

AGRICULTURE, HORTICULTURE AND CONSERVATION  
AND LAND MANAGEMENT INDUSTRY SECTOR

# IRC Skills Forecast and Proposed Schedule of Work

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**2017–2020**

Prepared on behalf of the Agriculture, Horticulture and Conservation and Land Management  
Industry Reference Committee for the Australian Industry and Skills Committee (AISC)

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# IRC SKILLS FORECAST AND PROPOSED SCHEDULE OF WORK 2017–2020

## Purpose

This skills forecast represents the latest industry intelligence and resulting schedule of work of the Agriculture, Horticulture and Conservation and Land Management Industry Reference Committee (IRC). It was developed through research of national and industry data sources and ongoing input from IRC members and key stakeholders. The report is designed to provide industry intelligence to support the Australian Industry and Skills Committee's (AISC) four-year rolling National Schedule of training product development and review work.

The industry intelligence component covers the following topics:

- **Sector overview:** Examining the depth and breadth of the industry and identification of the macro-environmental forces that currently challenge and/or provide opportunities for the industry
- **Employment:** Reviewing the employment projections by the Department of Employment and outlining of the current workforce profile and supply for the industry
- **Skills outlook:** Identifying the key priority skills for the industry and how they can benefit from improvement or development of national skill standards
- **Training product review work plan:** Establishing the scope and timeframe of proposed training package development in line with industry priority skills.

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## Executive summary

This report summarises the development, changes and skills needs for the sectors covered by this Industry Reference Committee (IRC). The report was commissioned by the Australian Industry and Skills Committee (AISC), to support the National Schedule of training product review work. It is structured into four main sections, according to the AISC template as follows:

- sector overview
- employment
- skills outlook
- training product review plan.

The research included in this report is derived from published national and industry data sources, input from IRC members, and stakeholders.

The report recognises the exponential population growth in Australia and overseas, inevitably increasing the need for food, feed, fibre and other agriculture products. This increased demand provides the industry with growth and new business opportunities. These opportunities are shaped by current government policies. An example of this is the recent expansion of Free Trade Agreements. Other initiatives include building branding awareness for Australian products, resulting in global recognition for the following:

- producing safe and clean crops and products
- integrating the importance of animal welfare
- implementing on-farm and regional biosecurity measures.

Precision agriculture using enhanced digital technologies and analytics will also help the industry increase its productivity and profitability.

The report describes the industry sector's workforce, a key feature being that workers are reaching retirement age in high numbers. An aging workforce such as this creates significant challenges for employers, particularly in trying to attract new people to the industry. New participants to the industry require a higher level of skills, developed and obtained through formal and on-the-job training.

This report outlines that employers will increasingly seek high-level skills (both industry specific and non-specific) to support more demanding job functions and more complex agricultural production systems. Businesses are responding to opportunities, with growing investment in leading technology. Strategies are being implemented for increased connectivity and services to domestic and international markets. New biosecurity strategies and programs are also being used to control invasive species. These developments require a lift in job specific skills and broader skills to take advantage of innovation, automation and digitisation.

## Summary of key points in each section

### Sector overview

- The agriculture, horticulture and conservation and land management industry can be described as having eight sectors: amenity horticulture, production horticulture, broadacre farming, livestock farming, mixed crop and livestock farming, agriculture support services, wholesaling, and conservation and land management. The industry can also be described in more detail through a range of sub-sectors.
- The industry includes more than 164,429 agricultural businesses, who employ 432,000 people. Almost 70 per cent of these businesses are owner-operated, non-employed farms, and almost 30 per cent employ less than 20 people. The sector also includes 4,230 agricultural product wholesalers and 120 conservation operators.
- Total sales turnover of the agriculture sectors increased by 4.4 per cent (or \$7.5 billion) to \$72.8 billion between 2013–14 and 2014–15.
- The industry is represented at a national level by more than 206 peak organisations, including industry and industry sub-sector associations, and industry service bodies such as R&D corporations, professional associations, employee associations and regulatory bodies.
- Key regulations for the industry include, or are related to the following: regulation of genetically modified crops, environmental regulations, food regulations, grape-growing legislation, livestock management legislation, the Australian ruminant feed ban, biosecurity legislations, live-animal export legislation, conservation laws, industry codes of conduct, grain-trade standards and legislation, international regulations and access to markets, and industry certification programs.
- There are regulated occupations<sup>1</sup> that are specific to the industry sectors; for example, landscapers, who must be registered with the relevant state/territory building practitioners board to carry out large-scale structural landscaping, and professional arborists, who need to meet several requirements stipulated by WorkCover and industry associations.
- Key macro forces that currently challenge and provide opportunities for the industry's sectors include:
  - the significance of global food security and higher food demand in expanding markets such as the Asia Pacific region, which is being reflected in a number of government policies aimed at facilitating growth in the sector (e.g. free trade agreements)
  - national and state-/territory-based biosecurity policies and strategies to combat pests and diseases that could have a negative impact on production and access to markets
  - climate change and its effects on the agricultural crops, which create both challenges and opportunities for many producers to capitalise on technology (i.e. biotechnology) and increase collaboration in supply chains. These partnerships will aim to support the development of more resilient crop varieties and large-scale farming systems
  - new global farming trends, including the growth of new food sources (e.g. seaweed); improved pharmaceuticals related to, for example, bugs on food and agricultural waste; and new sources of stockfeed and fertiliser

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<sup>1</sup> Regulated occupations have legal (or industry) requirements or restrictions to perform the work. Regulated occupations require a licence from, or registration by, a professional association or occupational licensing authority.

- increasing international trade, which creates both challenges and opportunities for agricultural producers, considering that the Australian agriculture industry is a competitive net-exporter sector, with around two-thirds of total production being exported
- the development of precision agriculture technologies – for example, drones and new chemical solutions – that help growers to increase productivity.

## Employment

- Employment in vegetable growing, fruit and tree nut growing, poultry farming and other livestock farming is forecast to grow at a faster rate than in other agriculture sub-sectors, with a positive employment growth over the next five years.
- About 23 per cent of the industry’s workforce is likely to retire over the next five years.
- A significant number of the industry’s workforce occupy roles that are unique and specific to the relevant sub-sectors, such as livestock and crop farmers, farm workers, shearers, agricultural and horticultural plant operators, nurserypersons and other nursery workers, and gardeners. A significant proportion of the workforce is also employed to undertake more general roles, such as clerical and administrative work.
- Seasonal workers from overseas (i.e. backpackers) are an important source of labour for the industry. The Pacific Islander Seasonal Worker Programme and skilled migrants from Asia and Africa are also sources of labour for Australian farms.

## Skills outlook

- Priority skills in the agriculture, horticulture and conservation and land management industry over the next four years, 2017–2020, are summarised in the following table.

Priority skill	Drivers	Training package solution <sup>2</sup>
Improve skills for the safe operation of agricultural machinery and new technology	<ul style="list-style-type: none"> <li>• Recent quad-bikes accidents have led to concern over the safety of operation. A recent coronial inquest called for the development of an improved and standardised nationally accredited training package for the operation of quad bikes, side-by-side and related vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>• Development of new units and skill sets as identified during review</li> <li>• Review of 36 units across Machinery and Operation sectors</li> </ul>
Skills in pest management, including wild dogs	<ul style="list-style-type: none"> <li>• Pest animals and weeds cost farmers billions of dollars a year in livestock losses, disease transmission and controls; the Australian Government and state/territory governments invest significantly in programs to support farmers and the community to tackle established pest animals. The new Certificate III in Pest Management (2016 version) doesn’t meet industry</li> </ul>	<ul style="list-style-type: none"> <li>• Development of new skill sets and units as identified during review</li> <li>• Review of one qualification, one skill set and 28 units</li> </ul>

<sup>2</sup> For a full list of relevant qualifications and units of competencies, refer to Attachment A.

Priority skill	Drivers	Training package solution <sup>2</sup>
	needs, according to the National Wild Dog Action Plan (NWDAP) Working Group for Training and Education (WG T&E).	
Current skills in chemical application and management	<ul style="list-style-type: none"> <li>• Australia's full implementation of the Global Harmonised System (GHS) making mandatory that all chemicals be labelled and comply with GHS regulations</li> <li>• The National Agvet Chemical Task Force harmonising the approach to chemical-training requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Development of new skill sets and units as identified during review</li> <li>• Review of one skill sets and 12 units.</li> </ul>
Arboriculture review: new skills in felling trees near buildings, and machinery operation	<ul style="list-style-type: none"> <li>• A number of stakeholders have provided feedback that the qualifications have a number of issues that need to be addressed, including new skills, unsuitable core units in Certificate III Arboriculture, RTOs not putting these qualifications on scope due to prohibitive costs associated with delivery, and prerequisite concerns.</li> </ul>	<ul style="list-style-type: none"> <li>• Development of up to five new units as identified during review</li> <li>• Review of five qualifications and 41 units across Arboriculture</li> </ul>
Skills in production nurseries	<ul style="list-style-type: none"> <li>• Overreliance on chemicals to manage plant pests and diseases, and development of new variants of agricultural chemicals</li> <li>• Use of generic units of competency, which do not provide the necessary skill sets for pest management, soil management and efficient irrigation systems</li> </ul>	<ul style="list-style-type: none"> <li>• Development of new skill sets and units as identified during review</li> <li>• Review of two qualifications and 34 units across production nursery.</li> </ul>
Skills in data capture and analysis	<ul style="list-style-type: none"> <li>• Growing investment in integrated world-leading technology (such as robotics and digital and wireless technology to monitor farm operations and detect issues with crop or livestock health)</li> <li>• Quality standards in operations</li> <li>• Industry databases (including commodity-specific production platforms and other technology platforms)</li> </ul>	<ul style="list-style-type: none"> <li>• Development of new skill sets and ten units as identified during review</li> <li>• Review of seven units and four qualifications</li> </ul>

Priority skill	Drivers	Training package solution <sup>2</sup>
Advanced skills in rural management and agribusiness	<ul style="list-style-type: none"> <li>Increasing market demands for innovation in product development, to ensure the viability of enterprises and to take opportunities in the new free trade agreement with China</li> </ul>	<ul style="list-style-type: none"> <li>Development of new skill sets and units as identified during review</li> <li>Review of three qualifications and 51 units</li> </ul>
Skills in irrigation design and management	<ul style="list-style-type: none"> <li>Ongoing implementation of new processes and technologies in irrigation</li> <li>Industry feedback that existing units need to be reviewed and updated to ensure that different types of irrigation (e.g. broadacre, gravity-fed, pressurised, domestic/urban irrigation) are covered.</li> </ul>	<ul style="list-style-type: none"> <li>Development of new skill sets and units as identified during review</li> <li>Review of four qualifications and 48 units</li> </ul>
Advanced skills in apiculture	<ul style="list-style-type: none"> <li>Recent Senate Inquiry into the future of the beekeeping and pollination service industries identified gaps in the nationally recognised course for beekeepers in relation to biosecurity, marketing, business management and communication</li> <li>Growing importance of pollination services that honey bees perform, including the ability to increase productivity and crop yield</li> <li>A rapid expansion of horticultural industries that rely on bees</li> </ul>	<ul style="list-style-type: none"> <li>Development of new skill sets and units as identified during review</li> <li>Review of one qualification and 19 units</li> </ul>
Skills in viticulture	<ul style="list-style-type: none"> <li>Industry concerns over the job outcomes of the Diploma of Viticulture in that it is not fit for purpose.</li> <li>The industry does not recognise the need for a Diploma of Viticulture</li> <li>Lack of entry requirements creates a misleading expectation, if a person who has done the Diploma cannot gain employment in the wine industry because the Diploma does not provide 'the right focus'</li> <li>Employer focus at this level is on skills in leadership and management, not specialist viticulture skills</li> </ul>	<ul style="list-style-type: none"> <li>Development of new skill sets and units as identified during review</li> <li>Review of one qualification and 11 units</li> </ul>

Priority skill	Drivers	Training package solution <sup>2</sup>
Skills in landscape design and landscape construction	<ul style="list-style-type: none"> <li>• The Masters Landscape Association has indicated that there are no clear pathways for landscape construction or landscape design roles</li> <li>• Areas for improvement include that the entry requirements to qualifications should meet industry needs</li> </ul>	<ul style="list-style-type: none"> <li>• Development of new skill sets and units as identified during review</li> <li>• Review of three qualifications and 32 units</li> </ul>
Advanced skills in carbon farming	<ul style="list-style-type: none"> <li>• Support from the National Farmers' Federation for farmers to be able to access the Emissions Reduction Fund, and a growing interest from farmers to diversify farming activities and income, have increased awareness on carbon farming</li> <li>• Currently, there is no nationally accredited training available to farmers or managers to fill this growing skills gap</li> </ul>	<ul style="list-style-type: none"> <li>• Development of new skill sets and units as identified during review</li> <li>• Review of eight skill sets and 11 units</li> </ul>

## A. ADMINISTRATIVE INFORMATION

**Name of applicable Industry Reference Committee (IRC):** Rural and Related Industry Reference Committee

**Name of applicable Skills Service Organisation (SSO):** Skills Impact Ltd

## B. SECTOR OVERVIEW

### Sector description

The agriculture, horticulture and conservation and land management industry sector is highly diverse, integrating all businesses that operate in the following sub-sectors:

#### **Amenity horticulture**

- Arboriculture
- Landscape services
- Gardening services
- Turf and sports turf management

#### **Production horticulture**

- Turf production (commercial)
- Nursery production
- Retail nursery
- Floriculture production
- Vegetable growing
- Fruit tree growing
- Nut tree growing

#### **Dryland & Irrigated Broadacre farming**

- Grain growing
- Fodder growing
- Sugar cane growing
- Cotton growing
- Seed production

#### **Livestock farming**

- Sheep farming
- Beef cattle farming
- Sheep-beef cattle farming
- Dairy cattle farming
- Poultry farming
- Other livestock farming

#### **Mixed crop and livestock farming**

- Grain-sheep or grain-beef cattle farming

#### **Agriculture support services**

- Shearing, cropping and agricultural support service
- Grain storage services

#### **Agricultural product wholesaling**

- Fruit and vegetable wholesaling
- Cereal grain wholesaling

- Wool wholesaling
- Fish and seafood wholesaling

#### **Conservation**

- Nature reserves and conservation parks
- Botanical gardens
- Land care and management

In 2016, the sector included more than 164,429 agricultural businesses, 69 per cent of which were non-employing farms, and 29 per cent of which were employing fewer than 20 people. Around three-quarters of these businesses were beef cattle farmers, mixed-crop livestock farmers, fruit growers, cereal grain growers, sheep farmers, sheep/beef farmers and dairy cattle farmers. The sector also included 11,051 gardening businesses, 14,751 landscape construction businesses, 4,230 agricultural product wholesalers and 120 conservation operators.<sup>3</sup>

The agriculture contribution to the Australian economy includes:<sup>4</sup>

- total sales turnover, which increased by 11.5 per cent (or \$7.5 billion) to \$72.8 billion between 2013 - 2014 and 2014 - 2015
- industry value added (IVA), which increased by 16.7 per cent (or \$3.6 billion) to \$25.4 billion over the same period
- employment, which decreased by 5.0 per cent (or 21,000 people) to 397,000 people at June 2015.

Increases in industry sales turnover and value added are attributed to a growing production of agricultural goods and services over the past years, being supported by a vibrant demand from the export markets (see also Market and trade section). The value of Australian farm exports is forecast to increase by further 3 per cent to 45 billion in 2015-2016<sup>5</sup>.

## Relevant training package qualifications

The training package for the agriculture, horticulture and conservation and land management industry sector is AHC – Agriculture, Horticulture and Conservation and Land Management. AHC comprises 91 qualifications, 24 skill sets and 820 units of competency.

### AHC QUALIFICATIONS

#### Qualification Level: Certificate I

Certificate I in AgriFood Operations  
Certificate I in Conservation and Land Management  
Certificate I in Horticulture  
Certificate I in Permaculture

#### Qualification Level: Certificate II

Certificate II in Agriculture  
Certificate II in Arboriculture  
Certificate II in Conservation and Land Management  
Certificate II in Floriculture  
Certificate II in Horticulture  
Certificate II in Irrigation  
Certificate II in Landscaping  
Certificate II in Parks and Gardens  
Certificate II in Permaculture  
Certificate II in Poultry Production Operations  
Certificate II in Production Horticulture

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<sup>3</sup> Australian Bureau of Statistics, 2017, 'Counts of Australian businesses, including entries and exits, June 2012 to June 2016', viewed April 2017,

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8165.0Jun%202012%20to%20Jun%202016?OpenDocument>.

<sup>4</sup> Australian Bureau of Statistics, 2014, *Australian Industry, 2013–14*, Cat No 8155.0.

<sup>5</sup> 2 ABARES, 2016, *Agricultural commodities –Vol 6 No 1*. March quarter 2016.

## AHC QUALIFICATIONS

Certificate II in Production Nursery  
Certificate II in Retail Nursery  
Certificate II in Rural Operations  
Certificate II in Shearing  
Certificate II in Sports Turf Management  
Certificate II in Wool Handling

### **Qualification Level: Certificate III**

Certificate III in Aboriginal-sites Work  
Certificate III in Advanced Wool Handling  
Certificate III in Agriculture  
Certificate III in Agriculture (Dairy Production)  
Certificate III in Arboriculture  
Certificate III in Beekeeping  
Certificate III in Commercial Composting  
Certificate III in Commercial Seed Processing  
Certificate III in Conservation and Land Management  
Certificate III in Conservation Earthworks  
Certificate III in Feedlot Operations  
Certificate III in Floriculture  
Certificate III in Horse Breeding  
Certificate III in Horticulture  
Certificate III in Indigenous Land Management  
Certificate III in Irrigation  
Certificate III in Lands, Parks and Wildlife  
Certificate III in Landscape Construction  
Certificate III in Natural Area Restoration  
Certificate III in Parks and Gardens  
Certificate III in Permaculture  
Certificate III in Pest Management  
Certificate III in Pork Production  
Certificate III in Poultry Production  
Certificate III in Production Horticulture  
Certificate III in Production Nursery  
Certificate III in Retail Nursery  
Certificate III in Rural Machinery Operations  
Certificate III in Rural Merchandising  
Certificate III in Rural Operations  
Certificate III in Seed Production  
Certificate III in Seed Testing  
Certificate III in Shearing  
Certificate III in Sports Turf Management  
Certificate III in Wool Clip Preparation

### **Qualification Level: Certificate IV**

Certificate IV in Agribusiness  
Certificate IV in Agriculture  
Certificate IV in Arboriculture

## AHC QUALIFICATIONS

Certificate IV in Conservation and Land Management

Certificate IV in Horticulture

Certificate IV in Irrigation

Certificate IV in Landscape

Certificate IV in Organic Farming

Certificate IV in Parks and Gardens

Certificate IV in Permaculture

Certificate IV in Pest Management

Certificate IV in Production Horticulture

Certificate IV in Production Nursery

Certificate IV in Retail Nursery

Certificate IV in Seed Production

Certificate IV in Seed Testing

Certificate IV in Shearing Contracting

Certificate IV in Sports Turf Management

Certificate IV in Wool Classing

**Qualification Level: Diploma**

Diploma of Agribusiness Management

Diploma of Agriculture

Diploma of Arboriculture

Diploma of Community Coordination and Facilitation

Diploma of Conservation and Land Management

Diploma of Horticulture

Diploma of Irrigation Management

Diploma of Landscape Design

Diploma of Landscape Project Management

Diploma of Organic Farming

Diploma of Parks and Gardens Management

Diploma of Permaculture

Diploma of Pest Management

Diploma of Pork Production

Diploma of Production Horticulture

Diploma of Production Nursery Management

Diploma of Retail Nursery Management

Diploma of Sports Turf Management

Diploma of Viticulture

**Qualification Level: Advanced Diploma**

Advanced Diploma of Agribusiness Management

Advanced Diploma of Arboriculture

Advanced Diploma of Conservation and Land Management

Advanced Diploma of Horticulture

**Qualification Level: Graduate Diploma**

Graduate Diploma of Arboriculture

## Sector analysis

### Description of sub-sectors and analysis of businesses involved

#### Amenity horticulture

Sub-sector name	Arboriculture services
Scope of work	<p>Businesses in this sector include practising arborists and consultants who conduct tree-care operations or diverse specialist arboricultural services. Areas of operations include:</p> <ul style="list-style-type: none"> <li>• utility clearance – eliminating contact between vegetation and power lines and maintaining clearances from infrastructure</li> <li>• tree care – planting, pruning and tree removal in urban areas, in confined spaces surrounded by buildings and in open spaces such as parks</li> <li>• providing services such as tree-climbing, seed collection, ecological and habitat work, and canopy access for hardware installations such as lights or fauna monitoring.</li> </ul>
Companies	Arboriculture practitioners are generally small operators, servicing local or regional communities.
Geographical location	Australian states with the largest number of arboriculture services businesses include NSW, QLD and VIC.
Automation and digitisation	The sub-sector requires operations that involve working at height and with specialised equipment, including chainsaws and skid-steer machinery. Global information systems (GIS) and mapping are also used to provide the location and specifics of trees or vegetation (or other features) to facilitate planning, management and risk mitigation.

Sub-sector name	Gardening services
Scope of work	Businesses in this sector are engaged in providing gardening services, including lawn-care service (e.g. fertilising, seeding, spraying), lawnmowing, and maintenance of plants and shrubs.
Companies	In June 2016, there were 11,051 gardening businesses in Australia. <sup>6</sup> More than half (65 per cent) are non-employing businesses. Many others (34 per cent) are small businesses, employing fewer than 20 people. The sub-sector also includes a number of large operators, which often operate as franchise businesses.

<sup>6</sup> Australian Bureau of Statistics, 2017, 'Counts of Australian businesses, including entries and exits, June 2012 to June 2016', viewed April 2017, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8165.0Jun%202012%20to%20Jun%202016?OpenDocument>.

<b>Sub-sector name</b>	<b>Gardening services</b>
<b>Geographical location</b>	Gardening services activities occur in all Australian states, yet NSW, VIC, QLD and WA combined host 89 per cent of all gardening businesses.
<b>Automation and digitisation</b>	Technology used in this industry includes mobile communications, blowers, lawn edgers, whipper snippers and chainsaws.

<b>Sub-sector name</b>	<b>Landscape construction services</b>
<b>Scope of work</b>	<p>The sector comprises companies that construct landscapes, which may include planting, land forming, the provision of retaining walls and paths, and the installation of garden drainage control, garden watering systems and structural garden features.</p> <p>The sub-sector also includes businesses that provide landscape consultancy and design services.</p>
<b>Companies</b>	In June 2016, there were 14,751 landscape businesses in Australia. <sup>7</sup> Just above half (56 per cent) are non-employed businesses that mainly service residential markets. Many others (42 per cent) are small businesses employing fewer than 20 people. The sector also includes a number of large operators, which dominate commercial work.
<b>Geographical location</b>	Landscape services activities occur in all Australian states, yet NSW, VIC and QLD together host 75 per cent of all landscape businesses.
<b>Automation and digitisation</b>	Computer-aided design (CAD) technology is widely used by landscape architects and designers. CAD techniques are used by larger landscaping service contractors to more efficiently plan and allocate resources on a project.

<b>Sub-sector name</b>	<b>Turf growing</b>
<b>Scope of work</b>	<p>This sector comprises companies that grow and harvest turf, including sports turf, grass and lawn. The turf product is sold to landscapers, households, governments, sport venues, revegetation contractors, and plant hire and garden service providers.</p> <p>The sector also includes companies that manage golf-course maintenance.</p>
<b>Producers</b>	In June 2016, there were 481 operating turf growers in Australia. <sup>8</sup> Most turf growers operate on a small scale, employing fewer than 20 people or

<sup>7</sup> Australian Bureau of Statistics, 2017, 'Counts of Australian businesses, including entries and exits, June 2012 to June 2016', viewed April 2017, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8165.0Jun%202012%20to%20Jun%202016?OpenDocument>.

<sup>8</sup> Ibid.

<b>Sub-sector name</b>	<b>Turf growing</b>
	operating as sole traders. Industry indicates that data related to the turf growing industry are often underreported.
<b>Geographical location</b>	Turf growing activities occur in NSW, QLD, WA and VIC, with NSW and QLD having the largest share (71 per cent) <sup>9</sup> of turf growers.
<b>Automation and digitisation</b>	This sub-sector, particularly larger processors, integrates automated processes and digital systems that provide computer-controlled watering and monitoring systems. Operators use tractors to seed, fertilise and maintain turf.

## Production horticulture

<b>Sub-sector name</b>	<b>Nursery production and retail</b>
<b>Scope of work</b>	Businesses in this sub-sector are involved in growing trees and shrubs, ornamental plants, and bulbs. These businesses sell to retailers or wholesalers, landscapers, local government and councils, and orchardists. Nursery production is organised into both under-cover and outdoors production systems.
<b>Producers</b>	The sector comprised 1,159 nursery producers in June 2016, consisting of 382 under-cover producers and 777 outdoor producers. The sector is dominated by small (40 per cent) or non-employing family operators (55 per cent). <sup>10</sup> There is a small number of medium-size private companies. There is also a degree of public-sector participation in the industry, such as government and municipal nurseries.
<b>Geographical location</b>	Nursery production occurs predominantly along the eastern seaboard of Australia. The majority of business activity (84 per cent) <sup>11</sup> is concentrated in NSW, VIC and QLD.
<b>Automation and digitisation</b>	The level of integration of digital technology depends on the scale of production. Some producers are using computer-based systems and software to achieve better inventory and production planning, and improved distribution systems.

<b>Sub-sector name</b>	<b>Floriculture production</b>
<b>Scope of work</b>	Producers in this sub-sector grow or produce flowers, foliage and seeds, either outdoors or in greenhouses, cold frames, cloth or lath houses.

<sup>9</sup> Horticulture Innovation Australia, 2016, *Australian Horticulture Statistics Handbook: Other Horticulture – 2014–15*, viewed April 2017, <http://horticulture.com.au/wp-content/uploads/2016/10/Australian-Horticulture-Statistics-Handbook-Other.pdf>.

<sup>10</sup> Australian Bureau of Statistics, 2017, 'Counts of Australian businesses, including entries and exits, June 2012 to June 2016', viewed April 2017, <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8165.0Jun%202012%20to%20Jun%202016?OpenDocument>.

<sup>11</sup> Horticulture Innovation Australia, 2016, *Australian Horticulture Statistics Handbook: Other Horticulture – 2014–15*, viewed April 2017, <http://horticulture.com.au/wp-content/uploads/2016/10/Australian-Horticulture-Statistics-Handbook-Other.pdf>.

<b>Sub-sector name</b>	<b>Floriculture production</b>
	Floriculture production is organised into both under-cover and outdoors production systems.
<b>Producers</b>	In June 2016, there were 786 floriculture producers in Australia, comprising 175 under-cover producers and 611 outdoor producers. <sup>12</sup> Most of these were non-employing, family-owned businesses or small-employing operators. The sub-sector has a small number of medium-size floriculture producers.
<b>Geographical location</b>	While floriculture producers are located in most Australian states, the sector is concentrated in VIC, NSW and QuLD (74 per cent).
<b>Automation and digitisation</b>	Some producers are using computer-based systems and software to achieve better inventory and production planning, and improved marketing and distribution systems.

<b>Sub-sector name</b>	<b>Vegetable growing</b>
<b>Scope of work</b>	Companies in this sub-sector grow and harvest a diverse range of vegetable crops, either outdoors or in greenhouses, cold frames, cloth or lath houses. The vegetables are sold to vegetable processors, wholesalers, supermarkets and grocery stores. Vegetable production is organised into both under-cover (hydroponics/greenhouse) and outdoors (field) production systems.
<b>Growers</b>	In June 2016, there were 5,871 vegetable growers in Australia, consisting of 836 under-cover producers and 5,035 outdoors producers. <sup>13</sup> More than half operate as small, family, non-employing businesses, and almost a third are small operators with fewer than 20 permanent and/or part-time employees. However, vegetable growers have among the highest labour needs during peak season, with the number of casual employees increasing considerably. The sub-sector also includes over 225 medium-size businesses that grow vegetables predominantly outdoors in open fields, as well as ten large growers whose growing is generally integrated with logistics and packing activities. Small producers have a significant role in small local markets, and also in market-gardening activity close to the peri-urban fringe.
<b>Geographical location</b>	Vegetable growers are spread across Australia, with the majority located in NSW, QLD, VIC, SA and WA.

<sup>12</sup> Australian Bureau of Statistics, 2017, 'Counts of Australian businesses, including entries and exits, June 2012 to June 2016', viewed April 2017,

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/8165.0Jun%202012%20to%20Jun%202016?OpenDocument>.

<sup>13</sup> Ibid.

<b>Sub-sector name</b>	<b>Vegetable growing</b>
<b>Automation and digitisation</b>	Operators in the vegetable growing sub-sector use automated planting and transplanting processes, integrated biological and chemical pest control, mechanical harvesting, micro-irrigation and wireless sensors for determining soil moisture levels, and turning irrigation systems. The sub-sector is also increasingly using controlled atmosphere storage to regulate the temperature, oxygen, carbon dioxide and humidity of storage conditions, so as to supply markets with fresh vegetables out of season.

<b>Sub-sector name</b>	<b>Fruit and nut tree growing</b>
<b>Scope of work</b>	The sub-sector consists of companies that grow and harvest a wide range of fruits, including table grapes, apple and pears, stone fruits, tropical fruits, berry fruits, olives and tree nuts. Fruits are sold as fresh products to fruit and vegetable wholesalers, sold directly to retailers, supermarkets, grocery stores and small fruit markets, or sold to producers for further processing into fruit produce.
<b>Growers</b>	The fruit growing sub-sector is characterised by a large number of operators, totaling 14,662 businesses in June 2016. <sup>14</sup> About 67 per cent are non-employing family farms operating as sole traders, and 29 per cent are farms employing fewer than 20 people. During busy harvesting periods, small- to large-scale operators engage additional casual employees. The sub-sector includes 604 medium-size businesses that employ between 20 and 199 employees, and 20 large fruit or nut growers that employ at least 200 employees, with most of these operating as vertically integrated companies.
<b>Geographical location</b>	Fruit producers are located in regional areas with suitable climatic conditions in all Australian states and territories. Temperate fruit farming activity is concentrated in regional NSW, VIC, SA and TAS. Tropical fruit growers are predominantly located in far north Queensland, the Northern Territory and Western Australia. Tree nuts are mainly produced in south-east QLD, northern NSW and temperate climates along the Riverina and Sunraysia regions.
<b>Automation and digitisation</b>	The fruit growing sector is characterised by improvement in machinery, particularly mechanical harvesters, and more efficient irrigation systems, including drip, micro-spray and mini-sprinkler systems. The sub-sector also integrates data collection software that allows farmers to manage planting activity, cropping dates, input costs and field output. Precision farming, based on extensive soil testing, and GPS systems are also applied by growers. The introduction of controlled-atmosphere storage technology, which regulates and monitors temperature, oxygen, carbon dioxide and humidity, provides growers with an alternative to chemical preservatives and pesticides.

<sup>14</sup> Ibid.

<b>Sub-sector name</b>	<b>Viticulture</b>
<b>Scope of work</b>	This sub-sector consists of companies that grow and harvest table or wine grapes, or sun-drying grapes. Grapes are sold as fresh products to wine and spirit producers for further processing into wine and wine-based alcoholic beverages, to fruit and vegetable wholesalers or to grape processing/crushing companies.
<b>Growers</b>	<p>The viticulture sub-sector is characterised by a large number of operators, totaling 6,600 growers in 2016.<sup>15</sup> About 70 per cent are non-employing farms operating as sole traders, and 27 per cent are businesses employing fewer than 20 people. During busy harvesting periods, small-scale operators engage additional employees. The sub-sector includes a small number of medium-size and large grape growers, with some operating as vertically integrated companies into downstream processes.</p> <p>Forty-six per cent of all wine grapes are grown in SA, with 31 per cent being grown in NSW and 20 per cent in VIC.</p>
<b>Geographical location</b>	<p>Vineyards are located in regional irrigable areas with suitable climatic conditions in all Australian states.</p> <p>Large growing regions for wine grapes include Barossa Valley, Clare Valley, Riverland, Riverina, Coonawarra, Eden Valley and Adelaide Hills in SA; Sunraysia, Yarra Valley, Mornington Peninsula, Heathcote, Western District, Rutherglen and Beechworth in VIC; and Hunter Valley, the Great Dividing Range, Orange, Forbes and Griffith in NSW.</p> <p>Large growing regions for table grapes include Sunraysia and the Murray Valley in VIC; the Riverina in NSW; and south-east QLD.</p>
<b>Automation and digitisation</b>	The viticulture sub-sector is characterised by improvements in machinery, particularly mechanical harvesters, and more efficient irrigation systems, including drip, micro-spray and mini-sprinkler systems. The sub-sector also integrates data collection software that allows growers to manage planting activity, cropping dates, input costs and field output. Precision farming, based on extensive soil testing, and GPS systems are also applied by larger growers. The introduction of controlled-atmosphere storage technology, which regulates and monitors temperature, oxygen, carbon dioxide and humidity, provides growers with an alternative to chemical preservatives and pesticides.

## Broadacre farming

<b>Sub-sector name</b>	<b>Grain growing</b>
<b>Scope of work</b>	This sub-sector includes businesses that grow cereal grains, including wheat, rice, oats, rye, barley, corn, peas, millet and sorghum. Farms in the sub-sector frequently diversify into different cereal-cropping activities, and sometimes into livestock activities. Cereal crops are harvested and sold to

<sup>15</sup> Ibid.

<b>Sub-sector name</b>	<b>Grain growing</b>
	cereal grain wholesalers or (for particular varieties) as feedstock for beef cattle and poultry.
<b>Producers</b>	The sector comprised 11,717 cereal grain producers in 2016, including many small, family-owned, non-employer farms (63 per cent) and farms employing fewer than 20 people. <sup>16</sup> The sector has a small number of large producers.
<b>Geographical location</b>	The location of grain farms in Australia is linked to climate and weather conditions suitable to the variety of grain. Most grain farms are established in NSW, VIC, SA, WA and QLD. The wheat-belt regions include the Wimmera and central west of VIC, the south east of SA, the mid-north and Flinders regions of SA, the central west of NSW, the goldfields region of WA and Darling Downs, QLD. Rice farms are predominantly located in NSW.
<b>Automation and digitisation</b>	<p>Activity in this sub-sector is characterised by the use of capital-intensive equipment such as tractors and irrigation systems, and the introduction of advanced equipment to monitor planted areas, test the soil, irrigate and harvest crops.</p> <p>Rice farms, which are water-intensive operations, use laser technology and advanced software to design farm irrigation systems and achieve water savings.</p> <p>The sub-sector also integrates computer-based technologies and sensors, such as WeedSeeker technology, to accurately identify and spray weeds to achieve efficient use of herbicides. Global positioning systems (GPS) and GIS systems, and spectral imaging for remote sensing assist grain farmers to determine which crops are best suited to each area.</p>

<b>Sub-sector name</b>	<b>Fodder growing</b>
<b>Scope of work</b>	This sub-sector comprises businesses that produce fodder crops, including hay, alfalfa and silage. Fodder growers sell the crops to animal farms, wholesalers and beef cattle feedlots.
<b>Growers</b>	The sub-sector includes many small fodder growers, most of which are non-employing businesses.
<b>Geographical location</b>	VIC, NSW and QLD all have significant numbers of fodder growers.
<b>Automation and digitisation</b>	Fodder crops involve capital-intensive irrigation systems and mechanical harvesters.

<b>Sub-sector name</b>	<b>Sugar cane growing</b>
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<sup>16</sup> Ibid.

<b>Scope of work</b>	This sub-sector includes businesses that grow sugar cane. The crop is sold to sugar manufacturing companies.
<b>Producers</b>	The sub-sector consisted of 4,825 sugar cane producers in 2016. <sup>17</sup> The majority are small, family-owned, non-employing businesses employing fewer than 20 people. There is a small presence of medium-size sugar cane growers, which are generally corporates or farmers' cooperatives with operations integrated vertically with downstream sugar cane processing.
<b>Geographical location</b>	The sub-sector is highly concentrated in QLD, because sugar cane requires specific climatic conditions to grow. Australia's major sugar cane region spans the coastal and river plains in QLD and northern NSW.
<b>Automation and digitisation</b>	Tractors, highly mechanised harvesters and irrigation systems are involved in the sub-sector's activity.

<b>Sub-sector name</b>	<b>Cotton growing</b>
<b>Scope of work</b>	This sub-sector comprises businesses that grow cotton. The crop is sent to cotton ginning businesses for further processing (to separate the cotton fibres/lint from the cottonseed).
<b>Producers</b>	The sector included 957 cotton producers in 2016. <sup>18</sup> The majority are small, family-owned business with either no employees or fewer than 20 employees. There is a small presence of medium-size cotton growers. These businesses are generally fully integrated operations, involved in the growing, ginning and marketing of cotton, or their operations diversify into other agricultural sectors such as horticulture and animal farming.
<b>Geographical location</b>	The sub-sector is highly concentrated in NSW and QLD.
<b>Automation and digitisation</b>	The sub-sector is highly mechanised, and benefits from new irrigation systems and technologies that measure soil moisture, enabling farmers to more accurately schedule watering to suit conditions.

<b>Sub-sector name</b>	<b>Seed production</b>
<b>Scope of work</b>	This sub-sector consists of businesses that produce seeds for crops such as grains, vegetables, fruit, flowers and oilseeds.
<b>Producers</b>	The sub-sector includes several large global seed production players and many small-scale seed growers.
<b>Geographical location</b>	Producers are generally located near areas with high concentrations of agricultural activities, particularly in NSW, VIC and WA.

<sup>17</sup> Ibid.

<sup>18</sup> Ibid.

<b>Sub-sector name</b>	<b>Seed production</b>
<b>Automation and digitisation</b>	The sector is characterised by capital-intensive laboratory settings, equipped with biotechnology-related infrastructure. X-ray technology is used intensively throughout the research, and to gain an understanding of seed structures and internal compositions.

## Livestock farming

<b>Sub-sector name</b>	<b>Livestock farming</b>
<b>Scope of work</b>	This sub-sector consists of either specialised or mixed livestock farms that breed and farm one or a variety of animals, including sheep, beef cattle, dairy cattle and poultry, or other livestock including deer, pigs and bees. Animals are grown for meat or to produce wool, raw milk, eggs or honey. Farmers supply live animals to meat processors, or supply animal products such as wool, milk, egg and honey to wholesalers or food processors.
<b>Producers</b>	The sub-sector is characterised by a large number of operators, totaling 88,068 farms in 2016. <sup>19</sup> Half are specialised beef cattle farmers. About 75 per cent of livestock farms are non-employing, family-run businesses, and 23 per cent employ fewer than 20 people. Few medium-size farms operate in the sub-sector, with some being vertically integrated into meat processing.
<b>Geographical location</b>	Although livestock farming occurs across Australia, most of the activity is in QLD, NSW, VIC, WA and SA.
<b>Automation and digitisation</b>	Cattle and livestock farming in general involves capital-intensive machinery to maintain cattle grazing pastures, equipment for branding, electric cattle tagging, and vehicles for traveling around large properties. Most dairy cattle farmers use automated or robotic milking systems and computerised inventory systems. Computer-based technologies, involving chip-collar sensors, allow improved quality control. The systems monitor, analyse and record data relating to production volumes and herd health.

## Mixed crop and livestock farming

<b>Sub-sector name</b>	<b>Mixed crop and livestock farming</b>
<b>Scope of work</b>	This sub-sector includes farms that grow grain in conjunction with beef cattle or sheep farming activities. Diversification in multiple agriculture sub-sectors allows farmers to reduce the business risks associated with unfavourable weather conditions and the volatility of markets and prices.
<b>Producers</b>	The sub-sector consists of a large number of operators, totaling 21,940 mixed crop and livestock farms in 2016. <sup>20</sup> The majority are small, family-

<sup>19</sup> Ibid.

<sup>20</sup> Ibid.

<b>Sub-sector name</b>	<b>Mixed crop and livestock farming</b>
	owned and operated businesses. There is a small presence of medium-size farms.
<b>Geographical location</b>	Mixed crop and livestock farming occurs across Australia; however, most crop and livestock farming establishments are located in NSW, VIC, WA, SA and QLD.
<b>Automation and digitisation</b>	Similar to specialised crop and livestock farming, this sub-sector employs a range of highly mechanised equipment and computer-based technology and systems to effectively and efficiently produce its agricultural products.

### Agriculture support services

<b>Sub-sector name</b>	<b>Agriculture support services</b>
<b>Scope of work</b>	Businesses in this sub-sector provide the agricultural sector with services including aerial agricultural services, shearing, contract crop harvesting, and animal testing. This sub-sector includes businesses involved in ginning and trading cotton.
<b>Businesses</b>	There were 1,004 shearing businesses, 41 cotton ginning businesses and 10,746 other agriculture and fishing support services in Australia in 2016. <sup>21</sup> The majority are small-scale family businesses operated by owners or employing less than 20 people. There are also several medium-size operators in the sub-sector.
<b>Geographical location</b>	The majority of businesses are located in NSW, VIC and QLD, close to agricultural farms.
<b>Automation and digitisation</b>	This sub-sector benefits from the use of new technology and ongoing automation in harvesting and aerial processes.

### Agricultural product wholesaling

<b>Sub-sector name</b>	<b>Agricultural product wholesaling</b>
<b>Scope of work</b>	<p>Businesses in this sub-sector wholesale on behalf of farmers through supply of:</p> <ul style="list-style-type: none"> <li>• fresh fruit and vegetables to fruit and vegetable retailers, supermarkets and grocery stores, or to the catering and food services sub-sector. Produce is brushed, washed or packaged by either producers or packaging companies</li> <li>• cereal grains to livestock farms and food processors</li> <li>• wool to textile producers</li> <li>• Fresh, frozen or processed fish to specialist fish and seafood retailers, supermarkets and grocery stores, food catering services, and restaurants</li> </ul>

<sup>21</sup> Ibid.

<b>Sub-sector name</b>	<b>Agricultural product wholesaling</b>
	<ul style="list-style-type: none"> <li>• other agricultural products.</li> </ul> <p>Wholesalers can also be importers and exporters of agricultural products.</p>
<b>Wholesalers</b>	There were 4,230 wholesaling units in the sector in 2015. <sup>22</sup> About half are non-employing businesses, and most of the other half are companies employing fewer than 20 people. These businesses normally distribute to local and smaller markets. The few large wholesalers cover significant markets, with some being part of global corporations.
<b>Geographical location</b>	Agricultural product wholesalers operate throughout Australia, yet the majority are concentrated in the states with most economic activity, such as NSW, VIC and QLD.
<b>Automation and digitisation</b>	<p>The sub-sector benefits from the use of computerised automation of inventory control and online trading. Radiofrequency identification (RFID) systems, supported by computerised databases, are widely adopted to record information on products and storage times. An increasing number of wholesaling operators have set up online marketplaces to bring together growers and buyers. In addition, wholesalers use digital technology and websites to provide market information and value-added services to growers, as well as facilitate cost control and manage commodity and exchange-rate risks.</p> <p>Parts of the sub-sector use specialised commercial chillers that are capable of reliably maintaining optimal temperatures by allowing for careful setting and monitoring of the temperature, humidity level, light and carbon dioxide supply.</p> <p>Global positioning systems (GPS) are used to track deliveries, achieve optimal routes and coordinate stock.</p>

## Conservation

<b>Sub-sector name</b>	<b>Conservation operations</b>
<b>Scope of work</b>	<p>This sub-sector comprises businesses and organisations that operate:</p> <ul style="list-style-type: none"> <li>• nature reserves and conservation parks, including national parks, state parks and other parks, to preserve flora and fauna in their natural environment</li> <li>• botanical gardens.</li> </ul>
<b>Organisations</b>	Nature reserves and conservation parks are operated by government bodies, including local, state and federal government agencies, and by non-government organisations. Private organisations also operate in the industry

<sup>22</sup> Ibid.

Sub-sector name	Conservation operations
	<p>through privately owned and operated parks and gardens that involve a large number of volunteers.</p> <p><b>Main organisations<sup>23</sup></b></p> <p><i>Nature reserves:</i></p> <ul style="list-style-type: none"> <li>• Parks Victoria</li> <li>• Office of Environment and Heritage NSW (through the NSW National Parks and Wildlife Service (NPWS))</li> <li>• Parks Australia</li> <li>• Local governments</li> <li>• Bush Heritage Australia (BHA)</li> </ul> <p><i>Botanical gardens:</i></p> <ul style="list-style-type: none"> <li>• Royal Botanic Gardens and Domain Trust</li> <li>• Royal Botanic Gardens Board Victoria</li> </ul>
Geographical location	<p>Each state and territory in Australia has government departments responsible for national park and conservation reserves. There is also one major public zoo and botanic garden in each state.</p>
Automation and digitisation	<p>Digital technology is used heavily in this sub-sector, including through tracking systems for animals, state-wide databases of flora and fauna, computerised maps and mapping, communication systems and local area networks (LANS) to cover all offices in a state/territory. Computerised asset management systems are also used across the nature reserves and conservation parks sub-sector. In addition, fixed-wing aircraft, helicopters and other techniques are used to control and fight fire.</p> <p>Botanic gardens operators use breeding, national and international computerised classification for tracking of animals and plants, and microchip implants for all endangered species in their collection as a means of individual identification. In addition, computerised ticketing systems allow for the collection of information on visitor origins. Scientific research on endangered vegetation usually involves the use of satellite and GPS.</p>
Sub-sector name	Land care and management
Scope of work	<p>Individuals and groups in this sub-sector provide support to farmers and fishers across Australia on best-practice sustainable agriculture. They are focused on expert management of natural assets such as soil, water and native vegetation. Caring for the land includes a range of activities, including:</p> <ul style="list-style-type: none"> <li>• sustainable farm practices</li> </ul>

<sup>23</sup> Ibid.

	<ul style="list-style-type: none"> <li>restoring native habitats and revegetation</li> <li>controlling weeds and pests</li> <li>developing and sharing local natural resource management skills and knowledge.</li> </ul>
<b>Groups</b>	The sector includes Landcare groups, farming systems groups, 'friends of groups and Indigenous land-management groups. It is estimated that there are 6,000 Landcare, Coastcare, Bushcare, Rivercare and other related community and farming groups, and over 100,000 volunteers across Australia caring for the land. Many farmers and landholders also undertake this work without being affiliated with a particular Landcare group. <sup>24</sup>
<b>Geographical location</b>	Landcare groups and individuals are represented across all Australian states and regions.

## Relevant stakeholders

The agriculture, horticulture and conservation and land management industry sector is represented at a national level by more than 206 peak organisations (see Tables 1 and 2). These organisations include two industry umbrella associations, over 155 industry sector and sub-sector associations – including government and non-government organisations responsible for Australian fauna and flora conservation – a small number of associated industry sector associations, 15 professional associations, 13 industry R&D services bodies, and a number of regulatory bodies and other industry service organisations. These numbers do not include state- and territory-based industry associations.

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<sup>24</sup> Ibid.

**Table 1: Relative number of industry peak bodies**

CATEGORY	NUMBER
Industry umbrella associations	2
Industry sector associations	154
Associated industry sector associations	8
Professional associations	12
Industry R&D services bodies	13
Regulatory bodies and other industry services	18
Total	206

**Table 2: Peak industry sector organisations**

CATEGORIES – PEAK INDUSTRY ORGANISATIONS
<b>INDUSTRY UMBRELLA ASSOCIATIONS</b>
National Farmers' Federation
Agribusiness Association of Australia Inc.
State/territory industry associations
<b>INDUSTRY SECTOR ASSOCIATIONS</b>
<b>Amenity horticulture</b>
<i>Arboriculture:</i>
Arboriculture Australia
International Society of Arboriculture
Landscaping Australia Incorporated
Tree Contractors Association Australia
State/territory industry associations
<i>Indoor plant hire and maintenance:</i>
National Interior Plantscape Association
<i>Turf and sports turf management:</i>
Australian Golf Course Superintendents Association
Sports Turf Australia
Turf Grass Association of Australia
Turf Producers Australia
Turf Australia
State/territory industry associations
<i>Nursery:</i>

## CATEGORIES – PEAK INDUSTRY ORGANISATIONS

Nursery and Garden Industry Australia

State/territory industry associations

### *Floriculture:*

Australian Flower Council

Flower Industry Association Australia Inc.

State Industry Associations

Wildflowers Australia

Wildflowers Australia Network

### **Production horticulture**

Voice of Horticulture

### *Mushroom and vegetable growing:*

Australian Asparagus Council

Australian Mushroom Growers Association Ltd

Australian Sweet Potato Growers Inc

AUSVEG

Potato Processing Association of Australia

Protected Cropping Australia

Onions Australia

State/territory and regional industry associations

### *Grape growing:*

Australian Table Grape Association

Wine Grape Growers Australia

Australian Society of Viticulture and Oenology

South Australian Wine Industry Association

### *Berry fruit growing:*

Australian Blueberry Growers Council

Raspberries and Blackberries Australia

Strawberries Australia Inc.

### *Apple and pear growing:*

Apple and Pear Australia Limited

### *Stone fruit growing:*

Summerfruit Australia Limited

Cherry Growers Australia Inc.

### *Citrus fruit growing:*

## CATEGORIES – PEAK INDUSTRY ORGANISATIONS

Citrus Australia

*Olive growing:*

Australian Olive Association

*Other fruit growing:*

Australian Banana Growers' Council

Australian Custard Apple Growers Association

Australian Lychee Growers Association

Australian Mango Industry Association

Australian Melon Association Inc.

Tropical Exotic Fruit Australia

Australian Pineapple Association

Avocados Australia Ltd

Australian Nut Industry Council

Dried Fruits Australia

Passionfruit Australia Inc.

*Tree nut growing:*

Almond Board of Australia

Australian Macadamia Society Ltd

Chestnuts Australia Inc.

Hazelnut Growers of Australia Inc.

Australian Pecan Growers Association Inc.

Persimmons Australia Inc.

Pistachio Growers Association Inc.

*Other nut growing:*

Peanut Company of Australia

### **Broadacre agriculture**

*Oilseeds:*

Australian Oilseeds Federation

Australian Sunflower Association

Canola Association of Australia

*Cereals:*

Australian Grain Harvesters Association (AGHA)

Barley Australia

Grain Growers

## CATEGORIES – PEAK INDUSTRY ORGANISATIONS

Grain Producers Australia

Grain Trade Australia

Maize Association of Australia

State/territory and regional industry associations

### *Pulses:*

Australian Mungbean Association

Bean Growers Australia

Pulse Australia

Soy Australia

### *Sugar cane:*

Australian Cane Farmers Association

Canegrowers

Cane Harvesters

### *Rice:*

Rice Growers' Association of Australia

### *Cotton:*

Australian Cotton Shippers Association

Cotton Australia

### *Fodder:*

Australian Fodder Industry Association

### *Seeds:*

Australian Seeds Federation

## **Livestock production**

### *Beef cattle:*

Cattle Council of Australia

Northern Territory Cattlemen's Association

Dairy Cattle

Australian Dairy Farmers

Australian Dairy Industry Council

Sheep (Meat, Fibre, Dairy)

Sheep Meat Council of Australia

Wool Producers Australia

Australian Association of Stud Merino Breeders

Poultry (Meat, Eggs)

## CATEGORIES – PEAK INDUSTRY ORGANISATIONS

Australian Chicken Growers' Council  
Egg Farmers Australia  
State/territory and regional industry associations

### *Deer:*

Deer Industry Association of Australia

### *Pigs:*

Australian Pig Breeders Association  
State/territory industry associations

### *Beekeeping:*

Australian Honey Bee Industry Council Inc.  
Australian Queen Bee Breeders Association  
Crop Pollination Association Inc.  
Honey Packers & Marketers Association of Australia Inc.  
National Association of Crop Pollination Associations  
State/territory industry associations

### *Other livestock:*

Australasian Alpaca Breeders Association  
Australian Alpaca Association  
Australian Ostrich Association  
Crocodile Farmers Association of the Northern Territory  
Dairy Goat Society of Australia  
Goat Industry Council of Australia

### **Agriculture support services**

Agricultural Supply Wholesaling  
Australian Cotton Ginners Association  
Australian Livestock and Rural Transporters' Association  
Australian Livestock Exporter's Council  
Australian Lot Feeders' Association  
Australian Wool Exchange  
Cotton Ginning  
Feedlotting  
Fertilising  
Fertilizer Australia  
Grain & Feed Trade Association

## CATEGORIES – PEAK INDUSTRY ORGANISATIONS

Grain Trade Australia

### Irrigation

Irrigation Australia

National Irrigator's Council

### Shearing

Shearing Contractors Association of Australia

Transport Services

Wheat Exports Australia

Wool Classers' Association of Australia

Wool Classing

### **Biosecurity**

Animal Health Australia

Plant Health Australia

### **Conservation and land management**

Australian Conservation Foundation

Australian Landcare Council

Australian National Botanic Gardens

Australian Native Plants Society

Australian Weeds Committee

Australian Wildlife Society

Botanic Gardens

Centralian Land Management Association

Conservation Farmers Inc.

Conservation Volunteers Australia

Director of National Parks

Ecological Society of Australia

Farm Tree & Landcare Association

Greening Australia

Indigenous Flora and Fauna Association

Indigenous Land Management

International Network for Environmental Compliance and Enforcement

International Plant Propagators Society Australia

Invasive Plants and Animals Committee

Landcare Australia Ltd

## **CATEGORIES – PEAK INDUSTRY ORGANISATIONS**

Marine Estate Management Authority  
National Aboriginal Lands Managers Association  
National Association for Sustainable Agriculture Australia  
National Environment Protection Council  
National Environmental Law Association  
National Landcare Network  
National Parks and Nature Reserves  
National Parks Australia Council  
National Parks Conservation Associations  
National Urban Forest Alliance  
Parks and Leisure Australia  
Parks Australia  
Specialist interest groups  
State/territory national parks associations  
The Australian Government National Landcare Programme  
The Wilderness Society  
State/territory organisations

## **ASSOCIATED INDUSTRY SECTORS ASSOCIATIONS**

Australian Livestock & Property Agents Association  
Australian Organics Recycling Association  
Biological Farmers Australia  
Green Roofs Australasia  
National Herd Improvement Association of Australia Incorporated  
Organic Federation of Australia  
Sustainable Gardening Australia

## **PROFESSIONAL ASSOCIATION**

Australian Environmental Pest Managers Association  
Australian Institute of Horticulture  
Australian Institute of Landscape Architects  
Australian Institute of Landscape Designers and Managers  
Australian Society of Horticultural Science  
Crop Consultants Association  
Institute of Australian Consulting Arboriculturists  
Institute of Australian Geographers

## CATEGORIES – PEAK INDUSTRY ORGANISATIONS

Parks & Leisure Australia  
State and Territory Weed Societies  
The Environment Institute of Australia and New Zealand  
The Queensland Agriculture Workforce Network  
Utility Arborist Association Australia

## INDUSTRY R&D SERVICES

Australian Egg Corporation Limited  
Australian Farm Institute  
Australian Pork Limited  
Australian Wool Innovation  
Cotton Research and Development Corporation  
Fisheries Research and Development Corporation  
Wine Australia  
Grains Research and Development Corporation  
Horticulture Innovation Australia  
Local Government Tree Resources Association  
Regional Australia Institute  
Rural Industries Research and Development Corporation  
Dairy Australia  
Meat & Livestock Australia Ltd

## REGULATORY BODIES AND OTHER INDUSTRY SERVICES

Australian Seeds Authority  
Wheat Quality Australia  
Australia Wool Testing Authority  
Corporate Agriculture Australia  
PrimeSafe  
Rural Skills Australia  
Livestock Biosecurity Network Inc.  
Australia Organic

## REGULATORY BODIES AND OTHER INDUSTRY SERVICES

Organic Federation of Australia  
Flower Export Council of Australia  
Australian Seeds Authority Ltd

Australian Dairy Herd Improvement Scheme  
Australian Wool Innovation  
National Feedlot Accreditation Scheme

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## Industry and occupational regulations and standards

### Industry regulations and standards

The Australian agriculture, horticulture and conservation and land management industry sector operates under a high level of regulation.

#### **Regulation of genetically modified crops**

Genetically modified (GM) crops in Australia, including seeds, are regulated under the *Gene Technology Act 2000* (Cth.) through the Office of the Gene Technology Regulator. The regulatory policy seeks to protect the health and safety of both people and the environment. The regulator identifies risks posed by, or posed as a result of, gene technology, and manages these risks. This Act regulates all dealings with live and viable genetically modified organisms (GMOs) in Australia, including research, manufacture, import, production, propagation, transport and disposal of GMOs. There is also corresponding legislation in each state and territory.

#### **Environmental regulations**

Most horticultural production systems are highly reliant on irrigation, fertilisers and pesticides. Laws governing environmental protection and management by horticultural producers include numerous federal, state and local Acts and regulations. Generally, these regulations relate to fertiliser and pesticide supply, handling, usage and storage; disposal of empty chemical containers and contaminated wastes; water usage; wastewater generation and the treatment of waste arising from production; biodiversity; and land and soil management.

National environmental legislation and regulations relevant to the industry include:<sup>25</sup>

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth.)
- *Hazardous Waste (Regulation of Exports and Imports) Act 1989* (Cth.)
- *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* (Cth.)
- *Water Act 2007, Water Amendment Act 2008* (Cth.) and associated water regulations
- National Water Quality Management Strategy
- National Environment Protection (Assessment of Site Contamination) Measure
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- Australian Drinking Water Guidelines (2011)
- Australia New Zealand Food Standards Code
- National Residue Survey
- National Environment Protection (Air Toxics) Measure.

State/territory government agencies regulate water usage via the allocation of water licences and dam management. They also decide on the timing and amount of water able to be accessed by irrigators. Water legislation focuses on developing efficient water usage for agriculture while limiting

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<sup>25</sup> Horticulture for Tomorrow and Horticulture Australia Limited, 2014, Guidelines for Environmental Assurance in Australian Horticulture, viewed April 2017, <http://horticulturefortomorrow.com.au/manage/wp-content/uploads/2014/05/Environmental-Assurance-Guidelines-2014-full-version-2.pdf>

its environmental effect, particularly in the Murray–Darling Basin, which supports a large proportion of Australia’s fruit and vegetable crops.

### Food regulations

Food Standards Australia New Zealand (FSANZ) establish standards relevant to the agriculture industry, particularly for poultry, meat, dairy, eggs and egg products, and seed sprout. FSANZ aims to strengthen food safety by reducing the incidence of foodborne illness associated with seed sprouts and eggs or egg products. In addition, dairy standards outline the implementation of documented food safety programs for primary dairy production and for the collection, transportation and processing of raw milk, as designed to protect public health across all jurisdictions.

The majority of fresh horticultural produce in Australia is grown under industry-based food safety schemes.<sup>26</sup> These schemes, and several state/territory regulations and guidelines, work to minimise risks linked to microbiological, chemical and physical factors that may be present in fresh produce for sale in Australia.

State/territory government regulations and guidelines include the following:

- The *Food (Plant Products Food Safety Scheme) Regulation (2005)* (NSW) provides specific control measures to manage the safe production and supply of seed sprouts, fresh-cut fruit and vegetables, and juices.
- The *Food Production (Safety) Regulation (2014)* (QLD) sets out requirements for the transport and processing of fresh primary produce.
- The NSW Food Authority’s *Industry Guide for the Development of a Food Safety Program (High Priority Plant Products Industry)* (2005) covers seed sprouts, fresh-cut fruits and vegetables, unpasteurised juice, and vegetables in oil.
- *Guidelines for On-Farm Food Safety for Fresh Produce* (2004) was published by the Australian Government Department of Agriculture, Fisheries and Forestry, now the Federal Department of Agriculture and Water Resources.

Industry food safety schemes in Australia include:

- HACCP Australia
- Freshcare
- GlobalGAP
- supermarket quality and food safety schemes.

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<sup>26</sup> Food Standards Australia New Zealand, 2014, ‘Horticulture’, viewed April 2017, <http://www.foodstandards.gov.au/code/primaryproduction/horticulture/Pages/default.aspx>.

## **Grape growing legislation**

The Australian viticulture sub-sector is subject to a number of federal and state/territory laws and regulations, including the *Australian Grape and Wine Authority Act 2013* (Cth.) and the *Australian Grape and Wine Authority Regulations 1981* (Cth.). These Acts provide for, among other things, the Label Integrity Program and the Register of Protected Geographical Indications and Other Terms.

## **Livestock management legislation**

The Department of Agriculture and Water Resources (DAWR) provides policies and legislation concerning aspects of livestock management and biosecurity, including live exports and supply of agricultural chemicals. DAWR is responsible for Australia's livestock export licences, and regularly carries out inspections to ensure that biosecurity, traceability and animal welfare requirements are being met for both export-licensing and importing countries. DAWR also manages quarantine controls at borders and provides import and export inspection and certification.

In addition, state/territory governments are responsible for livestock management, disease response and welfare arrangements within their jurisdictions, in terms of both enforcing national standards and agreements and administering state/territory legislation.

Legislation relating to livestock management includes:<sup>27</sup>

- *Agricultural and Veterinary Chemicals (Control of Use) Act 1992* (IC)
- *Agricultural and Veterinary Chemicals (Control of Use) Regulations 2007* (VIC)
- *Impounding of Livestock Act 1994* (VIC)
- *Impounding of Livestock Regulations 2008* (VIC)
- *Livestock Disease Control Act 1994* (VIC)
- *Livestock Disease Control Regulations 2006* (VIC)
- *Livestock Management Act 2010* (VIC)
- *Livestock Management Regulations 2011* (VIC)
- *Prevention of Cruelty to Animals Act 1986* (VIC)
- *Prevention of Cruelty to Animals Regulations 2008* (VIC)
- *Prevention of Cruelty to Animals (Domestic Fowl) Regulations 2006* (VIC)
- *Stock (Seller Liability and Declarations) Act 1993* (VIC).

## **Australian ruminant feed ban**

Australia has an inclusive ban on the feeding of restricted animal material (RAM), including meat and bone meal (MBM) derived from all vertebrates including fish and birds, to all ruminant animals. An enforceable ban seeks to minimise the risk of spreading the infectious agent in mad cow disease, in the unlikely event that it is introduced to Australia. The ruminant feed ban is nationally coordinated by Animal Health Australia (AHA) and is part of a comprehensive national TSE Freedom Assurance Project. The prohibition and the program target livestock producers and other end users of manufactured stockfeed, retailers of manufactured stockfeed, and stockfeed manufacturers. Each Australian state/territory adopted the ruminant feed ban in legislation, indicating feeding prohibition and requirements for labelling and RAM content.

In addition, the industry implements the FeedSafe accreditation program through the Stock Feed Manufacturers' Council of Australia (SFMCA). To achieve FeedSafe accreditation, feed manufacturing sites are required to address the elements of the Code of Good Manufacturing Practice for the Feed Milling Industry, particularly methods to ensure effective cleaning, flushing and sequencing between different types of stockfeeds, to minimise the possibility of cross-contamination.

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<sup>27</sup> Agriculture Victoria, 2016, 'Livestock management', viewed April 2017, <http://agriculture.vic.gov.au/agriculture/farm-management/legal-information-for-victorian-landholders/livestock-management>.

## **Biosecurity legislations**

The Department of Agriculture and Water Resources is responsible for developing and reviewing biosecurity policies for the safe importation of animals and animal products. The Department will co-administer the new *Biosecurity Act 2015* (Cth.) with the Department of Health from 16 June 2016, replacing the *Quarantine Act 1908* (Cth.).

In addition, state/territory biosecurity agencies develop policy, standards, delivery systems and services that reduce the threat of invasive plants and animals to agriculture and the natural environment; protect animals and plants from pests and diseases; enhance food safety; ensure minimal and effective chemical use; protect the welfare of animals; and preserve and expand market access for primary industries.

## **Live-animal export legislation**

Two bills were enforced in Australia to amend the *Australian Meat and Live-stock Industry Act 1997* (Cth.) and *Export Control Act 1982* (Cth.) in response to animal welfare concerns in the live-cattle export trade.

The *Live Animal Export Prohibition (Ending Cruelty) Bill 2014* (Cth.) and the *Live Animal Export (Slaughter) Prohibition Bill 2014* (Cth.) were introduced to prohibit the export of live stock for slaughter on or after 1 July 2017, and to compel export licence holders to ensure all live stock are treated satisfactorily prior to slaughter.

## **Conservation laws**

Government-managed nature reserves, including marine reserves, and conservation parks are licensed and regulated by federal, state and territory environment and conservation departments under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth.) (EPBC) and the *National Parks and Wildlife Act 1975* (Cth.). The EPBC Act contains an extensive regimen for the conservation of biodiversity.

## **Industry codes of practice**

A number of codes of practice have been developed across the industry sub-sectors to set out industry standards of conduct, including the following:

- Horticulture Code of Conduct
- Growing Australian Grain
- Mandatory Port Access Code of Conduct for Grain Export Terminals
- Food and Grocery Code of Conduct
- The Animal Welfare Codes of Practice
- Australian Animal Welfare Standards and Guidelines (for cattle and sheep)
- RSPCA Approved Farming Scheme
- Australian Wine Industry Code of Conduct
- Code of Good Manufacturing Practice for the Feed Milling Industry
- The Australian Aquaculture Code of Conduct
- Code of Practice: Amenity Tree Industry (WorkCover)
- Model Code of Practice for the Welfare of Animals – Domestic Poultry
- National Farm Biosecurity Manual – Poultry Production
- Farm Biosecurity Manual for the Duck Meat Industry.

## Grain trade standards and legislation

Grain Trade Australia oversees standards for wheat and coarse grain trade in the domestic and international markets.

## International regulations and access to markets

To ensure access to European markets, Australian beef producers must follow a series of European Union regulations, laws and other rules governing beef cattle farming. These measures take the form of chain-of-custody certification involving cattle properties, feedlots and processors, and integrate the National Livestock Identification Scheme, which allows for the permanent identification of cattle using electronic microchips.

## Industry certification programs

The industry has developed and implemented integrity systems to verify and assure food safety and other quality attributes of livestock. Examples of industry certification programs include:

- Livestock Production Assurance, an on-farm food safety certification program for cattle, sheep and goats
- National Feedlot Accreditation Scheme, which encompasses animal health and welfare, environmental conservation, food safety and product integrity
- Australian Dairy Food Safety Scheme, which monitors compliance with food standards to ensure the integrity of the dairy supply chain
- Australian Pork Industry Quality Assurance Program, which provides standards for Australian pig producers
- Egg Corp Assured, a quality assurance program administered by the National Egg Corporation
- Q-Alpaca, a quality assurance program for voluntary use by Australian alpaca breeders and owners
- B-Qual, a voluntary program for apiarists and honey-processing businesses that ensures that the honey bee industry's standards meet best practice, and domestic and international market demands.
- FeedSafe, the quality assurance program for the Australian stockfeed industry
- Freshcare, the largest on-farm HACCP assurance program.

## Regulated occupations in the industry

Regulated occupations are bound by legal (or industry) requirements or restrictions to perform the work. Regulated occupations require a licence from, or registration by, a professional association or occupational licensing authority.

The industry does not have any specific trade-licensed occupations. However, it involves different professional accreditation structures overseen by industry bodies. For example, in Victoria, landscapers are required by the *Domestic Building Contracts Act 1995* (Vic) to be registered with the state Building Practitioners Board in order to carry out large-scale structural landscaping. Qualifications include completion of Certificate III courses in landscape construction or horticulture.

Similarly, arborists do not need a licence to practise arboriculture in Australia, yet WorkCover, the Tree Contractors Association of Australia, Arboriculture Australia and the Local Government Tree Resources Association recommend that professional arborists meet several requirements. Arborists practising in Australia should represent a professional business, hold proper worker's compensation insurance, and have minimum qualifications of Certificate II in Horticulture (Arboriculture) for carrying out ground and climbing work, and Certificate III in Horticulture (Arboriculture) for supervising climbing work.

## Challenges and opportunities in the sector

The Australian agriculture, horticulture and conservation and land management industry sector operates in a dynamic environment that is shaped by a range of natural factors, as well as by policy frameworks at state/territory, national and international levels. Access to free trade and knowledge of market requirements have become increasingly important, along with developing new and innovative technologies in order to adapt to changes in land and water availability, biosecurity and climatic conditions. Challenges and industry opportunities for growth are discussed below; however, the outlook for the Australian agricultural sector is strong, with the world's demand for food rising, driven by population growth and calls for higher quality and a greater variety of food.

### Government policies

Agriculture, along with the food manufacturing sector, is at the forefront of the Australian Government policy agenda, and has been prioritised as a growth sector. Opportunities in the sector are provided by the importance of food security globally and by higher demand for food in expanding markets, such as Asia Pacific region. The Australian Government facilitates the sector's growth through a range of initiatives, including, among others, the following:

- Agricultural Competitiveness White Paper
- White Paper on Developing Northern Australia
- The Food and Agribusiness Industry Growth Centre
- CSIRO Food and Nutrition Flagship Programme
- Further global trade liberalisation through new free trade agreements, enabling increased tariff-free access to a diverse range of overseas markets.

State/territory governments have also seen the agricultural and food sectors as critical contributors to local growth and exports, leading with policies based on state-/territory-based industry strategies and action plans. The challenge for individual companies is to unlock commercial benefits from these government programs and agreements by becoming export-ready, culturally literate and market-savvy.

Governments have a shared responsibility to develop national surveillance and diagnostic programs to address Australia's broad range of biosecurity, including activities to investigate the presence or prevalence of pests and diseases in an animal population and its environment. A new state framework to manage biosecurity issues is the Western Australian Biosecurity Strategy, which helps protect WA growers from incursions of pests and diseases that could negatively affect production and access to markets, and which covers the period from 2016–2025.<sup>28</sup>

In an effort to combat invasive species that cost farmers billions of dollars in livestock losses, state/territory governments develop policies and allocate funds for new action plans and controls. A recent example is the Victorian Government, which allocated \$11 million in baiting, hunting and trapping programs in its 2016–17 budget. Similarly, the Western Australia Government announced a wild-dog action plan for the next five years centred around cell fencing grants, doggers, and restoration and extension of the existing state barrier fence.<sup>29</sup> The Australian Government is also supporting farmers and the community to tackle established pest animals through a recent funding

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<sup>28</sup> Department of Agriculture and Food, Western Australian Government, 2016, 'Western Australian biosecurity supported with new strategy', viewed April 2017, <https://www.agric.wa.gov.au/newsletters/agmemo-rangelands/rangelands-agmemo-december-2016-issue-4?page=0%2C6>.

<sup>29</sup> ABC News, 2016, 'Wild dog fencing key to bringing more sheep back to Western Australia, industry says', viewed April 2017, [http://www.abc.net.au/news/2016-11-15/wild-dog-funding-will-boost-sheep-flock-wa/8026018?WT.mc\\_id=newsmail](http://www.abc.net.au/news/2016-11-15/wild-dog-funding-will-boost-sheep-flock-wa/8026018?WT.mc_id=newsmail).

program to support the development of, and/or improvements to, innovative and forward-thinking control tools and technologies from 2017 to 2019.<sup>30</sup>

Under work health and safety laws, Australia implemented the Global Harmonised System (GHS) on 1 January 2017, which makes mandatory that all chemicals be labelled and comply with GHS regulations.<sup>31</sup>

### The climate's impact on agricultural crops

Climate change and soil degradation are factors that agricultural producers will increasingly have to deal with if they are to maintain or improve levels of productivity.

Future weather and climate scenarios projected by CSIRO, which include more extreme daily rainfall in most regions, more hot days, and an increase in droughts in southern Australia, have the potential to affect all upstream and downstream sectors of the industry.

Increased warming has significant implications for the geographic suitability of specific crops, livestock and aquatic species, and, consequently, for food production productivity. For instance, it is known that wine grapes are very sensitive to subtle shifts in temperature, rain and sunshine, and research predicts that up to 70 per cent of Australia's wine growing regions will be less suitable for grape growing by 2050.<sup>32</sup> Farmers recognise that, for example, 50 years ago, frost would remain on the ground for six weeks in winter in the south west of New South Wales; this is no longer the case, and that affects biosecurity. There are also new weeds and the tick-born parasite theileria, which spreads and causes anaemia in cattle.<sup>33</sup>

The agriculture sector will need to adapt to these changing conditions. There are opportunities for adaptation to the impacts of changed weather patterns through improved farming technologies and practices. For example, among many other benefits to emerging challenges, ongoing discoveries in biotechnology can benefit the environment through alternative species and hybrids that are salt-tolerant and resistant to drought, disease and pest species.

The challenge for individual farmers is to capitalise on technology that supports decision making to develop large-scale farming systems for increased productivity, efficiency and optimisation of available resource utilisation.

### Water and land availability

Land and water constraints are characteristic in Australian agriculture. Access to freshwater varies considerably across Australia; drought is frequent, as is the occurrence of flooding. Managing Australia's water more efficiently and increasing water capture and storage will be critical in maintaining, and ideally increasing, agricultural and food production levels given current predictions for the declining availability of freshwater.

As the population continues to expand, land remains an issue for agricultural production. A recent report reveals that Melbourne can currently provide enough food to meet 41 per cent of the city's

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<sup>30</sup> Department of Agriculture and Water Resources, 2016, 'Control tools and technologies for established pest animals and weeds competitive grants programme' viewed April 2017, <http://www.agriculture.gov.au/pests-diseases-weeds/pest-animals-and-weeds/wp-comp-grants-programme>.

<sup>31</sup> Work Safe Australia, 2017, 'Hazardous chemicals', viewed April 2017, <http://www.safeworkaustralia.gov.au/sites/swa/whs-information/hazardous-chemicals/pages/hazardous-chemicals-other-substances>.

<sup>32</sup> Melbourne Sustainable Society Institute, 2015, *Appetite for Change: Global Warming Impacts on Food and Farming Regions in Australia*, viewed April 2017, [http://sustainable.unimelb.edu.au/sites/default/files/MSSI\\_AppetiteForChange\\_Report\\_2015.pdf](http://sustainable.unimelb.edu.au/sites/default/files/MSSI_AppetiteForChange_Report_2015.pdf).

<sup>33</sup> ABC News, 2016, 'National Farmers' Federation partner with Climate Action farmers', viewed April 2017, [http://www.abc.net.au/news/2016-11-23/nff-link-with-farmers-for-climate-action/8049846?WT.mc\\_id=newsmail](http://www.abc.net.au/news/2016-11-23/nff-link-with-farmers-for-climate-action/8049846?WT.mc_id=newsmail).

food needs, but that urban expansion is putting city-fringe farmland at risk. By 2050, Melbourne will only be able to produce 18 per cent of what its people eat.<sup>34</sup>

Embedding sustainable practices as a core business strategy applied across the industry sub-sectors and their supply chains will lead to sustainable management of land and water and an ability to address the challenge of water and land availability.

## Market and trade

Agriculture is an important part of the Australian economy and is a competitive net exporter sector, with around two-thirds of total production being exported.<sup>35</sup> Australia's major agriculture export markets include China, the US, Japan, Europe, Indonesia, the Republic of Korea, New Zealand and Malaysia.<sup>36</sup> Opportunities to increase market access can extend beyond free trade agreements, through the building of brand awareness of Australia as a globally recognised producer of safe, clean food and fibre products.

Key points on the industry's international trade include the following:<sup>37</sup>

- The value of farm production is forecast to increase by 6.1 per cent to around \$60.2 billion in 2016–17, following an estimated 4.2 per cent increase to \$56.7 billion in 2015–16.
- The value of livestock production is forecast to decrease by 2.2 per cent to \$28.5 billion in 2016–17, following an estimated 7.7 per cent increase in 2015–16.
- The value of crop production is forecast to increase by 14.7 per cent to \$31.7 billion in 2016–17, particularly due to increases in the value of horticulture and cotton production.
- Export earnings from farm commodities are forecast to increase by 6.7 per cent to \$47.5 billion in 2016–17, following an estimated 1.4 per cent increase in 2015–16 to \$44.6 billion.
- The agricultural commodities for which export earnings are forecast to rise in 2016–17 are wheat (up 25 per cent), wool (3 per cent), sugar (23 per cent), wine (3 per cent), barley (15 per cent), cotton (56 per cent), chickpeas (74 per cent), lamb (4 per cent), canola (33 per cent) and rock lobster (6 per cent).
- The forecast increases in export earnings are expected to be partly offset by forecast falls in beef and veal (down 17 per cent), live feeder/slaughter cattle (17 per cent) and mutton (12 per cent). Export earnings for dairy products are expected to remain largely unchanged.

A weaker Australian exchange rate against the US dollar increases Australian farm-sector incomes by generating increased earnings from agricultural exports. For instance, ABARES estimates that a depreciation of the Australian dollar by US1 cent in 2014–15 increased farm-sector incomes as a whole by around \$350 million in that year. This is because export contracts are mostly denominated in US dollars.<sup>38</sup>

Many agricultural companies are already engaged in exporting agricultural commodities from Australia, and a few are currently involved in other international relationships (such as importing

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<sup>34</sup> Carey, R., Larsen, K., Sheridan, J. & Candy, S., 2016, *Melbourne's Food Future: Planning a Resilient City Foodbowl*, viewed April 2017, <http://www.ecoinnovationlab.com/wp-content/attachments/Melbourne-Food-Future-planning-a-resilient-city-food-bowl-web.pdf>.

<sup>35</sup> Department of Agriculture and Water Resources, 2017, 'Trade and market access', viewed April 2017, <http://www.agriculture.gov.au/market-access-trade>.

<sup>36</sup> Department of Foreign Affairs and Trade, 2016, 'Agriculture', viewed April 2017, <http://dfat.gov.au/trade/topics/pages/agriculture.aspx>.

<sup>37</sup> ABARES, 2016, Agricultural Commodities Report: December quarter 2016.

<sup>38</sup> ABARES, 2016, Agricultural Commodities Report: March quarter 2016.

goods or services, or being involved in an international supply chain or in international research and development collaboration); but many others see opportunities and plan to expand overseas in the coming years. The most significant challenges for the agricultural sector in doing business overseas includes:<sup>39</sup>

- high domestic costs in Australia
- adverse exchange-rate movements
- increased international competition
- risk of financial or economic crisis in key overseas market
- 'red tape' in Australia.

Global farming trends aimed at using less arable land, less water and fewer resources while feeding (and providing products for the medicinal purposes of) a population of 12 billion people by 2100, include:<sup>40,41</sup>

- farming the new species of seaweed to process into traditional pasta or flakes to feed farmed abalone, and growing seaweed for cosmetics and nutrients
- growing fly larvae and bugs on food and agriculture waste for conversion to stockfeed and fertiliser to increase yields
- growing medicinal cannabis as it became legalised, but strictly controlled. The raw material is difficult and expensive to import, but the domestic market for medicinal cannabis is worth an estimated \$100 million per year.

## Research, innovation and applied technology

In order to secure future success of the agriculture sector, it is crucial that research and development are used to build knowledge and an understanding of challenges, so that research outcomes can be applied, with the aid of technology, as innovative solutions to challenges. It is necessary to bridge the gap between research results and application on-farm/on-site, so as to harness the value of the investment in research through extension services. Greater application of technology from research investment will see improved access to new technologies and application of best practice on a broader scale. Increased coordination and communication between new technology and policy developments will lead to improved productivity, quality and profitability of Australian agriculture.<sup>42</sup>

Less than 25 per cent of arable farmland in Australia is currently managed using precision agriculture technologies. As a result, a project has been recently co-funded by the Victoria State Government to empower grain growers to understand the benefits of data management, and to increase the uptake of precision agricultural technologies, including digital technologies and analytics that will increase productivity and profitability.<sup>43</sup>

Unmanned aerial vehicles (UAV), or drones, have many applications in agriculture, and the recent introduction of new legislation at federal and state/territory levels is helping producers to use technology to both spray and monitor crops on their properties. Using drones to spray crops is now possible in Queensland because of amendments to the *Agricultural Chemicals Distribution Control*

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<sup>39</sup> Australia's International Business Survey, 2016, *Industry Profile Report: Agriculture, Forestry and Fishing*, viewed April 2017, <https://www.austrade.gov.au/ArticleDocuments/1358/AIBS-2015-agricultural-forestry-fishing-industry-profile.pdf.aspx>.

<sup>40</sup> ABC News, 2016, 'Food and agriculture companies seeking to secure future food supply pitch innovative ideas', viewed April 2017, <http://www.abc.net.au/news/2016-11-07/food-bytes-innovation-to-unlock-greater-food-production/8001442>.

<sup>41</sup> ABC News, 2017, 'Medicinal cannabis market offers new opportunities for agriculture', viewed April 2017, <http://www.abc.net.au/news/2017-02-22/medicinal-cannabis-new-agricultural-opportunity/8287346>.

<sup>42</sup> National Farmers' Federation, 2013, *Blueprint for Australian Agriculture 2013–2020*, viewed April 2017, <http://www.nff.org.au/blueprint.html>.

<sup>43</sup> Premier of Victoria, 2017, 'Supporting grain growers – adapting to climate change', viewed April 2017, <http://www.premier.vic.gov.au/supporting-grain-growers-adapting-to-climate-change/>.

*Act 1966*.<sup>44, 45</sup> For use of smaller, lightweight UAVs, which are useful for monitoring crops for pest, disease and weed presence, the Federal Government passed legislation in September 2016 to allow a person to operate a very small remotely piloted aircraft (RPA) (that is, one weighing less than 2 kg) without certification, if it is being operated in standard RPA operating conditions.<sup>46</sup>

A broad range of growers and producers, from nut, citrus, berry, tropical fruit and vegetable growers to nursery product producers, are expected to benefit in the future from increased access to chemicals from a large research program supported by Agvet grant funding to provide specific data. Growers will be provided with more opportunities to better manage pests, weeds and disease, ensuring the sustainability and profitability of the industry – and quality products for consumers.<sup>47</sup>

Embracing innovation and adopting new technologies to respond to market changes, to open up new markets and to maintain a competitive edge in the face of economic and climatic challenges will be essential for the agriculture sector.

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<sup>44</sup> Queensland Government, 2016, 'Queensland farmers can now spray crops from drones', viewed April 2017, <http://statements.qld.gov.au/Statement/2016/11/10/queensland-farmers-can-now-spray-crops-from-drones>.

<sup>45</sup> Biosecurity Queensland, n.d., 'Drones spray and monitor crops in Queensland', viewed April 2017, <http://www.vision6.com.au/em/message/email/view?a=10433&id=1133087&k=WgSTvyPipOAMIGqtk2udFuhAAb1TO84AM6lspWx3xGM>.

<sup>46</sup> Civil Aviation Safety Authority, 2016, 'Flying drones/remotely piloted aircraft in Australia', viewed April 2017, <https://www.casa.gov.au/aircraft/landing-page/flying-drones-australia>.

<sup>47</sup> Horticulture Innovation Australia, 2017, 'More than \$1.2 million in chemical grants secured', viewed April 2017, <http://horticulture.com.au/growing-innovation/issue-21-agvet-grants/>.

## C. EMPLOYMENT

### Employment outlook

The Department of Employment projects, based on a macroeconomic model, that total employment in the agriculture, horticulture and conservation and land management industry sector will drop by 2.6 per cent over the five years to November 2020 (see Table 3).<sup>48</sup> At the sub-sector level, the Department forecasts that employment in mushroom and vegetable growing, fruit and tree nut growing, poultry farming and other livestock farming will grow at a faster rate than other agriculture sub-sectors with a positive employment growth. The forecast also indicates a significant decrease in employment in the sheep, beef cattle and grain farming sub-sectors, as well as in nursery and floriculture production.

**Table 3: Department of Employment Industry Projections – five years to November 2020<sup>49</sup>**

INDUSTRY SECTOR	EMPLOYMENT LEVEL	EMPLOYMENT PROJECTIONS		
	Nov 2015 ('000)	Nov 2020 ('000)	Growth ('000)	(%)
<b>Agriculture</b>	<b>288.6</b>	<b>279.6</b>	<b>-9.0</b>	<b>-3.1%</b>
Sheep, beef cattle and grain farming	85.8	71.8	-14.0	-16.3
Agriculture	58.9	56.8	-2.1	-3.5
Fruit and tree nut growing	31.4	33.2	1.8	5.8
Dairy cattle farming	27.0	27.7	0.8	2.8
Other livestock farming	15.2	17.4	2.2	14.1
Agriculture and fishing support services	18.3	18.8	0.5	2.8
Mushroom and vegetable growing	20.9	22.6	1.8	8.4
Nursery and floriculture production	11.4	11.1	-0.3	-2.7
Poultry farming	13.1	14.2	1.1	8.2
Other crop growing	3.6	3.0	-0.6	-16.3
Agriculture, forestry and fishing	2.5	2.4	-0.1	-3.1
Deer farming	0.5	0.5	0.0	-3.5
<b>Agricultural product wholesaling</b>	<b>16.9</b>	<b>17.4</b>	<b>0.5</b>	<b>2.9</b>
<b>Conservation (parks and gardens operations)</b>	<b>22.0</b>	<b>22.1</b>	<b>0.1</b>	<b>0.7</b>
<b>Total</b>	<b>327.5</b>	<b>319.1</b>	<b>-8.4</b>	<b>-2.6</b>

<sup>48</sup> The Department's projections are based on based on the forecasts and projections set out in the Mid-Year Economic and Fiscal Outlook (MYEFO).

<sup>49</sup> Department of Employment, 2016, 'Industry employment projections – five years to November 2020, viewed April 2017, <http://lmp.gov.au/default.aspx?LMIP/EmploymentProjections>.

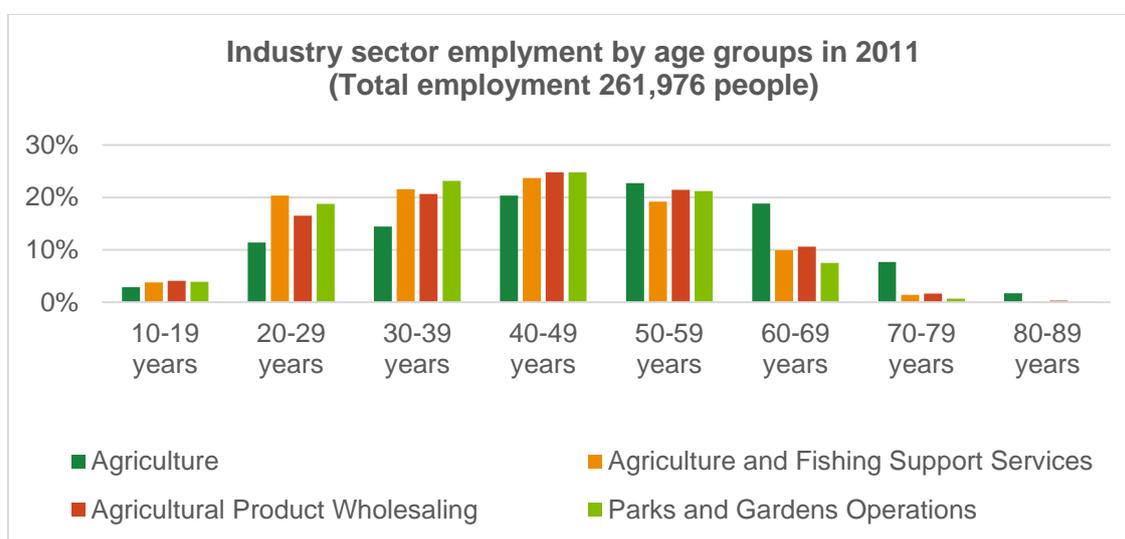
## Description of workforce supply

The agriculture, horticulture and conservation and land management industry sector is a significant employer of people in regional and remote areas. ABS statistics indicate that the industry workforce is ageing, presenting businesses with the challenge of an oncoming wave of retirement (see Figure 1).

Specifically, agriculture businesses employ a significant number of people aged between 60 and 80-plus years, and a smaller number of people in the 20–40 years age group.

Just over half (51 per cent) of the agriculture sector workforce was aged 50 years and over in 2011. Of this group, 19 per cent were expected to have retired from the workforce by 2015. An additional 23 per cent were likely to retire over the next five years. Coming workforce retirements are likely to bring significant job vacancies across the sector, requiring significant efforts from employers to replenish these skills. A similar rate of retirement is also expected in the wholesaling, support services and conservation sectors over the next few years.

**Figure 1: Industry sector employment by age groups in 2011**<sup>50</sup>



Current employing occupations in the agriculture, horticulture and conservation and land management industry sector include professions that are listed in Figures 2 to 5 below.

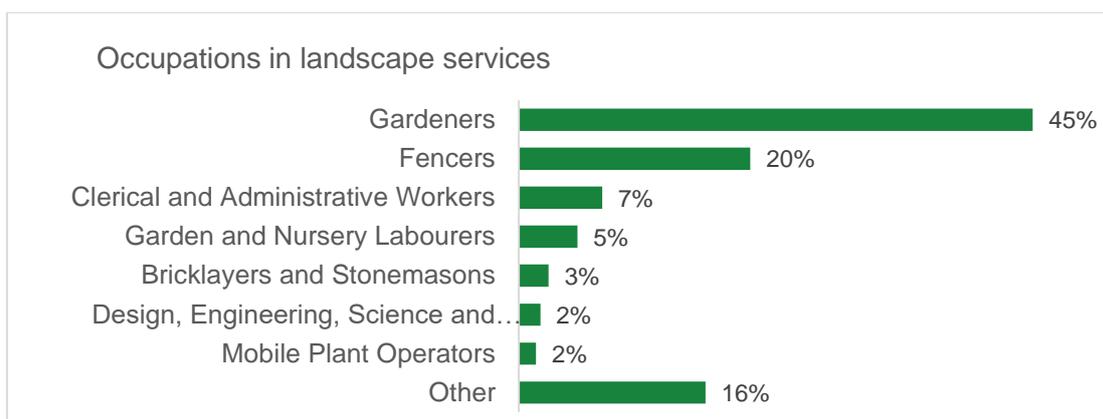
**Figure 2: Occupations and their relative number in the gardening services sector**<sup>51</sup>



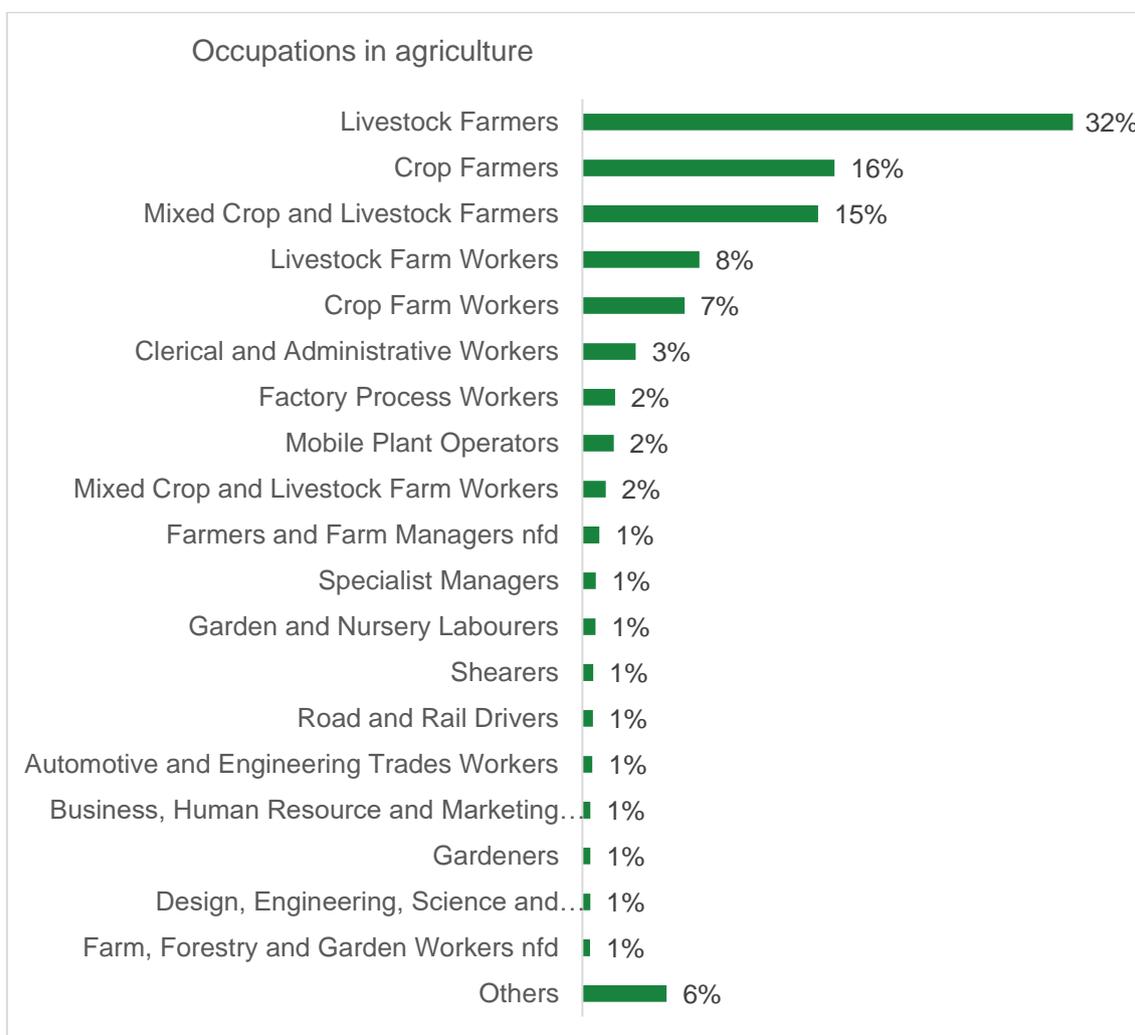
<sup>50</sup> Australian Bureau of Statistics, 2011, Census of Population and Housing.

<sup>51</sup> Ibid.

**Figure 3: Occupations and their relative number in the landscape services sector<sup>52</sup>**



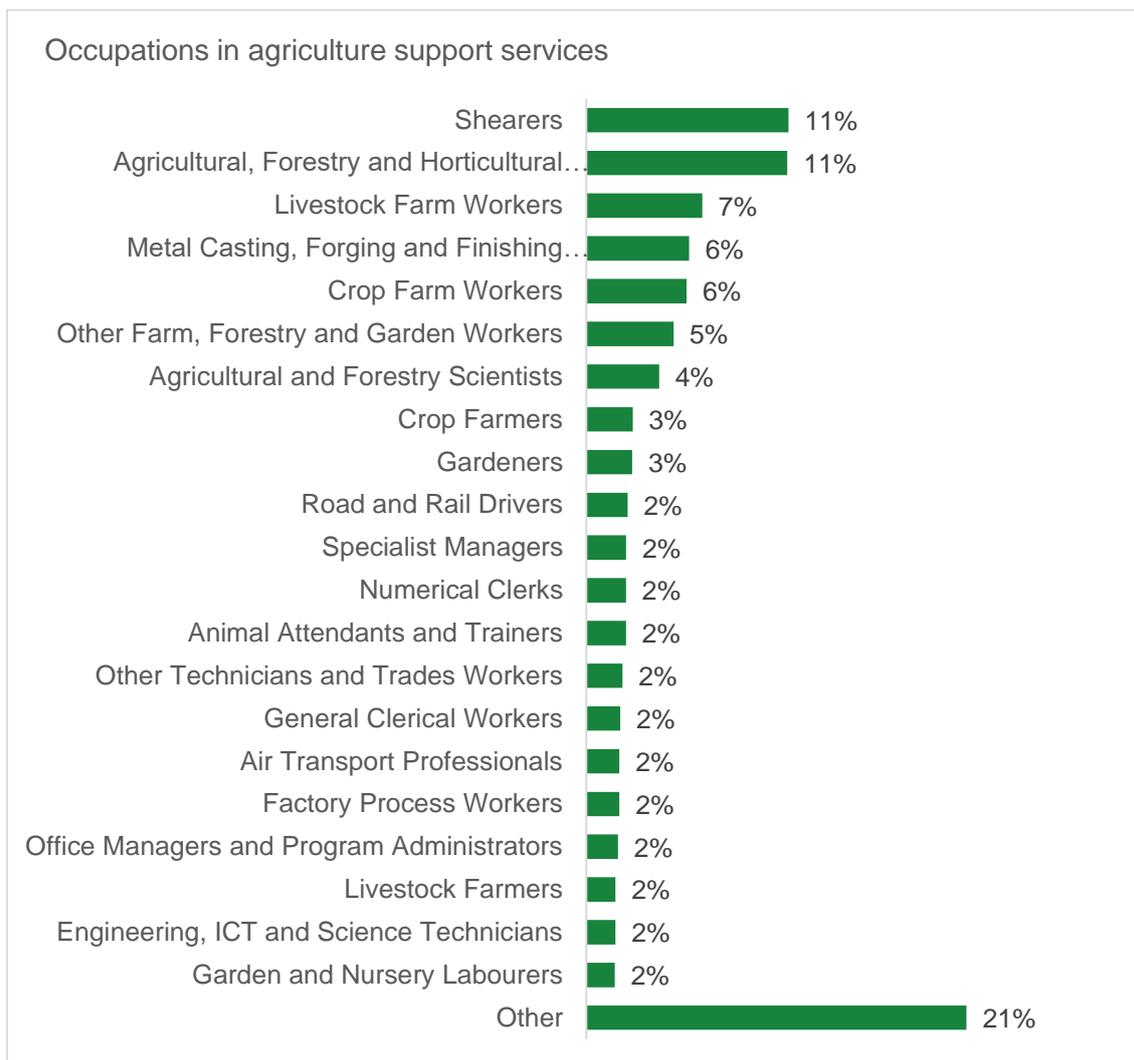
**Figure 4: Occupations and their relative number in the agriculture sector<sup>53</sup>**



<sup>52</sup> Ibid.

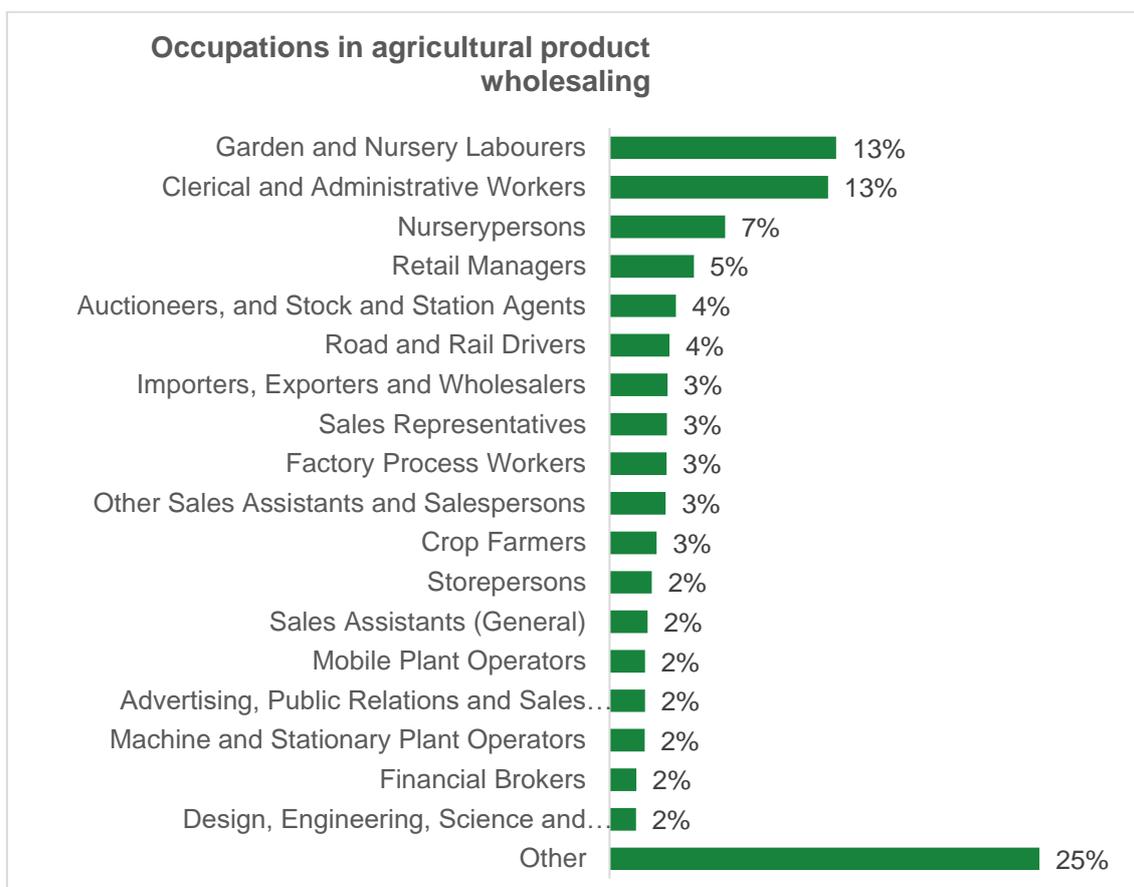
<sup>53</sup> Ibid.

**Figure 5: Occupations and their relative number in the agriculture support services sector<sup>54</sup>**

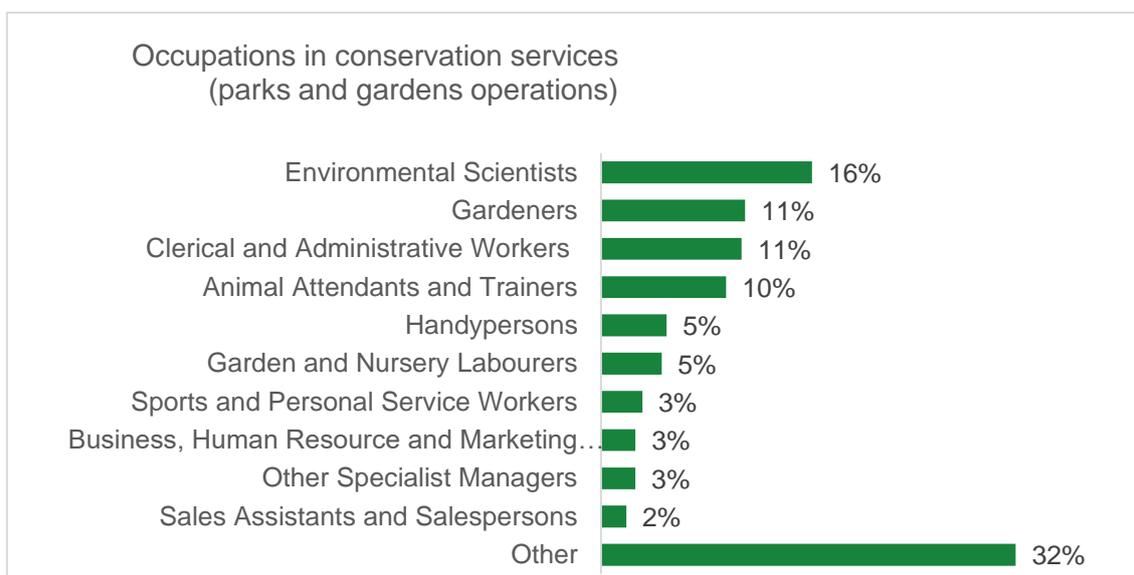


<sup>54</sup> Ibid.

**Figure 6: Occupations and their relative number in the agricultural product wholesaling services sector<sup>55</sup>**



**Figure 7: Occupations and their relative number in the conservation sector<sup>56</sup>**



As shown, a significant number of the workforce occupies roles that are specific to industry sub-sectors, including factory process workers such as livestock and crop farmers, farm workers,

<sup>55</sup> Ibid.

<sup>56</sup> Ibid.

shearers, agricultural and horticultural plant operators, nurserypersons, gardeners, and garden and nursery workers.

A significant workforce is also employed to undertake more general roles, such as clerical and administrative work. The sector also employs people for a range of other jobs, such as process workers, mobile plant operators, metal casting trade workers, and road and rail drivers. Professionals such as agricultural scientists, environmental scientists and veterinarians are significant occupations in the industry, as well.

For most skilled areas, learning occurs largely 'on the job' through workforce development activities provided by employers. This is the case because gaining industry-specific qualifications before employment commences remains a limited choice for young people and other potential new entrants. Thus, external supply of skilled workers is consistently low in the industry. In this context, the responsibility for engaging young people and existing workers in the sub-sectors, and in specialist training, resides solely with employers. Investment in new technology allows the sector to reduce its reliance on farm labour, yet the industry is growing, and investment in attracting and retaining the next generation of Australian farmers will remain critical.

In relation to low-skilled work, overseas workers will always have an important role to play in the sector. The seasonal nature of this work limits the capacity to offer permanent employment, which makes it less attractive to Australian job seekers. Other limitations for employers of local labour is that there is often a limited pool of local jobseekers in regional areas, along with insufficient interest to work in agriculture. The demand for labour at peak harvest times is more appealing to overseas workers than local workers. The supply of seasonal workers from overseas is influenced by migration policies in Australia, by ongoing pressure on governments and through the supply chain making it harder for farmers to access overseas workers.<sup>57</sup>

Skilled migrants from Asia and Africa are also a source of labour for the Australian farms. Many of these people become specialist contractors in tasks that were once carried out by an enterprise's traditional workforce. Many of them possess a rural background, and often require only contextual skills related to, and knowledge of, Australia's climate, soils, vegetation and animal welfare standards. The Pacific Islander Seasonal Worker Programme<sup>58</sup> offers employers a reliable returning workforce where there is not enough local labour to meet demand.

Meeting the skill needs of these various groups that supply workforce to the Australian farms becomes a shared responsibility of the tertiary sector and local industry bodies and regions to develop targeted responses that meet the skill needs of casual, contract and seasonal workers.<sup>59</sup>

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<sup>57</sup> National Farmers' Federation, 2015, Annual Review 2014–15, viewed April 2017, <http://www.nff.org.au/get/5154.pdf>.

<sup>58</sup> Australian Government Department of Employment, 2017, 'Seasonal Worker Programme', viewed April 2017, <https://www.employment.gov.au/seasonal-worker-programme>.

<sup>59</sup> AgriFood Skills Australia, 2015, *Environmental Scan 2015 of the Agricultural Industry*, viewed April 2017, [https://submissions.education.gov.au/forms/archive/2015\\_16\\_sol/documents/Attachments/AgriFoodSkills.pdf](https://submissions.education.gov.au/forms/archive/2015_16_sol/documents/Attachments/AgriFoodSkills.pdf).

## D. SKILLS OUTLOOK

Anticipating future skills needs in the agriculture, horticulture and conservation and land management sector is crucial to preparing to meet the new demands of biosecurity, business requirements and food markets in Australia. Leading indicators of the current and future skills needs in the sector include:

trends and/or estimates of workforce supply, skill shortages, employment growth or growing occupations

future changes in workplace and job design that are driven by innovation at the business and/or industry level as a result of economic, technological, social and environmental factors

the introduction of new policies and legislations.

This section identifies the priority skills needs in agriculture, horticulture and conservation and land management over the next four years (2017–2020) through an analysis of new and estimated future demands placed upon the industry. The section focuses on the skill needs that can benefit from improvement or the development of national skill standards, as opposed to market-adjustment mechanisms designed to balance the supply and demand of a skilled workforce.

The industry expects that the priority skill projects identified in this section will be undertaken over 2017 and 2018, so that the skills can be developed and available before 2020. Refer to Attachment A – IRC Training Product Review Plan 2017–2020 for the proposed schedule of priority skill projects and units to be checked for currency, and possibly reviewed, as part of the four-year cycle.

There are no current projects in the AHC – Agriculture, Horticulture and Conservation and Land Management training package.

### Industry priority skills

The 2017–2020 outlook for skills needs and priorities in the agriculture, horticulture and conservation and land management sector is shaped by a range of development trends and factors, as outlined below.

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<b>Priority skill 1</b>	<b>Skill description</b>
Improve skills for the safe operation of agricultural machinery and new technology	<p>New skills for the use of new technology and safety measures in all farm mobile machinery operations within the agriculture sector, including riding quad bikes, tractors, seeders, two-wheel motorbikes and other specialised equipment.</p> <p>Particularly, knowledge about:</p> <ul style="list-style-type: none"><li>• the serious risks of quad bikes, and particularly the risk of rollover when driving in steep and rocky terrain</li><li>• the use of personal protective equipment and engineering controls that 'design out' the hazard</li><li>• the appropriate tyre pressure of quad bikes and similar vehicles</li><li>• improved skills for safe operation of a small loaders</li></ul> <p><b>Relevant occupations</b></p> <p>Farm managers, farm workers, machinery operators, local government/council workers, parks and gardens workers, sports turf industry, arboriculturists and operators</p>

### Drivers

A total of 47 on-farm deaths and 61 non-fatal on-farm injury events were reported during January–September 2016. Quad bike-related injury accounted for over 50 per cent of all injury incidents, and for deaths. There were 17 additional quad bike-related injuries that occurred off-farm.<sup>60</sup> This has led to concern over the safety of quad bikes.<sup>61,62</sup>

A coronial inquest was held, and called for the development of an improved and standardised nationally accredited training package for the operation of quad bikes, side-by-side and related vehicles, and for the introduction of mandatory training, licensing or certification.<sup>63</sup>

Fatalities and serious injuries occur each year in the amenity tree industry, many of them caused by chainsaws, falls from height or improperly maintained equipment.

There is a social responsibility to continuously improve safety culture and contribute to reducing work-related injuries and fatalities in the sector's workplaces, and legislative requirements relate to this.

### Training package solutions<sup>64</sup>

- Review and improvement of 36 units across Machinery and Operation sectors and one qualification
- Development of up to five new units and skill sets as identified during review

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### Priority skill 2

Skills in pest management, including wild dogs

### Skill description

Knowledge of, and ability to apply, specific methods for trapping and destruction of predator pests, which differs from rodent control

Ability to manage animal activist groups/public perception of pest control through driving educated communication about the humane destruction of predator pests and the potential impact on domestic pets and wildlife

Ability to interpret and apply state/territory regulations regarding chemical use, storage and transport

### Relevant occupations

Wild dog control professionals, council workers, pest controllers, rangers, farm workers and managers, chemical-spraying contractors

### Drivers

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<sup>60</sup> The University of Sydney, 2016, 'Australian farm deaths & injuries media monitors snapshot January 1–September 30, 2016', viewed April 2017, [http://sydney.edu.au/medicine/aghealth/uploaded/Research%20Reports/Farm\\_Related\\_Deaths\\_and\\_Injuries\\_Media\\_Monitors\\_Sept16.pdf](http://sydney.edu.au/medicine/aghealth/uploaded/Research%20Reports/Farm_Related_Deaths_and_Injuries_Media_Monitors_Sept16.pdf).

<sup>61</sup> AustralianFarmers, 2016, 'Fighting for safer quad bike design', viewed April 2017, <http://www.farmers.org.au/content/nff/en/community/blog/fighting-for-safer-quad-bike-051016.html>.

<sup>62</sup> ABC News, 2016, 'National death toll puts quad bike safety in spotlight', viewed April 2017, [http://www.abc.net.au/news/2016-08-02/side-by-side-vehicle-alternatives-to-quad-bikes/7680858?WT.mc\\_id=newsmail](http://www.abc.net.au/news/2016-08-02/side-by-side-vehicle-alternatives-to-quad-bikes/7680858?WT.mc_id=newsmail).

<sup>63</sup> State Coroner's Court of New South Wales, 2015, Inquest, viewed April 2017, <http://www.coroners.justice.nsw.gov.au/Documents/Quad%20bike%20findings%20v2.pdf>.

<sup>64</sup> Refer to Appendix A for a full list of relevant qualifications and units of competencies.

Pest animals and weeds cost farmers billions of dollars a year in livestock losses, disease transmission and controls.<sup>65</sup>

The Australian Government and state/territory governments invest significantly in programs to support farmers and the community to tackle established pest animals.<sup>66,67</sup>

The National Wild Dog Action Plan (NWDAP) Working Group for Training and Education (WG T&E) reviewed the new Certificate III in Pest Management (2016 version) and determined it does not meet industry needs.<sup>68</sup> In addition, the Group recommended that pest animal controllers (PAC), such as wild dog control professionals, employed by agencies and land managers should have nationally endorsed qualifications. The Group identified that the minimum training required for PAC operators is a full certificate qualification.

#### **Training package solutions**

- Review and improvement of 28 units, one qualification and one skill set
- Development of new units and skill sets as identified during review

#### **Benefits from training package changes**

- Better occupational outcomes for industry
- PAC graduates receive relevant skills training
- Shortages of nationally accredited PAC professionals reported by stakeholders to the National Wild Dog Action Plan Committee will be addressed

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#### **Priority skill 3**

Current skills in chemical application and management

#### **Skill description**

Implementation of spray programs, applications of sprays, reading Global Harmonised System (GHS) labels and using safety data sheets (SDS), calibration of spray equipment

#### **Relevant occupations**

Individuals responsible for applying agricultural chemicals, supervisors and managers

#### **Drivers**

Australia fully implemented the Global Harmonised System (GHS) under work health and safety laws on 1 January 2017, making mandatory that all chemicals be labelled and comply with GHS regulations.

The National Agvet Chemical Task Force working group (Minimum Training and Licensing Working Group) was tasked with harmonising the approach to

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<sup>65</sup> Department of Agriculture and Water Resources, 2016, 'Funding innovation to help farmers win the war on pests', viewed April 2017, [http://www.agriculture.gov.au/biosecurity/australia/reports-pubs/biosecurity-matters/2016-06#4\\_](http://www.agriculture.gov.au/biosecurity/australia/reports-pubs/biosecurity-matters/2016-06#4_)

<sup>66</sup> Ibid.

<sup>67</sup> ABC News, 2016, 'Wild dog fencing key to bringing more sheep back to Western Australia, industry says', viewed [http://www.abc.net.au/news/2016-11-15/wild-dog-funding-will-boost-sheep-flock-wa/8026018?WT.mc\\_id=newsmail\\_](http://www.abc.net.au/news/2016-11-15/wild-dog-funding-will-boost-sheep-flock-wa/8026018?WT.mc_id=newsmail_)

<sup>68</sup> The National Wild Dog Action Plan, 2017, 'Communiqué 23', viewed April 2017, <http://www.pestsmart.org.au/nwdap-communique-23/>.

chemical training requirements, including a review of state-/territory-based regulatory frameworks and future developments in managing spray drift risks. This new approach will need to be reflected in chemical training.<sup>69, 70</sup>

#### **Training package solutions**

- Review of 12 units and two skill sets
- Development of new units and skill sets as identified during review

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#### **Priority skill 4**

New skills in arboriculture and review qualifications

#### **Skill description**

Knowledge of working with trees in a range of contexts, felling trees close to buildings and safely operating arboriculture machinery, such as chainsaws, from elevated work platforms (EWPs).

#### **Relevant occupations**

Climbing arborist, EWP arborist, ground-based arborist

#### **Drivers**

A number of issues regarding arboriculture have been raised by stakeholders, including:

- Certificate III qualifications not covering skills to operate in an urban environment; e.g. bringing down trees close to buildings
- the electrical industry unit (JETTDREL14A – Working safely near live electrical apparatus as a non-electrical worker) in the Certificate III, a core unit, prohibits school-based traineeships
- assessment guidelines that refer to specific association resources and copywriting issues
- RTOs not delivering qualifications due to costs associated with the new specifications and requirements listed in the training package
- the impact of prerequisites in a number of qualifications
- fatalities and serious injuries occurring each year in the amenity tree industry, many caused by chainsaws, falls from height and improperly maintained equipment.

#### **Training package solutions**

- Review and improvement of 41 units and five qualifications
- Development of up to five new units and skill sets as identified during review

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#### **Priority skill 5**

#### **Skill description**

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<sup>69</sup> Department of Agriculture and Water Resources, 2016, 'Streamlining the regulation of agvet chemicals', viewed April 2017, <http://www.agriculture.gov.au/ag-farm-food/ag-vet-chemicals/better-regulation-of-ag-vet-chemicals/streamlining>.

<sup>70</sup> Department of Agriculture and Water Resources, 2015, 'A single national framework for the regulation of agricultural chemicals and veterinary medicines – regulatory model', viewed April 2017, <http://www.agriculture.gov.au/ag-farm-food/ag-vet-chemicals/domestic-policy/history-of-coag-reforms/regulatory-model#executive-summary>.

Skills in  
production  
nurseries

Knowledge of, and ability to apply, botanical principles, current pruning techniques and current grafting techniques

Ability to apply a holistic approach to pest management, integrating pest/disease identification, balancing chemical use based on organic systems rather than chemical agents, and introducing beneficial insects for a more environmentally sustainable outcome and benefit to the overall ecosystem

Knowledge of physical and chemical properties of soils, including current principles of healthy soil composition and degradation; broader knowledge of container growing; an ability to carry out tests to determine soil characteristics and decide soil treatment techniques to improve ability to grow a range of plants

Ability to evaluate and use the newest irrigation systems to achieve water-use efficiency in nurseries

### **Relevant occupations**

Production nursery assistant, production nursery tradesperson

### **Drivers**

Drivers include overreliance on chemicals to manage plant pests and diseases, development of new variants of agricultural chemicals based on biological agents, increasing resistance by pests, and conservation of the beneficial insects that actually control the pest. For instance, half of beekeeping businesses indicated that the use of agricultural chemicals negatively affected floral resources available, and thus had an impact on their honey production.<sup>71</sup>

Generic units of competency across groups of horticultural enterprises do not provide nursery students with the necessary skill sets. Growing in the ground is significantly different to containerised production, and soil composition varies dramatically.

Current irrigation units do not adequately cover the different types of irrigation systems used in production nurseries and the sector's water-efficiency requirements.

Possible implications on the delivery of the qualifications due to the *Biosecurity Act 2015* (NSW), which stipulates a general biosecurity duty that is imposed on everyone in the supply chain.

### **Training package solutions**

- Review and improvement of 34 units and two qualifications across production nursery
- Development of new units and skill sets as identified during review

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## **Priority skill 6**

## **Skill description**

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<sup>71</sup> ABARES, 2016, 'Australian honey bee industry: 2014–15 survey results', viewed April 2017, [http://www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb\\_auhbi9aas\\_20161208.xml](http://www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrdl/DAFFService/display.php?fid=pb_auhbi9aas_20161208.xml).

Skills in data capture and analysis	<p>Knowledge of, and ability to use, specialised geospatial software and technologies, including remote sensors, drones, new-generation satellite imagery technologies, and wearable and mobile technologies and apps</p> <p>Knowledge of data capture from a range of devices (eg, drones, digital cameras, infrared cameras, mobile apps, soil moisture sensors, climate data loggers, etc.)</p> <p>Ability to apply a range of analytical methods to geospatial and other technology-platform data that directly support assessment of crop/livestock health, planning, diagnosis and decision making.</p> <p><b>Relevant occupations</b></p> <p>Animal attendant/stockperson, farm or station hand, farm or station worker, farm or station labourer, livestock transport driver, farm team leader, farm supervisor, farm production manager, production unit manager, agronomist, station/property manager</p> <p><b>Drivers</b></p> <p>Growing investment in integrated world-leading technology (such as robotics and digital and wireless technology to monitor farm operations and detect issues with crop or livestock health), quality standards in operations and industry databases (including commodity-specific production platforms and other technology platforms) are expected to influence the roles of farmers.</p> <p>Continuous development of technology, with new discoveries providing the potential to support farmers with emerging challenges, including those arising from climate change, pressure on global food supplies and fresh water, and the management of pests and diseases, will add to the vocational outcomes of agricultural work sector.</p> <p><b>Training package solutions</b></p> <ul style="list-style-type: none"> <li>• Review of four qualifications and seven units</li> <li>• Development of up to ten new units and skill sets as identified during review</li> </ul>
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<b>Priority skill 6</b>	<p><b>Skill description</b></p> <p>Advanced skills in rural management and agribusiness</p> <p>Skills in strategic planning, risk management, mergers and acquisitions, online marketing business development and financial planning to respond to the dynamic and changing operating environment, with increased competition and opportunities to reach global markets</p> <p>New skills in agricultural innovation strategies, implementation of new products and innovation leadership to lead innovative thinking and practice</p> <p><b>Relevant occupations</b></p> <p>Rural and regional agribusiness manager (including lending managers, insurance brokers, machinery dealers, chemical resellers, stock agents, grain marketers and real-estate agents), agriculture enterprise business manager, production horticulture enterprise business manager, agribusiness administrator</p> <p><b>Drivers</b></p>
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Increasing market demands for innovation in product development to ensure viability of enterprises and to take opportunities in the new free trade agreement with China

#### **Training package solutions**

- Review of five1 units and three qualifications
- Development of new units and skill sets as identified during review

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#### **Priority skill 7**

Skills in irrigation design and management

#### **Skill description**

Ability to apply various types of irrigation systems, such as pressurised irrigation and gravity-fed irrigation, and to use existing and new technologies (e.g. mobile apps, capacitance probes, tensiometers, Neutron Probe) in irrigation monitoring

#### **Relevant occupations**

Irrigation installation site worker and manager, worker and manager of irrigation systems, irrigation business manager, irrigation service worker

#### **Drivers**

Ongoing implementation of new processes and technologies in irrigation has facilitated the need for flexibility in irrigation specialities. An example of new technology is mobile apps designed to help guide irrigation decisions.<sup>72</sup>

Industry (Rural and Related Industry Reference Committee) feedback that existing units need to be reviewed and updated to ensure that different types of irrigation (broadacre, gravity fed, pressurised, domestic/urban irrigation) are covered in the range of units and are able to be delivered separately based on specific job roles

#### **Training package solutions**

- Review of 48 units and four qualifications
- Development of new units and skill sets as identified during review

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#### **Priority skill 8**

Advanced skills in apiculture

#### **Skill description**

Knowledge of honey bees' contribution to food security and high-value crops, and ability to provide efficient, managed pollination of crops and plants

Knowledge of honey bee biosecurity threats and control measures, and practices to bring operations in line with biosecurity standards

Knowledge of, and ability to, apply marketing strategies (including the ability to capitalise on the reputation of Australia's high-quality honey internationally, and to promote the value of pollination services to farmers domestically) to address international and domestic opportunities for growth

Business management and communication skills to manage honey production and provide pollination services

#### **Relevant occupations**

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<sup>72</sup> Horticulture Innovation Australia, 2016, 'New app will tell growers when plants need watering', viewed April 2017, <http://horticulture.com.au/new-app-will-tell-growers-when-plants-need-watering/>.

Bee keeper, farm manager

### Drivers

A recent Senate Inquiry into the future of the beekeeping and pollination service industries in Australia, and suggestions for improving existing biosecurity measures through implementation of a national standard or code of practice for beekeeping to promote beekeeping best-management practices and optimal biosecurity. Gaps in the nationally recognised course for beekeepers were identified in relation to biosecurity, marketing, business management and communication.<sup>73</sup>

Growing importance of pollination services that honey bees perform, including the ability to increase productivity and crop yield. Paid pollination was conducted by around 44 per cent of beekeepers in 2014–15. The proportion of beekeepers and the value of payments received were higher in areas that produced large amounts of bee-pollination dependent crops, such as almonds and cherries.<sup>74</sup> A rapid expansion of horticultural industries that rely on bees, including almond and apple production, involving plans for large-scale planting of new trees and a rapid increase in the number of bee hives for pollination over the next years. The bee industry, which traditionally focused on bulk honey production, is now moving to paid pollination.<sup>75,76</sup>

### Training package solutions

- Review of 19 units and one qualification
- Development of new units and skill sets as identified during review

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Priority skill 9	Skill description
Skills in viticulture	Working knowledge of vineyard operations, leadership, farm management, irrigation and quality assurance systems
	<b>Relevant occupations</b>
	Vineyard manager
	<b>Drivers</b>
	Industry does not consider the Diploma is fit for purpose because:
	<ul style="list-style-type: none"><li>• The industry does not recognise the need for a Diploma of Viticulture.</li></ul>

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<sup>73</sup> Senate Standing Committee on Rural and Regional Affairs and Transport, 2014, 'Future of the beekeeping and pollination service industries in Australia', viewed April 2017, [http://www.aph.gov.au/Parliamentary\\_Business/Committees/Senate/Rural\\_and\\_Regional\\_Affairs\\_and\\_Transport/Beekeeping/Report/~media/Committees/Senate/committee/rrat\\_ctte/beekeeping/report/report.pdf](http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Rural_and_Regional_Affairs_and_Transport/Beekeeping/Report/~media/Committees/Senate/committee/rrat_ctte/beekeeping/report/report.pdf).

<sup>74</sup> ABARES, 2016, 'Australian honey bee industry: 2014–15 survey results', viewed April 2017, [http://www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrd/DAFFService/display.php?fid=pb\\_auhbi9aas\\_20161208.xml](http://www.agriculture.gov.au/abares/publications/display?url=http://143.188.17.20/anrd/DAFFService/display.php?fid=pb_auhbi9aas_20161208.xml).

<sup>75</sup> ABC News, 2016, 'Busy bees: 70,000 new hives needed for massive almond expansion', viewed April 2017, [http://www.abc.net.au/news/2016-08-19/bees-and-almonds/7765408?WT.mc\\_id=newsmail](http://www.abc.net.au/news/2016-08-19/bees-and-almonds/7765408?WT.mc_id=newsmail).

<sup>76</sup> ABC News, 2016, 'Honey production to fall as beekeepers embrace pollination', viewed April 2017, [http://www.abc.net.au/news/2016-10-24/horticulture-success-creates-pollination-boom/7960188?WT.mc\\_id=newsmail](http://www.abc.net.au/news/2016-10-24/horticulture-success-creates-pollination-boom/7960188?WT.mc_id=newsmail).

- The lack of entry requirements creates a misleading expectation, if a person who has done the Diploma cannot gain employment in the wine industry because the Diploma does not provide 'the right focus'.
- Employers at this level look for skills in leadership and management, not specialist viticulture skills.

**Training package solutions**

- Review of 11 units and one qualification
- Development of new units and skill sets as identified during review

**Priority skill 10**

Skills in landscape design and construction

**Skill description**

Landscape design, with a focus on construction units

**Relevant occupations**

Landscape design supervisor, landscape design team leader

**Drivers**

The LNA Master Landscapers Association has raised concerns that AHC42016 – Certificate IV in Landscape currently has no entry requirements. The LNA Master Landscapers Association had made a submission to the previous Skills Council to review qualifications and entry requirements in 2015. Their concerns have not been addressed in the new release of AHC42016 in 2016. The intention was that AHC30916 – Certificate III in Landscape Construction would be part of the pathway from a Certificate III to a diploma-level qualification.

There are no clear pathways for landscape design- or landscape construction-focused job roles. Feedback received has indicated that there is a need to have qualifications that have clear pathways to job outcomes in one or the other field. Industry would benefit from clear delineation of the skills involved when seeking applicants for specialised positions.

**Training package solutions**

- Review of three qualifications and 32 units
- Development of new units and skill sets as identified during review

**Priority skill 11**

Renewing skills in Carbon Farming

**Skill description**

Working knowledge of carbon farming and legislation, and carbon project management

**Relevant occupations**

Agribusiness worker, farmer, farm manager, technical advisor

**Drivers**

Support from the National Farmers' Federation for farmers to be able to access the Emissions Reduction Fund,<sup>77</sup> and a growing interest from farmers in diversifying farming activities and income, have increased awareness of carbon farming. Currently, there is no nationally accredited training available to farmers or managers to fill this growing skills gap.

Previously accredited carbon farming units and skills sets have been superseded, with no replacements.

Requests to reinstate units and skill sets have been made by Carbon Farming Australia.

### **Training package solutions**

- Review of 11 units and eight skills sets
  - Development of new units and skill sets as identified during review
- 

## Additional skills development priorities for the industry

The following is an additional priority area for skills development in the agriculture, horticulture and land care management industry that does not necessarily involve improvement or development of national skill standards, but rather other mechanisms and processes supported by the Department of Education and Training and the industry.

### **Learning resources for arboriculture**

- Development of national industry learning guides
- Development of classroom learning guides for AQF levels 2 to 8

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<sup>77</sup> Australian Farmers, 2016, 'Time to unlock carbon markets for forestry', viewed April 2017, <http://www.farmers.org.au/content/nff/en/news-updates/nff-news/forestry-method-181016.html>.

## E. TRAINING PRODUCT REVIEW PLAN 2017–2020

The IRC Training Product Review Plan 2017–2020 for the agriculture, horticulture and conservation and land management industry sector is provided in Attachment A.

### Time-critical projects

The criteria for outlining time-critical projects within the AHC – Agriculture, Horticulture and Conservation and Land Management training package include work health and safety issues, regulatory needs, biosecurity issues (disease outbreak), qualifications under the VET Student Loans courses list, and qualifications with low enrolments, which can benefit from improvement or development of national skill standards.

Proposed project	Time-critical issues
Safe operation of agricultural machinery and new technology	<p><i>Workplace safety</i></p> <p>Quad bike-related injuries accounting for over half of all non-fatal on-farm injury incidents, many deaths, and significant off-farm injuries</p> <p><i>Regulatory needs</i></p> <p>Coronial request calling for improved national skill standards, mandatory training, licensing or certification</p>
Chemical application and management	<p><i>Regulatory needs</i></p> <p>A full implementation of the Global Harmonised System (GHS) from January 2017, making mandatory that all chemicals be labelled and comply with GHS regulations, and introduction of new chemical training requirements</p>
Pest management, including wild dogs	<p><i>Biosecurity issues</i></p> <p>Pest animals and weeds costing farmers and governments billions of dollars in livestock losses, disease transmission, controls and investment in pest-mitigation programs</p>
Advanced skills in apiculture	<p><i>Biosecurity issues</i></p> <p>Senate Inquiry suggesting improvements in existing biosecurity measures in the beekeeping industry through implementation of a national standard or code of practice to promote best-management practices and optimal biosecurity</p>

Proposed projects that will involve review or development of new units for qualifications under VET Student Loans include the following:

Proposed project	Improving VET Student Loans qualifications
Skills in data capture and analysis	AHC50116 Diploma of Agriculture

Proposed project	Improving VET Student Loans qualifications
Advanced skills in rural management and agribusiness	AHC51416 Diploma of Agribusiness Management AHC60316 Advanced Diploma of Agribusiness Management
Skills in irrigation design and management	AHC51816 Diploma of Organic Farming AHC51616 Diploma of Irrigation Management AHC51516 Diploma of Viticulture AHC50716 Diploma of Parks and Gardens Management AHC50416 Diploma of Horticulture AHC50316 Diploma of Production Horticulture
Skills in viticulture	AHC51516 Diploma of Viticulture
Skills in landscape design and construction	AHC50616 Diploma of Landscape Design

### Interdependencies

Proposed projects with an opportunity to involve more than one training package or IRC include the following:

Proposed project	Interdependencies
Skills in data capture and analysis	There is a shared interest among the agriculture, forestry and animal care and management industries in specialised skills for using geospatial software and technologies to capture data that support both biosecurity programs and strategic decisions in these industries. Hence, there is an opportunity for a joint project between three training packages: ACM, AHC and FGM.

### Current projects

There are no current projects within this training package.

## F. IRC SIGNOFF

**This IRC Skills Outlook and Proposed Schedule of Work was agreed** as a result of a properly constituted Rural and Related Industry Reference Committee decision.

**Signed** for and on behalf of the **Rural and Related Industry Reference Committee** by its appointed Chair:



(Signature of Chair)



(Print name of Chair)

27/04/2017

(Date)

## ATTACHMENT A

### IRC Training Product Review Plan 2017–2020 for the agriculture, horticulture and conservation and land management industry

**Relevant training package:** AHC Agriculture, Horticulture and Conservation and Land Management

**Contact details:** Skills Impact Ltd, 559A Queensberry St, North Melbourne, VIC 3051

**Date submitted to Department of Education and Training:** 28 April 2017

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2017	Safe operation of agricultural machinery and new technology	AHC32616 Certificate III in Rural Machinery Operations	<p>AHCXXXXXX Safe operation of a small loader</p> <p>AHCXXXXXX Operate commercial lawnmowers</p> <p><b>Total new units</b> <b>2</b></p> <p>AHCMOM101 Assist with routine maintenance of machinery and equipment</p> <p>AHCMOM201 Operate two wheel motorbikes</p> <p>AHCMOM202 Operate tractors</p> <p>AHCMOM203 Operate basic machinery and equipment</p> <p>AHCMOM204 Undertake operational maintenance of machinery</p> <p>AHCMOM205 Operate vehicles</p> <p>AHCMOM206 Conduct grader operations</p> <p>AHCMOM207 Conduct frontend loader operations</p> <p>AHCMOM208 Conduct excavator operations</p>

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCMOM209 Conduct dozer operations AHCMOM210 Conduct scraper operations AHCMOM211 Operate side by side utility vehicles AHCMOM212 Operate quad bikes AHCMOM213 Operate and maintain chainsaws AHCMOM214 Operate cane haulage vehicle AHCMOM301 Coordinate machinery and equipment maintenance and repair AHCMOM302 Perform machinery maintenance AHCMOM304 Operate machinery and equipment AHCMOM305 Operate specialised machinery and equipment AHCMOM306 Ground spread fertiliser and soil ameliorant AHCMOM307 Operate a cane harvester AHCMOM308 Operate broadacre and row crop harvest machinery and equipment AHCMOM309 Operate broadacre sowing machinery and equipment AHCMOM310 Operate landforming machinery and equipment AHCMOM311 Operate precision control technology AHCMOM312 Operate row crop planting and seeding machinery and equipment AHCMOM313 Operate mobile irrigation machinery and equipment AHCMOM314 Transport machinery

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCMOM315 Operate chemical application machinery and equipment AHCMOM316 Refuel machinery or vehicle AHCMOM401 Conduct major repair and overhaul of machinery and equipment AHCMOM402 Supervise maintenance of property, machinery and equipment AHCMOM501 Manage machinery and equipment AHCMOM502 Implement a machinery management system AHCMOM601 Analyse machinery options AHCWRK304 Respond to rescue incidents <b>Total for review 36</b>
2017	Skills in pest management including wild dogs	AHC33616 Certificate III in Pest Management AHCSS00043 Vertebrate Pest Management Planning Skill Set AHCSSXXXX Wild Dog Controller <b>(new)</b>	AHCXXXXXX Trap and transport wild dogs AHCXXXXXX Implement wild dog management plan AHCXXXXXX Euthanase wild dogs AHCXXXXXX Prepare wild dog baits <b>Total new units 4</b> AHCBIO201 Inspect and clean machinery for plant, animal and soil material AHCBIO305 Apply biosecurity measures AHCEXP301 Handle and store explosives AHCFAU201 Recognise fauna AHCINF201 Carry out basic electric fencing operations

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCINF202 Install, maintain and repair farm fencing AHCNAR306 Conduct photography for fieldwork AHCNAR307 Read and interpret maps AHCCPM202 Collect, prepare and preserve plant specimens AHCCPM303 Identify plant specimens AHCCPMG201 Treat weeds AHCCPMG202 Treat plant pests, diseases and disorders AHCCPMG203 Work effectively in a pest management environment AHCCPMG301 Control weeds AHCCPMG302 Control plant pests, diseases and disorders AHCCPMG304 Use firearms to humanely destroy animals AHCCPMG305 Survey pests AHCCPMG306 Determine pest control techniques AHCCPMG307 Apply animal trapping techniques AHCCPMG308 Implement pest management strategies AHCCPMG309 Apply pest animal control techniques AHCCPMG310 Prepare, monitor and maintain biological agents AHCCPMG311 Use firearms for pest control activities from aircraft AHCWRK203 Operate in isolated and remote situations AHCWRK302 Monitor weather conditions AHCCPMG409 Implement a pest management plan

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCPMG412 Develop a pest management plan AHCPMG413 Define the pest problem <i>Total for review</i> <b>28</b>
2018	Current skills in chemical application and management	AHCSS00026 Advanced Chemical Spray Application Skill Set AHCSS00027 Agricultural Chemical Skill Set	AHCCHM101 Follow basic chemical safety rules AHCCHM201 Apply chemicals under supervision AHCCHM301 Use application equipment to apply fumigant in confined spaces AHCCHM302 Fumigate soil AHCCHM303 Prepare and apply chemicals AHCCHM304 Transport and store chemicals AHCCHM305 Conduct manual fumigation of vertebrate and invertebrate pests AHCCHM306 Prepare and apply chemicals for hand held application equipment AHCCHM401 Develop procedures to minimise risks in the use of chemicals AHCCHM402 Plan and implement a chemical use program AHCCHM403 Prepare safe operating procedures for calibration of equipment AHCCHM501 Develop and manage a chemical use strategy <i>Total for review</i> <b>12</b>

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2018	Arboriculture Qualifications	AHC30816 Certificate III in Arboriculture AHC41916 Certificate IV in Arboriculture AHC50516 Diploma of Arboriculture AHC60516 Advanced Diploma of Arboriculture AHC80116 Graduate Diploma of Arboriculture	AHCXXXXXX Felling trees close to buildings AHCXXXXXX Safe operation of chainsaws above ground from elevated platforms AHC XXXXXX Safe operation of chainsaws when climbing trees <b>Total new units</b> <b>3</b> AHCARB201 Apply a range of treatments to trees AHCARB206 Operate and maintain stump grinding machines AHCARB207 Perform ground based rigging AHCARB208 Recognise trees AHCARB209 Assist with aerial rescue from the ground AHCARB210 Work effectively in the arboriculture industry AHCARB301 Implement a tree maintenance program AHCARB302 Inspect trees for access and work AHCARB303 Perform pruning operations AHCARB305 Dismantle trees AHCARB306 Undertake aerial rescue AHCARB307 Use advanced climbing techniques AHCARB308 Install cable and bracing AHCARB309 Implement a tree protection program AHCARB310 Perform aerial rigging AHCARB311 Tie, dress, set and finish arborist knots

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			<p>AHCARB312 Use standard climbing techniques to access trees</p> <p>AHCARB313 Identify trees</p> <p>AHCARB401 Verify pruning specifications</p> <p>AHCARB402 Supervise and audit tree operations</p> <p>AHCARB403 Perform a groundbased tree defect evaluation</p> <p>AHCARB404 Conduct a safety audit</p> <p>AHCARB405 Perform geospatial data collection</p> <p>AHCARB504 Develop an arboricultural impact assessment report</p> <p>AHCARB505 Document and audit tree work</p> <p>AHCARB506 Prepare arborist reports</p> <p>AHCARB507 Generate tree plans using computeraided design software</p> <p>AHCARB601 Examine and assess trees</p> <p>AHCARB602 Diagnose tree diseases</p> <p>AHCARB603 Interpret diagnostic test results</p> <p>AHCARB604 Measure and improve the performance of urban forests</p> <p>AHCARB605 Provide consultation in a legal framework</p> <p>AHCARB606 Develop an operational tree management plan</p> <p>AHCARB607 Review and develop strategic tree policy</p> <p>AHCARB701 Analyse tree biomechanics</p> <p>AHCARB702 Analyse mycology cultures</p> <p>AHCARB703 Research urban forest performance</p>

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCARB704 Conduct an entomology research project AHCARB801 Contextualise diagnostic tests AHCARB802 Develop an urban forest management framework AHCARB803 Analyse edaphic interactions of trees and structures  <b>Total for review</b> <span style="float: right;"><b>41</b></span>
2018	Skills in production nurseries	AHC31116 Certificate III in Production Nursery AHC40616 Certificate IV in Production Nursery	AHCBER301 Work effectively in an emergency disease or plant pest response AHCBER303 Carry out emergency disease or plant pest control procedures at infected premises AHCBER304 Carry out movement and security procedures AHCBIO302 Identify and report unusual disease or plant pest signs AHCHYD301 Implement a maintenance program for hydroponic systems AHCHYD302 Install hydroponic systems AHCMER301 Process customer complaints AHCMER303 Sell products and services AHCNSY301 Maintain nursery plants AHCNSY302 Receive and dispatch nursery products AHCNSY303 Install and maintain plant displays AHCNSY304 Deliver and promote sales of plants AHCNSY305 Prepare specialised plants AHCNSY306 Implement a propagation plan

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCNSY307 Operate fertigation equipment AHCPCM301 Implement a plant nutrition program AHCSOL202 Assist with soil or growing media sampling and testing AHCSOL301 Prepare growing media AHCSOL401 Sample soils and interpret results AHCWAT301 Monitor and operate water treatment processes AHCWHS301 Contribute to work health and safety processes AHCWRK303 Respond to emergencies AHCWRK305 Coordinate work site activities AHCWRK309 Apply environmentally sustainable work practices AHCBER401 Plan and supervise control activities on infected premises AHCBER402 Carry out field surveillance for a specific emergency disease or plant pest AHCBIO403 Plan and implement a farm or enterprise biosecurity plan AHCNSY401 Plan a growingon program AHCNSY402 Plan a propagation program AHCPCM401 Recommend plants and cultural practices AHCPCM402 Develop a soil health and plant nutrition program AHCPCM501 Diagnose plant health problems AHCPTH502 Develop a horticultural production plan AHCPMG410 Implement the pest monitoring and evaluation plan

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			<b>Total for review</b> <b>34</b>
2018	Skills in data capture and analysis	AHC20116 Certificate II in Agriculture AHC30116 Certificate III in Agriculture AHC40116 Certificate IV in Agriculture AHC50116 Diploma of Agriculture	<p>There are no related units in the existing AHC. Therefore, no units will need to be reviewed. However, ten new units will need to be developed:</p> <p>AHCXXXXXX Operate digital applications in agriculture AHCXXXXXX Develop digital applications in agriculture AHCXXXXXX Operate data loggers in agriculture AHCXXXXXX Maintain and set up data loggers in agriculture AHCXXXXXX Detecting issues with crop health AHCXXXXXX Interpreting data in crop health AHCXXXXXX Detecting issues in livestock health AHCXXXXXX Interpreting data in livestock health AHCXXXXXX Develop agricultural databases AHCXXXXXX Using robotics in agriculture</p> <p><b>Total new units</b> <b>10</b></p> <p>AHCAGB506 Manage application technology AHCAGB507 Select and use agricultural technology AHCAGB508 Improve agricultural sustainability using renewable energy and recycle systems AHCAGB509 Select and implement a Geographic Information System (GIS) for sustainable agricultural systems AHCAGB510 Implement the introduction of biotechnology into the production system</p>

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCAGB511 Develop and manage a plan for sustainable production reflecting sustainable production principles AHCBUS301 Use hand held ebusiness tools <b>Total for review 7</b>
2018	Advanced skills in rural management and agribusiness	AHC41016 Certificate IV in Agribusiness AHC51416 Diploma of Agribusiness Management AHC60316 Advanced Diploma of Agribusiness Management	AHCAGB301 Keep production records for a primary production business AHCAGB401 Plan and implement property improvement AHCAGB402 Analyse and interpret production data AHCAGB403 Keep financial records for primary production business AHCBAC408 Manage agricultural crop production AHCBUS401 Administer finance, insurance and legal requirements AHCBUS402 Cost a project AHCBUS404 Operate within a budget framework AHCBUS405 Participate in an ebusiness supply chain AHCBUS509 Develop and implement business structures and relationships AHCLSK501 Manage livestock production AHCPMG411 Ensure compliance with pest legislation AHCSHG406 Prepare shearing team wages AHCWHS401 Maintain work health and safety processes AHCWRK401 Implement and monitor quality assurance procedures AHCWRK402 Provide information on issues and policies AHCWRK403 Supervise work routines and staff performance

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCAGB501 Develop climate risk management strategies AHCAGB502 Plan and manage infrastructure requirements AHCAGB503 Plan and monitor production processes AHCAGB504 Plan production for the whole business AHCAGB505 Develop a whole farm plan AHCBUS501 Manage staff AHCBUS502 Market products and services AHCBUS503 Negotiate and monitor contracts AHCBUS504 Prepare estimates, quotes and tenders AHCBUS506 Develop and review a business plan AHCBUS507 Monitor and review business performance AHCBUS508 Prepare and monitor budgets and financial reports AHCBUS510 Manage finance, insurance and legal requirements AHCNAR506 Develop and implement sustainable land use strategies AHCWHS501 Manage work health and safety processes AHCWRK511 Develop workplace policy and procedures for sustainability AHCAGB601 Develop export markets for produce AHCAGB602 Manage estate planning AHCAGB603 Manage the production system AHCAGB604 Analyse business performance AHCAGB605 Manage business capital

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCAGB606 Manage price risk through trading strategy AHCBUS601 Manage capital works AHCBUS602 Review land management plans and strategies AHCBUS603 Develop and review a strategic plan AHCBUS604 Design and manage the enterprise quality management system AHCBUS605 Manage human resources AHCBUS606 Develop a monitoring, evaluation and reporting program AHCBUS607 Implement a monitoring, evaluation and reporting program AHCBUS608 Manage risk AHCMER501 Develop a sales strategy for rural products AHCWRK601 Monitor projects in a program AHCWRK602 Lead and manage community or industry organisations AHCWRK603 Design and conduct a fieldbased research trial <b>Total for review</b>
2018	Skills in irrigation design and management	AHC21116 Certificate II in Irrigation AHC32416 Certificate III in Irrigation AHC41116 Certificate IV in Irrigation AHC51616 Diploma of Irrigation Management	AHCIRG101 Support irrigation work AHCIRG202A Assist with the operation of pressurised irrigation AHCIRG215 Assist with low volume irrigation operations AHCIRG216 Assist with surface irrigation operations AHCIRG217 Assist with pressurised irrigation operations AHCIRG218 Assist with pump and flow control device operations

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YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCIRG301A Implement a maintenance program for an irrigation system AHCIRG302A Install irrigation systems AHCIRG303 Measure irrigation delivery system performance AHCIRG306 Troubleshoot irrigation systems AHCIRG308 Monitor soils under irrigation AHCIRG309 Install irrigation pumps AHCIRG310 Operate and maintain irrigation pumping systems AHCIRG315 Interpret irrigation plans and drawings AHCIRG325 Operate irrigation technology AHCIRG326 Operate irrigation injection equipment AHCIRG327 Implement an irrigation schedule AHCIRG331 Install pressurised irrigation systems AHCIRG332 Operate pressurised irrigation systems AHCIRG333 Maintain pressurised irrigation systems AHCIRG334 Operate and maintain gravity fed irrigation systems AHCIRG335 Operate and maintain moving irrigation system AHCIRG402 Determine hydraulic parameters for an irrigation system AHCIRG404 Implement an irrigationrelated environmental protection program AHCIRG406A Plan onsite irrigation system installation and construction work

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			<p>AHCIRG407A Supervise onsite irrigation installation and construction work</p> <p>AHCIRG408 Schedule irrigations</p> <p>AHCIRG410 Select and manage pumping systems for irrigation</p> <p>AHCIRG415 Interpret and apply irrigation designs</p> <p>AHCIRG422 Manage a moving sprinkler irrigation system</p> <p>AHCIRG426 Evaluate water supply for irrigation</p> <p>AHCIRG431 Supervise irrigation system installation</p> <p>AHCIRG432 Supervise irrigation system maintenance</p> <p>AHCIRG433 Manage irrigation systems</p> <p>AHCIRG434 Manage surface irrigation systems</p> <p>AHCIRG501 Audit irrigation systems</p> <p>AHCIRG502 Design irrigation system maintenance and monitoring programs</p> <p>AHCIRG503 Design irrigation, drainage and water treatment systems</p> <p>AHCIRG504 Develop an irrigation and drainage management plan</p> <p>AHCIRG505 Establish and maintain an irrigationrelated environmental protection program</p> <p>AHCDRG401 Coordinate and supervise installation of an irrigation drainage system</p> <p>AHCDRG201 Maintain drainage systems</p> <p>AHCDRG301 Install drainage systems</p>

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCDRG302 Measure drainage system performance AHCDRG303 Troubleshoot drainage systems AHCDRG304 Maintain and repair irrigation drainage systems AHCDRG402 Monitor and control irrigation drainage systems AHCDRG501 Design drainage systems <b>Total for review</b>
			<b>48</b>
2018	Advanced skills in apiculture	AHC32016 Certificate III in Beekeeping	AHCBEK201 Support beekeeping work AHCBEK202 Use a bee smoker AHCBEK203 Open and reassemble a beehive AHCBEK204 Construct and repair beehives AHCBEK301 Manage honey bee swarms AHCBEK302 Manipulate honey bee brood AHCBEK303 Requeen a honey bee colony AHCBEK304 Remove a honey crop from a hive AHCBEK305 Extract honey AHCBEK306 Manage pests and disease within a honey bee colony AHCBEK401 Collect and store propolis AHCBEK402 Perform queen bee artificial insemination AHCBEK403 Produce and harvest royal jelly AHCBEK404 Provide bee pollination services AHCBEK405 Select and establish an apiary site

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCBEK406 Trap and store pollen AHCBEK407 Rear queen bees AHCWRK306 Comply with industry quality assurance requirements AHCWRK308 Handle bulk materials in storage area <b>Total for review</b> <b>19</b>
2018	Skills in viticulture	AHC51516 Diploma of Viticulture	AHCBAC505 Plan and manage longterm weed, pest or disease control in crops AHCBER501 Manage active operational emergency disease or plant pest sites AHCBER502 Manage the implementation of an emergency disease or plant pest control program AHCORG501 Develop an organic management plan AHCORG502 Prepare the enterprise for organic certification AHCPHT504 Develop a grape production plan AHCPHT505 Evaluate wine AHCPHT506 Manage a wine making process AHCSOL501 Monitor and manage soils for production projects AHCWAT502 Manage water systems AHCWRK501 Plan, implement and review a quality assurance program <b>Total for review</b> <b>11</b>

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2018	Skills in landscape design and construction	AHC30916 Certificate III in Landscape Construction AHC42016 Certificate IV in Landscape AHC50616 Diploma of Landscape Design	AHCARB502 Identify, select and specify trees AHCCCF402 Report on project AHCDES501 Design sustainable landscapes AHCDES502 Prepare a landscape design AHCDES503 Assess landscape sites AHCDES504 Design for construction of landscape features AHCLSC301 Set out site for construction works AHCLSC302 Construct landscape features using concrete AHCLSC303 Construct brick and block structures and features AHCLSC305 Construct stone structures and features AHCLSC306 Implement a paving project AHCLSC307 Implement a retaining wall project AHCLSC401 Supervise landscape project works AHCLSC501 Survey and establish site levels AHCLSC502 Manage landscape projects AHCNAR401 Supervise natural area restoration works AHPCPM302 Provide information on plants and their culture AHPCPM503 Specify plants for landscapes AHPCPM504 Design specialised landscape AHCPER401 Provide advice on permaculture principles and practices

YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCPER403 Design an urban permaculture system AHCPER404 Plan and implement permaculture works AHCPER505 Plan and supervise the implementation of permaculture project works AHCPGD301 Implement a plant establishment program AHCPGD401 Design plant displays AHCPGD402 Plan a plant establishment program AHCSOL303 Implement soil improvements for garden and turf areas AHCWRK503 Prepare reports AHCWRK507 Implement professional practice AHCWRK508 Interpret legislation AHCWRK509 Provide specialist advice to clients AHCWRK510 Audit site operations  <b>Total for review</b>
2018	Renewing skills in carbon farming	AHCSS00015 Carbon Farming Initiative Advisor Skill Set AHCSS00016- Carbon Farming Initiative Business Skill Set AHCSS00022 Carbon Farming Initiative Emissions Avoidance from Soil and Crops Project Implementer Skill Set AHCSS00017 Carbon Farming Initiative Livestock Project Implementer Skill Set	AHCCFI503A Advise on Carbon Farming Initiative project planning and implementation AHCCFI505A Aggregate Carbon Farming Initiative projects AHCCFI502A Assess the feasibility of a Carbon Farming Initiative project AHCCFI504A Monitor and report on a Carbon Farming Initiative project AHCCFI506A Plan a Carbon Farming Initiative livestock project AHCCFI511A Plan a Carbon Farming Initiative project to avoid emissions from soil or crops

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YEAR	PRIORITY SKILLS	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHCSS00020 Carbon Farming Initiative Savannah Burning, Feral Animal, Rangelands Project Implementer Skill Set AHCSS00019 Carbon Farming Initiative Soil or Biochar Project Implementer Skill Set AHCSS00021 Carbon Farming Initiative Vegetation Project Implementer Skill Set AHCSS00018 Carbon Farming Initiative Waste and Manure Management Project Implementer Skill Set	AHCCFI508A Plan a Carbon Farming Initiative project to sequester carbon in soil or biochar AHCCFI509A Plan a Carbon Farming Initiative savannah burning, feral animal or rangelands project AHCCFI510A Plan a Carbon Farming Initiative vegetation project AHCCFI507A Plan a Carbon Farming Initiative waste or manure management project AHCCFI501A Provide technical advice on the Carbon Farming Initiative <b>Total for review</b> <b>11</b>

**PROPOSED AHC UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE**

YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2019	Artificial Insemination	AHC20116 Certificate II in Agriculture AHC30416 Certificate III in Pork Production AHC30116 Certificate III in Agriculture AHC40116 Certificate IV in Agriculture	AHCAIS201 Assist with artificial insemination procedures AHCAIS301 Collect semen AHCAIS302 Process and store semen AHCAIS303 Artificially inseminate livestock AHCAIS401 Supervise artificial breeding and embryo transfer programs
2019	Aboriginal-sites Work	AHC32516 Certificate III in Aboriginal Sites Work	AHCASW301 Protect places of Aboriginal cultural significance AHCASW302 Relate Aboriginal culture to sites work

**PROPOSED AHC UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE**

YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			<p>AHCASW303 Identify and record Aboriginal sites, objects and cultural landscapes</p> <p>AHCASW304 Identify Indigenous culturally significant plants</p> <p>AHCASW305 Work with Aboriginal ceremonial secret sacred materials</p> <p>AHCASW306 Use technology in Aboriginal sites work</p> <p>AHCASW307 Support the documentation of Aboriginal cultural landscapes</p> <p>AHCASW308 Apply cultural significance to Aboriginal sites and landscapes</p> <p>AHCASW309 Interpret Aboriginal cultural landscape</p> <p>AHCASW310 Move and store Aboriginal cultural material</p> <p>AHCASW312 Maintain an Aboriginal cultural site</p> <p>AHCASW313 Apply knowledge of relevant legislation to Aboriginal sites work</p> <p>AHCASW501 Survey and report on Aboriginal cultural sites</p>
2019	Broad Acre Cropping	<p>AHC10216 Certificate I in AgriFood Operations</p> <p>AHC20116 Certificate II in Agriculture</p> <p>AHC30116 Certificate III in Agriculture</p> <p>AHC40116 Certificate IV in Agriculture</p> <p>AHC51816 Diploma of Organic Farming</p>	<p>AHCBAC101 Support agricultural crop work</p> <p>AHCBAC201 Assist agricultural crop establishment</p> <p>AHCBAC202 Assist agricultural crop maintenance</p> <p>AHCBAC203 Assist agricultural crop harvesting</p> <p>AHCBAC204 Prepare grain storages</p>

**PROPOSED AHC UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE**

YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC51516 Diploma of Viticulture AHC50116 Diploma of Agriculture	AHCBAC301 Conserve forage AHCBAC302 Establish pastures and crops for livestock production AHCBAC303 Prepare to receive grains and seeds AHCBAC304 Test grains and seeds on receipt AHCBAC305 Undertake preparation of land for agricultural crop production AHCBAC306 Establish agricultural crops AHCBAC307 Maintain agricultural crops AHCBAC308 Undertake agricultural crop harvesting activities AHCBAC310 Maintain pastures and crops for livestock production AHCBAC401 Manage pastures for livestock production AHCBAC402 Plan a pasture establishment program AHCBAC403 Supervise agricultural crop establishment AHCBAC404 Plan and implement agricultural crop maintenance AHCBAC405 Supervise agricultural crop harvesting AHCBAC406 Maintain grain quality in storage AHCBAC407 Save, prepare and store agricultural seed AHCBAC502 Manage forage conservation AHCBAC503 Manage integrated crop and pasture production AHCBAC504 Plan and manage a stored grain program

**PROPOSED AHC UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE**

YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCBAC506 Manage the harvest of crops AHCBAC507 Develop production plans for crops AHCBAC508 Apply plant biology to agronomic practices
2019	Emergency Response		AHCBER601 Plan and oversee an emergency disease or plant pest control program
2019	Biosecurity		AHCBIO202 Follow site quarantine procedures
2019	Community Coordination and Facilitation	AHC51216 Diploma of Community Coordination and Facilitation AHC40916 Certificate IV in Conservation and Land Management	AHCCCF401 Prepare project acquittal AHCCCF403 Obtain and manage sponsorship AHCCCF404 Contribute to association governance AHCCCF405 Develop community networks AHCCCF406 Facilitate ongoing group development AHCCCF407 Obtain resources from community and groups AHCCCF408 Promote community programs AHCCCF409 Participate in assessments of project submissions AHCCCF410 Support individuals in resource management change processes AHCCCF411 Develop approaches to include cultural and human diversity AHCCCF412 Coordinate board or committee elections

**PROPOSED AHC UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE**

YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCCCF413 Service committees AHCCCF414 Coordinate fundraising activities AHCCCF415 Coordinate social events to support group purposes AHCCCF416 Present proposed courses of action to meeting AHCCCF501 Evaluate project submissions AHCCCF502 Facilitate development of group goals and projects AHCCCF503 Promote group formation and development AHCCCF504 Support group and community changes in resource management AHCCCF505 Contribute to regional planning process AHCCCF506 Manage the incorporation of a group AHCCCF601 Coordinate the development of regional plans
2019	Common		AHCCMN101 Adapt to work requirements in the agrifood industry AHCCMN102 Apply effective work practices AHCCMN103 Demonstrate care and apply safe practices at work AHCCMN201 Contribute to animal care through work activities AHCCMN202 Contribute to work activities to produce food
2019	Composting	AHC32216 Certificate III in Commercial Composting	AHCCOM201 Assess and receive raw materials for composting

**PROPOSED AHC UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE**

YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			<p>AHCCOM202 Recognise and respond to fire emergencies on a composting site</p> <p>AHCCOM203 Recognise raw materials, production processes and products on a composting site</p> <p>AHCCOM301 Operate compost processing plant, machinery and equipment</p> <p>AHCCOM302 Dispatch materials and composted product</p> <p>AHCCOM303 Operate a compost bagging process</p> <p>AHCCOM401 Develop a composting recipe</p> <p>AHCCOM402 Plan and schedule compost production</p> <p>AHCCOM501 Identify and secure raw materials supply for compost production</p>
2019	Deer	<p>AHC50116 Diploma of Agriculture</p> <p>AHC40116 Certificate IV in Agriculture</p>	<p>AHCDER401 Handle, store and grade deer velvet</p> <p>AHCDER501 Comply with deer industry national velvet accreditation requirements</p> <p>AHCDER502 Harvest deer velvet</p>
2019	Dairy	<p>AHC40116 Certificate IV in Agriculture</p> <p>AHC30216 Certificate III in Agriculture (Dairy Production)</p>	<p>AHCDRY201 Milk livestock</p> <p>AHCDRY301 Coordinate milking operations</p> <p>AHCDRY302 Operate a dairy recycling system</p> <p>AHCDRY401 Manage milking shed routines</p>

**PROPOSED AHC UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE**

YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2019	Explosives		AHCEXP302 Identify and select explosive products AHCEXP303A Prepare and use explosives
2019	Fauna	AHC21016 Certificate II in Conservation and Land Management AHC51116 Diploma of Conservation and Land Management	AHCFAU301 Respond to wildlife emergencies AHCFAU501 Manage fauna populations
2019	FIRE	AHC51116 Diploma of Conservation and Land Management	AHCFIR201 Assist with prescribed burning AHCFIR501 Manage wildfire hazard reduction programs AHCFIR502 Plan prescribed burning for fuel, ecological and cultural resource management
2019	Horse Breeding	AHC40116 Certificate IV in Agriculture	AHCHBR201A Monitor horse health and welfare AHCHBR202A Handle young horses AHCHBR203A Provide daily care for horses AHCHBR204A Assist with mating procedures and parturition of horses AHCHBR302A Carry out basic hoof care procedures AHCHBR303A Carry out mare mating or artificial insemination procedures AHCHBR304A Educate, ride and care for horses and equipment AHCHBR305A Handle and care for stallions

**PROPOSED AHC UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE**

YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCHBR306A Prevent and treat equine injury and disease AHCHBR307A Assess suitability of horses for stock work AHCHBR401A Carry out stud stable management duties AHCHBR402A Supervise raising young horses
2019	Hydroponics	AHC50416 Diploma of Horticulture AHC50316 Diploma of Production Horticulture	AHCHYD501 Develop a plan for a hydroponic system
2019	Indigenous Land Management	AHC32516 Certificate III in Aboriginal Sites Work AHC21016 Certificate II in Conservation and Land Management AHC31516 Certificate III in Indigenous Land Management AHC40916 Certificate IV in Conservation and Land Management AHC51116 Diploma of Conservation and Land Management	AHCILM201 Maintain cultural places AHCILM202 Observe and report plants or animals AHCILM203 Record information about Country AHCILM302 Provide appropriate information on cultural knowledge AHCILM305 Work with an Aboriginal Community or organisation AHCILM306 Follow Aboriginal cultural protocols AHCILM307 Implement Aboriginal cultural burning practices AHCILM308 Identify traditional customs and land rights for an Indigenous Community AHCILM401 Protect places of cultural significance AHCILM402 Report on place of potential cultural significance AHCILM403 Contribute to the proposal for a negotiated outcome for a given area of Country

**PROPOSED AHC UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE**

YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			<p>AHCILM404 Record and document Community history</p> <p>AHCILM405 Develop work practices to accommodate cultural identity</p> <p>AHCILM501 Conduct field research into natural and cultural resources</p> <p>AHCILM502 Develop conservation strategies for cultural resources</p> <p>AHCILM503 Manage restoration of cultural places</p> <p>AHCILM504 Develop strategies for Indigenous land or sea management</p> <p>AHCILM505 Map relationship of business enterprise to culture and Country</p> <p>AHCILM506 Operate within Community cultures and goals</p> <p>AHCILM508 Propose a negotiated outcome for a given area of Country</p> <p>AHCILM510 Plan for successful cultural practice at work</p> <p>AHCILM601 Manage cultural processes in an Indigenous organisation</p>
2019	Infrastructure	<p>AHC32416 Certificate III in Irrigation</p> <p>AHC41116 Certificate IV in Irrigation</p> <p>AHC30116 Certificate III in Agriculture</p>	<p>AHCINF203 Maintain properties and structures</p> <p>AHCINF204 Fabricate and repair metal or plastic structures</p> <p>AHCINF301 Implement property improvement, construction and repair</p>

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCINF302 Plan and construct an electric fence AHCINF303 Plan and construct conventional fencing AHCINF304 Install and terminate extra low voltage wiring systems
2019	Lands, Parks and Wildlife	AHC31616 Certificate III in Lands, Parks and Wildlife AHC40916 Certificate IV in Conservation and Land Management AHC51116 Diploma of Conservation and Land Management AHC60415 Advanced Diploma of Conservation and Land Management	AHCLPW301 Supervise park visitor activities AHCLPW303 Construct access tracks AHCLPW304 Carry out inspection of designated area AHCLPW305 Perform diving for scientific purposes AHCLPW306 Undertake sampling and testing of water AHCLPW401 Process applications for changes in land use AHCLPW402 Implement land and sea management practices AHCLPW403 Inspect and monitor cultural places AHCLPW404 Produce maps for land management purposes AHCLPW405 Monitor biodiversity AHCLPW501 Develop a management plan for a designated area AHCLPW503 Assess applications for legislative compliance AHCLPW505 Implement natural and cultural resource management plans AHCLPW601 Coordinate the preparation of a regional resource management plan

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2019	Landscape	AHC21616 Certificate II in Landscaping AHC31016 Certificate III in Parks and Gardens AHC50716 Diploma of Parks and Gardens Management AHC20416 Certificate II in Horticulture AHC30816 Certificate III in Arboriculture AHC30716 Certificate III in Horticulture AHC50416 Diploma of Horticulture AHC32516 Certificate III in Aboriginal Sites Work AHC31516 Certificate III in Indigenous Land Management AHC31416 Certificate III in Conservation and Land Management	AHCLSC101 Support landscape work AHCLSC201 Assist with landscape construction work AHCLSC202 Construct lowprofile timber or modular retaining walls AHCLSC203 Install aggregate paths AHCLSC204 Lay paving AHCLSC205 Install tree protection devices AHCLSC304 Erect timber structures and features AHCLSC308 Install metal structures and features AHCLSC309 Install water features AHCLSC310 Implement a tree transplanting program AHCLSC503 Manage a tree transplanting program
2019	Livestock	AHC20116 Certificate II in Agriculture AHC30116 Certificate III in Agriculture AHC40116 Certificate IV in Agriculture AHC50116 Diploma of Agriculture	AHCLSK101 Support extensive livestock work AHCLSK102 Support intensive livestock work AHCLSK201 Assist with feeding in a production system AHCLSK202 Care for health and welfare of livestock AHCLSK203 Carry out birthing duties AHCLSK204 Carry out regular livestock observation AHCLSK205 Handle livestock using basic techniques

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCLSK206 Identify and mark livestock AHCLSK207 Load and unload livestock AHCLSK208 Monitor livestock to parturition AHCLSK209 Monitor water supplies AHCLSK210 Muster and move livestock AHCLSK211 Provide feed for livestock AHCLSK212A Ride horses to carry out stock work AHCLSK213 Clean out production sheds AHCLSK214 Maintain production growing environments AHCLSK215 Carry out alpaca handling and husbandry operations AHCLSK216 Clean and maintain livestock pens AHCLSK217 Apply animal welfare principles to handling and husbandry of livestock AHCLSK218 Ride educated horses to carry out basic stock work AHCLSK301 Administer medication to livestock AHCLSK302 Mate and monitor reproduction of alpacas AHCLSK303 Carry out feedlot operations AHCLSK304 Carry out postmortem examination of livestock AHCLSK305 Maintain livestock water supplies AHCLSK306 Coordinate and monitor production performance

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCLSK307 Euthanase livestock
			AHCLSK308 Identify and draft livestock
			AHCLSK309 Implement animal health control programs
			AHCLSK310 Implement feeding plans for intensive production
			AHCLSK311 Implement feeding plans for livestock
			AHCLSK312 Coordinate artificial insemination and fertility management of livestock
			AHCLSK313 Monitor livestock production growing environments
			AHCLSK314 Prepare animals for parturition
			AHCLSK315 Prepare for and implement natural mating of livestock
			AHCLSK316 Prepare livestock for competition
			AHCLSK317 Plan to exhibit livestock
			AHCLSK318 Rear newborn and young livestock
			AHCLSK319 Slaughter livestock
			AHCLSK320 Coordinate and monitor livestock transport
			AHCLSK321 Service and repair bores and windmills
			AHCLSK322 Transport farm produce or bulk materials
			AHCLSK323 Maintain and monitor feed stocks
			AHCLSK324 Care for and train working dogs
			AHCLSK325 Castrate livestock

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCLSK326 Mix and mill standard stockfeed AHCLSK327 Collect, store and administer colostrum AHCLSK328 Remove and facilitate reuse of effluent and manure from an intensive production system AHCLSK329 Implement procedures for calving AHCLSK330A Implement procedures for foaling down mares AHCLSK331 Comply with industry animal welfare requirements AHCLSK332 Monitor animals in intensive production systems AHCLSK333 Monitor pen condition and ration suitability AHCLSK334 Plan, prepare and conduct mulesing procedures AHCLSK335 Conduct dropped ovary technique procedures for spaying cattle AHCLSK336 Educate, care for, and ride horses for stock work AHCLSK401 Develop feeding plans for a production system AHCLSK402 Develop livestock feeding plans AHCLSK404 Implement and monitor animal welfare programs AHCLSK405 Implement intensive production systems AHCLSK406 Oversee animal marking operations AHCLSK407 Plan and monitor intensive production systems AHCLSK408 Pregnancy test animals

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCLSK409 Supervise animal health programs AHCLSK410 Supervise feedlot operations AHCLSK411 Supervise natural mating of livestock AHCLSK412 Arrange livestock purchases AHCLSK413 Design livestock handling facilities AHCLSK414 Arrange transport for farm produce or livestock AHCLSK415 Oversee alpaca farm activities AHCLSK416 Identify and select animals for breeding AHCLSK417 Manage horses for stock work AHCLSK418 Escort livestock during export AHCLSK502 Arrange marketing of livestock AHCLSK503 Develop and implement a breeding strategy AHCLSK504 Develop livestock health and welfare strategies AHCLSK505 Develop production plans for livestock AHCLSK506 Design livestock effluent systems AHCLSK507 Plan, monitor and evaluate strategies to improve livestock through genetics
2019	Merchandising and Sales	AHC40116 Certificate IV in Agriculture AHC32716 Certificate III in Rural Merchandising	AHCMER302 Provide advice on hardware products AHCMER304 Recommend irrigation products and services

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC31216 Certificate III in Retail Nursery AHC41116 Certificate IV in Irrigation	AHCMER401 Coordinate customer service and networking activities AHCMER402 Provide advice and sell machinery AHCMER403 Provide advice and sell farm chemicals AHCMER404 Provide advice on agronomic products AHCMER405 Provide advice on livestock products AHCMER406 Provide information on fertilisers and soil ameliorants AHCMER407 Provide irrigation sales and service
	Milk Harvesting	AHC40116 Certificate IV in Agriculture	AHCMKH301 Carry out minor service of milking equipment AHCMKH303 Service and repair milking equipment AHCMKH304 Monitor and establish milking machine cleaning AHCMKH305 Mechanically test milking machines AHCMKH401 Carry out cleaningtime tests of milking machines AHCMKH402 Design and fabricate milking equipment installations AHCMKH403 Design and install enterprise milk cooling and storage AHCMKH404 Install milking equipment AHCMKH405 Performance test milking machines

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2019	Natural Area Restoration	<p>AHC21016 - Certificate II in Conservation and Land Management</p> <p>AHC32516 Certificate III in Aboriginal Sites Work</p> <p>AHC31716 Certificate III in Natural Area Restoration</p> <p>AHC31516 Certificate III in Indigenous Land Management</p> <p>AHC21716 Certificate II in Permaculture</p> <p>AHC31616 Certificate III in Lands, Parks and Wildlife</p> <p>AHC31416 Certificate III in Conservation and Land Management</p> <p>AHC30416 Certificate III in Pork Production</p> <p>AHC42016 Certificate IV in Landscape</p> <p>AHC40916 Certificate IV in Conservation and Land Management</p> <p>AHC51116 Diploma of Conservation and Land Management</p> <p>AHC40416 Certificate IV in Horticulture</p>	<p>AHCNAR101 Support natural area conservation</p> <p>AHCNAR102 Support native seed collection</p> <p>AHCNAR201 Carry out natural area restoration works</p> <p>AHCNAR202 Maintain wildlife habitat refuges</p> <p>AHCNAR301 Maintain natural areas</p> <p>AHCNAR302 Collect and preserve biological samples</p> <p>AHCNAR303 Implement revegetation works</p> <p>AHCNAR304 Undertake direct seeding</p> <p>AHCNAR305 Collect native seed</p> <p>AHCNAR402 Plan the implementation of revegetation works</p> <p>AHCNAR501 Manage natural areas on a rural property</p> <p>AHCNAR502 Conduct biological surveys</p> <p>AHCNAR503 Design a natural area restoration project</p> <p>AHCNAR504 Manage natural area restoration programs</p> <p>AHCNAR505 Plan river restoration works</p>
2020	Natural Resource Management	<p>AHC40916 Certificate IV in Conservation and Land Management</p> <p>AHC60415 Advanced Diploma of Conservation and Land Management</p>	<p>AHCNRM401 Plan and implement a biosecurity program</p> <p>AHCNRM501 Develop a coastal rehabilitation strategy</p> <p>AHCNRM502 Develop a water quality monitoring program</p>

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC51316 Diploma of Pest Management AHC51216 Diploma of Community Coordination and Facilitation AHC51116 Diploma of Conservation and Land Management AHC50516 Diploma of Arboriculture AHC60516 Advanced Diploma of Arboriculture	AHCNRM503 Support the implementation of waterways strategies AHCNRM504 Interpret and report on catchment hydrology AHCNRM505 Provide technical advice on sustainable catchment management AHCNRM506 Plan and monitor works projects in catchments and waterways AHCNRM507 Manipulate and analyse data within geographic information systems AHCNRM508 Investigate suspected breaches of natural resource management legislation AHCNRM601 Review land management plans and strategies AHCNRM602 Develop a monitoring, evaluation and reporting program AHCNRM603 Implement a monitoring, evaluation and reporting program
2020	Nursery	AHC10316 Certificate I in Horticulture AHC10216 Certificate I in AgriFood Operations AHC10116 Certificate I in Conservation and Land Management AHC21516 Certificate II in Floriculture AHC20816 Certificate II in Retail Nursery	AHCNSY101 Support nursery work AHCNSY201 Pot up plants AHCNSY202 Care for nursery plants AHCNSY203 Undertake propagation activities AHCNSY204 Maintain indoor plants

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC20716 Certificate II in Production Nursery AHC20416 Certificate II in Horticulture AHC33216 Certificate III in Floriculture AHC31216 Certificate III in Retail Nursery AHC31116 Certificate III in Production Nursery AHC30716 Certificate III in Horticulture	
2020	Organic Production	AHC10416 Certificate I in Permaculture AHC10216 Certificate I in AgriFood Operations AHC42116 Certificate IV in Permaculture AHC41616 Certificate IV in Organic Farming AHC40416 Certificate IV in Horticulture AHC40316 Certificate IV in Production Horticulture AHC40116 Certificate IV in Agriculture AHC51816 Diploma of Organic Farming AHC52116 Diploma of Permaculture AHC51516 Diploma of Viticulture AHC50316 Diploma of Production Horticulture AHC50116 Diploma of Agriculture	AHCORG101 Support organic production AHCORG401 Manage biodynamic production AHCORG402 Manage organic livestock production AHCORG403 Manage organic soil improvement AHCORG404 Arrange selling through community based marketing AHCORG405 Implement sustainable practices in the organic farm based business AHCORG406 Oversee compliance with an organic certification scheme AHCORG407 Manage a landless organic production system AHCORG408 Manage on farm composting AHCORG503 Design and document an organic farm landscape AHCORG504 Develop and manage a community based marketing supply chain

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCORG505 Develop and monitor a sustainable production plan AHCORG506 Manage an agroecology production system
2020	Plant culture and management	AHC21016 Certificate II in Conservation and Land Management AHC20416 Certificate II in Horticulture AHC21616 Certificate II in Landscaping AHC21516 Certificate II in Floriculture AHC20816 Certificate II in Retail Nursery AHC20716 Certificate II in Production Nursery AHC20616 Certificate II in Parks and Gardens AHC31016 Certificate III in Parks and Gardens AHC30716 Certificate III in Horticulture Certificate IV in Pest Management AHC51316 Diploma of Pest Management-2 AHC51116 Diploma of Conservation and Land Management AHC50916 Diploma of Retail Nursery Management AHC50816 Diploma of Production Nursery Management	AHCPCM201 Recognise plants AHCPCM203 Fell small trees AHCPCM304 Report on health and condition of trees AHCPCM403 Implement an integrated pest management program AHCPCM502 Collect and classify plants AHCPCM505 Conduct environment and food safety risk assessment of plant nutrition and soil fertility programs AHCPCM506 Develop an integrated pest management program AHCPCM601 Develop and implement a plant health management strategy

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC50716 Diploma of Parks and Gardens Management AHC50416 Diploma of Horticulture AHC50316 Diploma of Production Horticulture AHC50116 Diploma of Agriculture AHC60516 Advanced Diploma of Arboriculture AHC60216 Advanced Diploma of Horticulture AHC51016 Diploma of Sports Turf Management AHC50516 Diploma of Arboriculture	
2020	Permaculture	AHC10416 Certificate I in Permaculture AHC21716 Certificate II in Permaculture AHC33816 Certificate III in Permaculture AHC42116 Certificate IV in Permaculture AHC52116 Diploma of Permaculture	AHCPER101 Observe permaculture principles and work practices AHCPER102 Support resource conservation practices AHCPER103 Support plant care in a permaculture system AHCPER104 Support animal care in a permaculture system AHCPER105 Assist with maintaining structures in a permaculture system AHCPER201 Work effectively in permaculture AHCPER202 Harvest, treat and store seed AHCPER203 Record information about the local bioregion AHCPER204 Check and operate permaculture water systems AHCPER205 Prepare and store permaculture products

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCPER206 Plant and maintain permaculture crops AHCPER207 Care for animals in a permaculture system AHCPER208 Harvest permaculture crops AHCPER209 Recognise characteristics of integrated plant and animal systems AHCPER210 Operate within community projects AHCPER211 Recognise threats and create opportunities in a permaculture system AHCPER212 Use and maintain garden hand tools and equipment AHCPER213 Assist with basic earth shaping for nutrient capture and storage AHCPER214 Propagate plants for a permaculture garden system AHCPER215 Assist with garden soil health and plant nutrition AHCPER301 Research and communicate information on permaculture principles and practices AHCPER302 Develop recommendations for integrated plant and animal systems AHCPER303 Maintain integrated plant and animal systems AHCPER304 Carry out animal care, maintenance and treatment programs in a permaculture system AHCPER305 Implement crop maintenance and harvesting programs for permaculture systems

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCPER306 Use weedy plants in a permaculture system AHCPER307 Establish a rural permaculture system AHCPER308 Establish an urban permaculture system AHCPER309 Install and maintain permaculture water systems AHCPER310 Install structures for permaculture systems AHCPER311 Kill and dress small livestock for domestic consumption AHCPER312 Plan organic garden and orchard systems AHCPER313 Coordinate preparation and storage of permaculture products AHCPER314 Read and interpret property maps and plans AHCPER315 Coordinate community projects AHCPER316 Select plant and animal species for permaculture systems AHCPER317 Build with earth, straw and reclaimed materials AHCPER318 Plan propagation activities for a permaculture system AHCPER319 Test, improve and maintain healthy soil in a permaculture system AHCPER320 Manage plant pests, diseases and disorders in a permaculture system

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			<p>AHCPER321 Demonstrate permaculture practices to small groups of learners</p> <p>AHCPER402 Design a rural permaculture system</p> <p>AHCPER405 Select appropriate technology for a permaculture system</p> <p>AHCPER406 Identify and analyse bioregional characteristics and resources</p> <p>AHCPER407 Design harvesting and storage systems for permaculture products</p> <p>AHCPER408 Implement and monitor animal health and welfare programs for a permaculture system</p> <p>AHCPER409 Manage a permaculture seed bank</p> <p>AHCPER410 Recommend approaches for sustainable community and bioregional development</p> <p>AHCPER411 Operate within a sustainable community and bioregional development program</p> <p>AHCPER412 Operate within a permaculture aid and development program</p> <p>AHCPER413 Evaluate suitability of species as solutions for permaculture applications</p> <p>AHCPER501 Carry out permaculture field research</p> <p>AHCPER502 Design an integrated permaculture system</p>

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			<p>AHCPER503 Develop a strategic plan for a permaculture project or enterprise</p> <p>AHCPER504 Manage a permaculture project or enterprise</p> <p>AHCPER506 Develop a relocalisation or transition project</p> <p>AHCPER507 Research and interpret requirements for a permaculture project</p> <p>AHCPER508 Manage a permaculture aid and development project</p> <p>AHCPER509 Design permaculture structures and features</p> <p>AHCPER510 Prepare a sustainable community and bioregional development strategy</p> <p>AHCPER511 Facilitate participatory planning and learning activities</p> <p>AHCPER512 Plan community governance and decisionmaking processes</p>
2020	Parks and gardens	<p>AHC10316 Certificate I in Horticulture</p> <p>AHC10216 Certificate I in AgriFood Operations</p> <p>AHC21616 Certificate II in Landscaping</p> <p>AHC21016 Certificate II in Conservation and Land Management</p> <p>AHC20916 Certificate II in Sports Turf Management</p> <p>AHC20616 Certificate II in Parks and Gardens</p>	<p>AHCPGD101 Support gardening work</p> <p>AHCPGD201 Plant trees and shrubs</p> <p>AHCPGD202 Prepare and maintain plant displays</p> <p>AHCPGD203 Prune shrubs and small trees</p> <p>AHCPGD204 Transplant small trees</p> <p>AHCPGD205 Prepare a grave site</p> <p>AHCPGD206 Conduct visual inspection of park facilities</p>

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC20516 Certificate II in Arboriculture AHC20416 Certificate II in Horticulture AHC31416 Certificate III in Conservation and Land Management AHC31016 Certificate III in Parks and Gardens AHC30716 Certificate III in Horticulture AHC50716 Diploma of Parks and Gardens Management AHC50516 Diploma of Arboriculture AHC50416 Diploma of Horticulture	AHCPGD302 Plan and maintain plant displays AHCPGD303 Perform specialist amenity pruning AHCPGD304 Implement a landscape maintenance program AHCPGD305 Conduct operational inspection of park facilities AHCPGD306 Implement a maintenance program for an aquatic environment AHCPGD501 Manage plant cultural practices AHCPGD502 Plan the restoration of parks and gardens AHCPGD503 Manage parks and reserves AHCPGD504 Develop and implement a streetscape management plan AHCPGD505 Conduct comprehensive inspection of park facilities
2020	Performance Horse		AHCPHR504 Manage equine nutrition
	Production horticulture	AHC10316 Certificate I in Horticulture AHC10216 Certificate I in AgriFood Operations AHC21516 Certificate II in Floriculture AHC20316 Certificate II in Production Horticulture AHC20116 Certificate II in Agriculture AHC33216 Certificate III in Floriculture	AHCPHT101 Support horticultural production AHCPHT201 Plant horticultural crops AHCPHT202 Carry out canopy maintenance AHCPHT203 Support horticultural crop harvesting AHCPHT204 Undertake field budding and grafting AHCPHT205 Carry out postharvest operations

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC30616 Certificate III in Production Horticulture	AHCPHT206 Handle and move mushroom boxes
		AHC30116 Certificate III in Agriculture	AHCPHT207 Perform mushroom substrate process tasks
		AHC40316 Certificate IV in Production Horticulture	AHCPHT208 Water mushroom crops
			AHCPHT209 Produce trellis dried grapes
			AHCPHT301 Carry out a crop regulation program
			AHCPHT303 Implement a postharvest program
			AHCPHT304 Harvest horticultural crops mechanically
			AHCPHT305 Regulate crops
			AHCPHT306 Establish horticultural crops
			AHCPHT307 Prepare raw materials and compost feedstock
			AHCPHT308 Prepare value added compostbased products
			AHCPHT309 Supervise mushroom substrate preparation
			AHCPHT310 Coordinate horticultural crop harvesting
			AHCPHT401 Assess olive oil for style and quality
			AHCPHT402 Develop a crop regulation program
			AHCPHT403 Develop harvesting and processing specifications to produce an olive oil
			AHCPHT404 Implement and monitor a horticultural crop harvesting program
			AHCPHT405 Manage mushroom substrate preparation

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCPTH406 Control Phase II mushroom substrate process AHCPTH407 Manage mushroom crop development AHCPTH408 Oversee vineyard practices AHCPTH503 Manage a controlled growing environment
2020	Poultry	AHC20116 Certificate II in Agriculture AHC30516 Certificate III in Poultry Production	AHCPLY201 Collect store and handle eggs from breeder flocks AHCPLY202 Maintain health and welfare of poultry AHCPLY203 Set up shed for placement of dayold chickens AHCPLY204 Collect and pack eggs for human consumption AHCPLY205 Grade and pack eggs for human consumption AHCPLY206 Catch and load poultry AHCPLY207 Identify and sex poultry AHCPLY301 Artificially inseminate poultry AHCPLY302 Brood poultry AHCPLY304 Incubate eggs AHCPLY305 Beak tip poultry AHCPLY306 Clean and disinfect poultry production sheds AHCPLY307 Implement and monitor biosecurity measures in poultry production

**PROPOSED AHC UNITS TO BE CHECKED FOR CURRENCY AND POSSIBLY REVIEWED AS PART OF THE FOUR-YEAR CYCLE**

YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
2020	Pest Management	AHC40910 Certificate IV in Conservation and Land Management AHC41716 Certificate IV in Pest Management  AHC51316 Diploma of Pest Management AHC51116 Diploma of Conservation and Land Management AHC50816 Diploma of Production Nursery Management AHC50416 Diploma of Horticulture	AHCPMG404A Coordinate the local pest management strategy AHCPMG414 Apply predator trapping techniques AHCPMG506 Manage the implementation of legislation AHCPMG507 Develop a regional pest management plan AHCPMG508 Develop a system to monitor and evaluate the pest management plan AHCPMG509 Investigate a pest control failure AHCPMG510 Develop a pest survey strategy AHCPMG602A Develop a plant pest destruction strategy
2020	Pork	AHC20116 Certificate II in Agriculture AHC30416 Certificate III in Pork Production AHC40116 Certificate IV in Agriculture AHC50216 Diploma of Pork Production	AHCPRK201 Care for health and welfare of pigs AHCPRK203 Move and handle pigs AHCPRK204 Care for weaner pigs AHCPRK205 Care for health and welfare of outdoor pigs AHCPRK206 Conduct outdoor pig operations AHCPRK301 Pregnancy test pigs AHCPRK302 Treat rectal prolapse in pigs AHCPRK303 Artificially inseminate pigs AHCPRK304 Mate pigs and monitor dry sow performance AHCPRK305 Care for grower and finisher pigs

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCPRK306 Monitor and maintain outdoor pig production AHCPRK401 Implement a feeding strategy for pig production AHCPRK402 Maintain outdoor pig production environment
2020	Soil and Water Conservation	AHC21016 Certificate II in Conservation and Land Management AHC20116 Certificate II in Agriculture AHC33816 Certificate III in Permaculture AHC32316 Certificate III in Conservation Earthworks AHC31716 Certificate III in Natural Area Restoration AHC31616 Certificate III in Lands, Parks and Wildlife AHC31416 Certificate III in Conservation and Land Management AHC42116 Certificate IV in Permaculture AHC40916 Certificate IV in Conservation and Land Management AHC51116 Diploma of Conservation and Land Management AHC52116 Diploma of Permaculture	AHCSAW201 Conduct erosion and sediment control activities AHCSAW301 Construct conservation earthworks AHCSAW302 Implement erosion and sediment control measures AHCSAW401 Set out conservation earthworks AHCSAW403 Supervise implementation of conservation earthworks plans AHCSAW501 Design control measures and structures AHCSAW502 Plan erosion and sediment control measures AHCSAW503 Plan conservation earthworks
2020	Seed Production	AHC33416 Certificate III in Seed Production AHC41416 Certificate IV in Seed Production	AHCSDP301 Undertake preparation of land for seed crop production

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCSDP302 Establish seed crops AHCSDP303 Maintain seed crops AHCSDP304 Harvest seed crops AHCSDP401 Plan a seed crop establishment program AHCSDP402 Supervise seed crop establishment AHCSDP403 Plan and implement seed crop maintenance AHCSDP404 Supervise seed crop harvesting AHCSDP405 Inspect a seed crop for quality assurance purposes
2020	Seed Testing	AHC33516 Certificate III in Seed Testing AHC41516 Certificate IV in Seed Testing	AHCSDT301 Prepare a working sample AHCSDT302 Identify seeds AHCSDT303 Perform a fluorescence test on seeds AHCSDT304 Perform a seed purity analysis AHCSDT305 Perform a seed moisture test AHCSDT306 Perform a seed germination test AHCSDT307 Perform a 'Determination of Other Seeds by Number' test AHCSDT401 Maintain a quarantine approved laboratory AHCSDT402 Prepare and maintain a seed reference collection AHCSDT403 Perform an Anguina test on annual ryegrass seed

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			<p>AHCSDT404 Develop and implement laboratory policy and procedures</p> <p>AHCSDT405 Handle and store quarantinable seeds</p> <p>AHCSDT406 Undertake internal audits in a seed laboratory</p> <p>AHCSDT407 Perform an endophytic seed test</p> <p>AHCSDT408 Perform an electrophoresis test on a seed sample</p> <p>AHCSDT409 Perform a tetrazolium test</p> <p>AHCSDT410 Perform a seed vigour test</p> <p>AHCSDT411 Perform a 1000 seed weight test</p>
2020	Shearing	<p>AHC21316 Certificate II in Shearing</p> <p>AHC21416 Certificate II in Wool Handling</p> <p>AHC20116 Certificate II in Agriculture</p> <p>AHC32916 Certificate III in Shearing</p> <p>AHC30116 Certificate III in Agriculture</p> <p>AHC42216 Certificate IV in Shearing Contracting</p> <p>AHC40116 Certificate IV in Agriculture</p>	<p>AHCSHG201 Crutch sheep</p> <p>AHCSHG202 Assist in preparing for shearing and crutching</p> <p>AHCSHG203 Shear sheep to novice level</p> <p>AHCSHG204 Shear sheep to improver level</p> <p>AHCSHG205 Grind combs and cutters for machine shearing</p> <p>AHCSHG206 Prepare handpiece and downtube for machine shearing</p> <p>AHCSHG207 Shear goats</p> <p>AHCSHG208 Shear alpacas</p> <p>AHCSHG209 Support alpaca shearing operations</p> <p>AHCSHG210 Undertake basic shearing and crutching</p>

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			AHCSHG301 Prepare livestock for shearing AHCSHG302 Prepare combs and cutters for machine shearing AHCSHG303 Maintain and service shearing handpieces AHCSHG304 Shear sheep to professional level AHCSHG305 Maintain consistent shearing performance AHCSHG306 Carry out postshearing procedures AHCSHG307 Plan and prepare for alpaca shearing AHCSHG401 Apply advanced shearing techniques AHCSHG402 Conduct equipment experting for machine shearing AHCSHG403 Account for shearing shed supplies AHCSHG405 Arrange employment for shearing operations
2020	Soil and Media	AHC42116 Certificate IV in Permaculture AHC41616 Certificate IV in Organic Farming AHC41416 Certificate IV in Seed Production AHC40316 Certificate IV in Production Horticulture AHC40116 Certificate IV in Agriculture AHC40916 Certificate IV in Conservation and Land Management AHC50116 Diploma of Agriculture	AHCSOL402 Develop a soil use map for a property AHCSOL403 Prepare acid sulphate soil management plans AHCSOL404 Supervise acid sulphate soil remediation and management projects AHCSOL502 Manage soils to enhance sustainability AHCSOL503 Manage erosion and sediment control AHCSOL504 Develop and manage a plan to reclaim land affected by salinity

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC50116 Diploma of Agriculture	
2020	Seed Processing	AHC32116 Certificate III in Commercial Seed Processing AHC31416 Certificate III in Conservation and Land Management	AHCSPO301 Operate a screen cleaner for seed processing AHCSPO302 Operate an indent cylinder AHCSPO303 Operate a gravity table AHCSPO304 Operate seed modification machinery AHCSPO305 Operate seed treatment machinery AHCSPO306 Operate specialised seed processing machinery AHCSPO307 Handle, package and store commercial quantities of seed AHCSPO308 Sample seed before and after processing
2020	Sustainability	AHC50116 Diploma of Agriculture	AHCSUS501 Develop and manage a plan for sustainable supply and use of water on a farm AHCSUS502 Develop and manage a plan to improve biodiversity on a farm
2020	Turf	AHC10316 Certificate I in Horticulture AHC10216 Certificate I in AgriFood Operations AHC21616 Certificate II in Landscaping AHC20416 Certificate II in Horticulture AHC20916 Certificate II in Sports Turf Management	AHCTRF101 Support turf work AHCTRF201 Assist with turf construction AHCTRF202 Prepare turf surfaces for play AHCTRF203 Renovate grassed areas AHCTRF204 Support turf establishment

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC20616 Certificate II in Parks and Gardens AHC31316 Certificate III in Sports Turf Management AHC31016 Certificate III in Parks and Gardens AHC30716 Certificate III in Horticulture AHC40816 Certificate IV in Sports Turf Management AHC40516 Certificate IV in Parks and Gardens AHC40416 Certificate IV in Horticulture AHC51016 Diploma of Sports Turf Management AHC50716 Diploma of Parks and Gardens Management AHC50416 Diploma of Horticulture	AHCTRF301 Construct turf playing surfaces AHCTRF302 Establish turf AHCTRF303 Implement a grassed area maintenance program AHCTRF304 Monitor turf health AHCTRF305 Renovate sports turf AHCTRF401 Develop a sports turf maintenance program AHCTRF402 Plan and implement sports turf renovation AHCTRF501 Plan the establishment of sports turf playing surfaces AHCTRF502 Manage sports turf renovation programs AHCTRF503 Develop sports turf management programs AHCTRF504 Manage sports turf facility assets
2020	Water	AHC20116 Certificate II in Agriculture AHC50816 Diploma of Production Nursery Management AHC50416 Diploma of Horticulture AHC50316 Diploma of Production Horticulture	AHCWAT201 Set up, operate and maintain water delivery systems for compost AHCWAT501 Design water treatment systems
2020	Work Health and Safety	AHC10416 Certificate I in Permaculture AHC10316 Certificate I in Horticulture AHC10216 - Certificate I in AgriFood Operations	AHCWHS101 Work safely AHCWHS201 Participate in work health and safety processes

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC10116 Certificate I in Conservation and Land Management	
2020	Wool	AHC10216 Certificate I in AgriFood Operations	AHCWOL101 Support woolshed activities
		AHC21416 Certificate II in Wool Handling	AHCWOL201 Pen sheep
		AHC20116 Certificate II in Agriculture	AHCWOL202 Perform board duties
		AHC33116 Certificate III in Advanced Wool Handling	AHCWOL203 Carry out wool pressing
		AHC33016 Certificate III in Wool Clip Preparation	AHCWOL204 Undertake basic skirting of alpaca fleece
		AHC30116 Certificate III in Agriculture	AHCWOL301 Appraise wool using industry descriptions
		AHC41316 Certificate IV in Wool Classing	AHCWOL303 Prepare wool based on its characteristics
		AHC40116 Certificate IV in Agriculture	AHCWOL304 Prepare fleece wool for classing
			AHCWOL305 Prepare skirtings and oddments
			AHCWOL306 Supervise clip preparation
			AHCWOL307 Document a wool clip
			AHCWOL308 Prepare facilities for shearing and crutching
			AHCWOL310 Press wool for a clip
			AHCWOL311 Perform shed duties
			AHCWOL312 Class goat fibre
			AHCWOL313 Class alpaca fleece
			AHCWOL401 Determine wool classing strategies

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
			<p>AHCWOL402 Use individual fleece measurements to prepare wool for sale</p> <p>AHCWOL403 Plan, implement and review wool harvesting and clip preparation</p> <p>AHCWOL404 Establish work routines and manage wool harvesting and preparation staff</p> <p>AHCWOL405 Class fleece wool</p>
2020	Work	<p>AHC21416 Certificate II in Wool Handling</p> <p>AHC30416 Certificate III in Pork Production</p> <p>AHC20616 Certificate II in Parks and Gardens</p> <p>AHC33316 Certificate III in Feedlot Operations</p> <p>AHC21716 Certificate II in Permaculture</p> <p>AHC21616 Certificate II in Landscaping</p> <p>AHC21516 Certificate II in Floriculture</p> <p>AHC21316 Certificate II in Shearing</p> <p>AHC21216 Certificate II in Rural Operations</p> <p>AHC21116 Certificate II in Irrigation</p> <p>AHC21016 Certificate II in Conservation and Land Management</p> <p>AHC20816 Certificate II in Retail Nursery</p>	<p>AHCWRK101 Maintain the workplace</p> <p>AHCWRK201 Observe and report on weather</p> <p>AHCWRK202 Observe environmental work practices</p> <p>AHCWRK204 Work effectively in the industry</p> <p>AHCWRK205 Participate in workplace communications</p> <p>AHCWRK206 Observe enterprise quality assurance procedures</p> <p>AHCWRK207 Collect and record production data</p> <p>AHCWRK208 Provide information on products and services</p> <p>AHCWRK209 Participate in environmentally sustainable work practices</p> <p>AHCWRK301 Collect samples for a rural production or horticulture monitoring program</p> <p>AHCWRK307 Develop and apply fertiliser and soil ameliorant product knowledge</p>

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC20716 Certificate II in Production Nursery	AHCWRK310 Provide onjob training support
		AHC20516 Certificate II in Arboriculture	AHCWRK311 Conduct site inspections
		AHC20416 Certificate II in Horticulture	AHCWRK405 Implement and monitor environmentally sustainable work practices
		AHC20316 Certificate II in Production Horticulture	AHCWRK502 Collect and manage data
		AHC20116 Certificate II in Agriculture	AHCWRK504 Assess new industry developments
		AHC33416 Certificate III in Seed Production	AHCWRK505 Manage trial and research material
		AHC32716 Certificate III in Rural Merchandising	
		AHC30516 Certificate III in Poultry Production	
		AHC30216 Certificate III in Agriculture (Dairy Production)	
		AHC33816 Certificate III in Permaculture	
		AHC33616 Certificate III in Pest Management	
		AHC32316 Certificate III in Conservation Earthworks	
		AHC31716 Certificate III in Natural Area Restoration	
		AHC31616 Certificate III in Lands, Parks and Wildlife	
		AHC31416 Certificate III in Conservation and Land Management	
		AHC30716 Certificate III in Horticulture	
		AHC30116 Certificate III in Agriculture	
		AHC32416 Certificate III in Irrigation	

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YEAR	SPECIALISATION	QUALIFICATION CODE & NAME	UNIT OF COMPETENCY CODE & NAME
		AHC60516 Advanced Diploma of Arboriculture	
		AHC51616 Diploma of Irrigation Management	
		AHC51116 Diploma of Conservation and Land Management	
		AHC50216 Diploma of Pork Production	
		AHC51816 Diploma of Organic Farming	
		AHC51316 Diploma of Pest Management	
		AHC51216 Diploma of Community Coordination and Facilitation	
		AHC51016 Diploma of Sports Turf Management	
		AHC50916 Diploma of Retail Nursery Management	
		AHC50816 Diploma of Production Nursery Management	
		AHC50516 Diploma of Arboriculture	
		AHC50416 Diploma of Horticulture	
		AHC50116 Diploma of Agriculture	