management
Nursery and Garden Industry Victoria
Primary Industries Industry Advisory Group Executive Officer
Resources Industry Advisory Group Executive Officer
Victorian Department of Environment, Land, Water and Planning
Victorian Department of Jobs, Precincts and Regions
Victorian Farmers Federation
Victorian Forest Products Association

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