

AGRICULTURE, HORTICULTURE AND CONSERVATION AND LAND MANAGEMENT INDUSTRY SECTOR

IRC Work Plan 2016-2019

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

The Agriculture, Horticulture and Conservation and Land Management Industry Reference Committee Work Plan 2016 - 2019

Purpose

This workforce development and skills needs analysis represents the latest industry intelligence and resulting work plan 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

An analysis of 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 – review of employment projections by the Department of Employment and an outline of the current workforce profile and supply for the industry

Skills Outlook

Provides insights into the key trends that could potentially drive changes in workplace design and identification of key priority skills and skilled labour shortages for the industry.

The *IRC Training Product Review Plan 2016 – 2019 for the Agriculture, Horticulture and Conservation and Land Management Industry* (provided at Appendix 1) draws on the industry intelligence, reports and various points of engagement with industry associations, employers and training providers.

Content

The Agriculture, Horticulture and Conservation and Land Management Industry Reference Committee Work Plan 2016 - 2019	2
Purpose	2
Sector Overview	2
Employment –	2
Skills Outlook	2
Content	3
Executive Summary	4
Summary of Key Points in Each Section	5
A. Administrative Information	9
B. Sector Overview	10
Sector Description	10
Relevant Training Package Qualifications	11
Sector Analysis	14
Relevant Stakeholders	26
Challenges and Opportunities in the Sector	37
C. Employment	40
Employment Outlook	40
Description of Workforce Supply	41
Trends in Workplace Design/Job Design	47
Other Relevant Skills-Related Insights	51
D. IRC Training Product Review Plan 2016 – 2019 for the Agriculture, Horticulture and Conservation and Land Management Industry	52
Explanation	52
Time Critical Issues and Interdependencies	53
Interdependencies	54
Training products scheduled for review more than once in four years	54
E. IRC Signoff	55
Appendix 1	56
IRC Training Product Review Plan 2016 -2019 for the Agriculture, Horticulture and Conservation and Land Management Industry	56

Executive Summary

This report provides an overview of workforce development and skills needs for the Australian agriculture, horticulture, conservation and land management industry sectors. The report was commissioned to support the Australian Industry and Skills Committee (AISC) in developing the four-year rolling National Schedule of training product development and review work. The report is structured, as per the AISC template, in four main sections as follows: sector overview, employment, skills outlook, and training product review plan. Methods of analysis include research of published national and industry data sources and input from Industry Reference Committee (IRC) members and key stakeholders.

The report draws attention to the fact that agriculture, as the process of producing food, feeding products, fibre and other products, and exponential population growth provides this industry with the potential for growth and new business opportunities. The opportunities are also shaped by a number of current government policies including Free Trade Agreements and initiatives like building branding awareness for Australia to be globally recognised as producer of safe, clean agricultural crops and fibre products which integrates animal welfare and on-farm biosecurity measures.

Further, the report describes the industry sector's workforce, consistent with many other industry sectors, as reaching retirement age in high numbers, creating significant challenges for employers – particularly in respect to their ability to attract people to the industry and develop their skills through on the job learning and formal training.

Importantly, the report shows that employers will increasingly seek high level skills to support more demanding job functions in most workplaces and utilisation of more specialist skills driven by growing technological developments and adoption in the agricultural production systems. This occurs because businesses respond to opportunities with growing investments in integrated world-leading technology, continuous development of biotechnology, strategies for better connectivity with and service to domestic and international markets, and ongoing conservation strategies and programs to control invasive species, among many other innovations.

The right mix of high level skills will allow the farmers to capture all the benefits offered by technology. Also, examples of high level skills include a range of skills in the Science Technology Engineering and Mathematics (STEM), compliance, and leadership areas.

The report identifies a growing trend for urban green infrastructure systems and, hence, the emergence of a new generation of horticultural experts.

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 169,339 agricultural businesses, who employ 432,000 people. Almost 70% of these businesses are owner operated, non-employing farms and almost 30% employ less than 20 people. The sector also includes 6,119 agricultural product wholesalers and 120 conservation operators.
- Total sales turnover of the agriculture sectors increased by 4.4% (or \$2.732 billion) to \$64.7 billion between 2012 - 2013 and 2013 - 2014.
- The industry is represented by more than 206 peak organisations at a national level, including industry and industry sub-sectors 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: regulation of genetically modified crops, environmental regulations, food regulations, grape growing legislation, livestock management legislation, Australian ruminant feed ban, biosecurity legislations, live animal export legislation, conservation laws, industry code of conduct, grain trade standards and legislation, international regulations and access to markets, and industry certification programs.
- There are regulated occupations¹ specific to the industry sectors, namely landscapers who must be registered with the state Building Practitioners Board to carry out large structural landscaping; and professional arborists who need to meet several requirements recommended by WorkCover and three industry associations.
- Key macro forces which currently challenge and provide opportunities for the industry sectors include:
 - Global food security significance and higher food demand in expanding markets such as the Asia Pacific region, being reflected also in a number of Government policies aimed at facilitating the sector's growth (e.g. free trade agreements).
 - Climate change and its effects on the agricultural crops, which creates 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 decisions and development of more resilient crop varieties and large scale farming systems.
 - Australian exchange rate against the US dollar, which increases Australian farm sector incomes when depreciation occurs by generating increased earnings from agricultural exports.
 - Exports, which are projected to grow for most agricultural products. International trade creates both challenges and opportunities for many agricultural produces, considering that the Australian agriculture industry is a competitive net exporter sector, with around two thirds of total production being exported.

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

- Existing and ongoing development of enabling technologies, which allows for more efficient and sustainable farming. Examples of enabling technologies include robotics and digital and wireless technology to monitor farm operations, detect issues with crop or livestock health, and reduce water use.

Employment

- Employment growth is anticipated for most of the industry sectors in the coming years.
- About 23% of the industry workforce is likely to retire over the next five years.
- A significant number of the workforce occupies roles unique and specific to the sectors such as livestock and crop farmers, farm workers, shearers, agricultural and horticultural plant operators, nurserypersons, gardeners, garden and nursery workers. A significant 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 Program and skilled migrants from Asia and Africa are also a source of labour for the Australian farms.

Skills outlook

DRIVER	SKILLS OUTLOOK	TRAINING PACKAGE PROJECT
Transition to ongoing implementation of new processes and technologies in irrigation.	Skills required around various types of irrigation such as pressurized irrigation operations and gravity fed irrigation systems.	Review qualifications in: Certificate II in Irrigation Certificate III in Irrigation Certificate IV in Irrigation Diploma of Irrigation Management
The National Agvet Chemical Task Force working group were tasked with harmonizing the approach to chemical training requirements, including a review of state based regulatory frameworks and future developments in managing spray drift risks.	Skills required in the industry are required to reflect the recommendations of the Task Force.	Review units of competency in the Chemical Application (CHM) sector.
The National Wild Dog Action Plan has identified the need for minimum standards to be applied nationally to facilitate the access to and uptake of wild dog control professionals by agencies and land managers. Currently there are shortages of such professionals. Changes to regulatory requirements for the training and assessment for handling and application of agricultural chemicals, veterinary medicines and other	Increased demand for skills in pest control and management including wild dog control.	Develop new qualification in wild dog management. Review Certificate III in Pest Management and Certificate II in Vertebrate Pest Management.

DRIVER	SKILLS OUTLOOK	TRAINING PACKAGE PROJECT
substances are currently being implemented.		
Transition to new technology and processes used in conservation and land management.	New knowledge and operational capacity to optimize technology	Develop 15 new units of competency across following areas: Manage remote solar power supply system Manage public access and activities in wilderness areas Working around power lines Interpret and recognize geology and land forms Use camera traps
Recent deaths on Quadbikes has led to concern over the safety of operation. New Machinery may be used instead of quads (drones).	In response to quadbike deaths there is concern regarding the level of skills operators have. New and emerging skills will be required for the use of new technology such as drones.	Review four units of competency: Operate quad bikes Operate tractors Operate vehicles Operate side by side utility vehicles Develop one new unit of competency: Operate Drones (new Unit)
Over reliance on chemicals to manage pests is causing concerns environmentally with increasing resistance to chemicals requiring new variants of chemicals to be developed. Many chemicals also take out the beneficial insects that actually control the pest. A holistic approach of balancing chemical use with a greater use of introducing beneficial insects and use of organic rather than chemical agents will be more environmentally sustainable benefitting the overall ecosystem.	Industry requires skills in botanical knowledge, pruning techniques, grafting techniques, plant identification, pest identification, integrated pest management, and identifying soil/media composition.	Review Qualifications in: Certificate IV in Production Horticulture Certificate III in Production Horticulture.
Introduction of online shopping and ordering has increased the sales footprint of many organisations leading to an expansion in the delivery and sourcing of products from longer distances. Managing the logistics of obtaining inputs for enterprises is a growing skill need for small to medium enterprises.	Higher level supply chain and logistics skills required to support lean, fast, reliable, transparent and collaborative relationships with key suppliers and customers and with other companies, including competition and research organisations	Supply chain and logistics at AQF level 5.
Free trade agreements to China have opened up	Skills required in how to export food and livestock to	Develop/update qualifications, skill sets and units covering skills for export readiness

DRIVER	SKILLS OUTLOOK	TRAINING PACKAGE PROJECT
opportunities for market access to Australian Farmers.	Asian markets and global logistics.	(including logistics market planning, negotiation and contract management, cultural competency and an awareness of Asian market preferences for products, presentation and transportation).
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 in the future.	Owners and senior managers will need to be equipped with 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.	Review Agribusiness qualifications.
Increasing use of genetically modified crops in Australia.	New skills related to the regulation, adoption and management of biotechnology, such as genetically modified cotton and canola.	Develop new Skills Sets.
Increasing market demands for innovation in product development to ensure viability of enterprises and to take opportunities in new free trade agreements with China.	New knowledge and operational capacity related to innovation and product development	<p>Develop four units of competency for supporting, managing and leading product innovation in agriculture, horticulture and CLM industries</p> <p>New unit: support product innovation</p> <p>New unit: manage the implementation of product innovations</p> <p>New unit: initiate and lead industry innovation</p> <p>New unit: lead industry innovative thinking and practice</p>
STEM has been identified as an important skill need in all education areas in Australia.	Review and update qualifications, skills sets and/or units for use of spatial and information technologies, sensors and robotics for environmental monitoring, precision	Review and update skills for use of data analysis spatial and information technologies, sensors and robotics for environmental monitoring, precision agriculture/horticulture and traceability, controlled

DRIVER	SKILLS OUTLOOK	TRAINING PACKAGE PROJECT
	agriculture/horticulture traceability	atmosphere storage, and drone operation.
<p>Growing investment in integrated farm technology, quality standards and data analysis are expected to influence the roles of farmers.</p> <p>Continuous development of biotechnology 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>In response to climate change and government policy, knowledge of relevant science, digital and analytical skills, assessing crop health, data capture from a range of devices, and strategic planning and business management.</p>	<p>Review Qualifications: Certificate II in Agriculture Certificate III in Agriculture Certificate IV in Agriculture Diploma of Agriculture</p>
<p>The Australian honey bee industry is composed of about 12,000 registered beekeepers. CSIRO has made submissions to an enquiry in low bee numbers describing bee deaths as a real threat to Australia's beekeeping industries and the agricultural sector. Bee pollination contributes up to \$1.73 billion in agricultural crops annually.</p> <p>A major threat to honey bees in Australia is the Varroa Mite.</p>	<p>Skills required in biosecurity, pest management, pollination, and value adding.</p>	<p>Review the Certificate III in Beekeeping.</p> <p>Develop a new basic introduction to bees Skill Set</p>
<p>The changing landscape of animal welfare, farm gate milk processing technology, increasing automation and low milk pricing have broader implications on training.</p>	<p>Skill needs in the areas of milking automation, animal welfare, and processing technology.</p>	<p>Review the Certificate III in Agriculture (Dairy Production).</p>

A. ADMINISTRATIVE INFORMATION

Name of Applicable Industry Reference Committee:

Rural and Related Industry Reference Committee (IRC)

Name of Applicable Skills Service Organisation (SSO):

Skills Impact Ltd

B. SECTOR OVERVIEW

Sector Description

The Agriculture, Horticulture, 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

- Nursery production
- Floriculture production
- Vegetable growing
- Fruit & Nut growing

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 storages services

Agricultural Product Wholesaling

- Fruit and vegetables wholesaling

- Cereal grain wholesaling
- Wool wholesaling
- Fish and seafood wholesaling

Conservation

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

In 2015 the sector included more than 169,339 agricultural businesses, 69% of which were non-employing farms and 29% employing less 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 farmer. The sector also included 6,119 agricultural product wholesalers and 120 conservation operators.²

The agriculture contribution to the Australian economy includes: ³

- Total sales turnover, which increased by 4.4% (or \$2.732 billion) to \$64.7 billion between 2012 - 2013 and 2013 - 2014
- Industry value added (IVA), which increased by 1.4% (or \$321 million) to \$22.6 billion over the same period
- Employment, which increased by 2.6% (or 11,000 people) to 432,000 people at June 2014.

The value of Australian farm exports is expected to increase by further 3%, to be around \$45 billion in 2015 – 2016.⁴

Relevant Training Package Qualifications

The Training Packages for the Agriculture, Horticulture, Conservation and Land Management Industry Sector are *AHC Agriculture, Horticulture and Conservation and Land Management*. AHC comprises 91 Qualifications, 24 skill sets and 820 units of competency.

Qualification Level: Certificate I

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

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
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

² ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

³ ABS, Australian Industry, 2013-14, Cat No 8155.0.

⁴ ABARES, 2016, Agricultural commodities – vol. 6 no. 1. March quarter 2016

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
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

Sub-sector description and analysis of businesses involved

AMENITY HORTICULTURE

Sub-Sector Name	Arboriculture Services
Scope of Work	<p>Businesses in this sector include practicing arborists and consultants who conduct tree care operations or provide diverse specialist arboricultural services. Area of operations include:</p> <ul style="list-style-type: none"> • Utility clearance, eliminating contact between vegetation and power lines and maintaining clearances from infrastructure • Tree care, planting, pruning and tree removal in urban area, in confined spaces surrounded by buildings and open spaces such as parks • Tree climbing, providing services such as seed collection, ecology and habitat work and canopy access for hardware installations such as lights or fauna monitoring/bridges.
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 New South Wales, Queensland and Victoria.
Automation and Digitisation	The sector involves operations which require working at height and with specialised equipment including chainsaw and skid steer machinery. Global information systems (GIS) and mapping is also used in the industry to provide the location and specifics of all 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 (fertilising, seeding, spraying), lawn mowing, maintenance of plants and shrubs.
Companies	In June 2015 there were 10,921 gardening businesses in Australia. ⁵ More than half (65%) are non-employing businesses. Many others (34%) are small businesses, employing fewer than 20 people. The sector also includes a number of large operators, which often operate as franchise businesses.
Geographical Location	Gardening services activities occur in all Australian states, yet New South Wales, Victoria, Queensland and Western Australia host together 89% of all gardening businesses.

⁵ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

Sub-Sector Name	Gardening Services
Automation and Digitisation	Technology used in this industry involves mobile communications, blowers, lawn edgers, whipper snippers, and chain saws.

Sub-Sector Name	Landscape Construction Services
Scope of Work	<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 garden structural features.</p> <p>The sector also includes businesses that provide landscape consultancy and design services.</p>
Companies	In June 2015 there were 14,472 landscape businesses in Australia. ⁶ Just above half (56%) are non-employing businesses which mainly service residential market. Many others (42%) are small businesses, employing fewer than 20 people. The sector also includes a number of large operators, which dominate commercial work.
Geographical Location	Landscape services activities occur in all Australian states, yet New South Wales, Victoria and Queensland host together 75% of all landscape businesses.
Automation and Digitisation	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.

Sub-Sector Name	Turf Growing
Scope of Work	<p>This sector is comprised of 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 manages the golf course maintenance.</p>
Producers	In June 2015 there were 484 operating turf growers in Australia. ⁷ Most turf growers operate on a small scale, employing fewer than 20 people or operating as sole traders. Industry indicates that data related from the turf growing industry is often under reported.

⁶ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

⁷ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

Geographical Location	Turf growing activities occur in all Australian states with New South Wales and Queensland having the largest share (72%) of turf growers.
Automation and Digitisation	This 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

Sub-Sector Name	Nursery Production and Retail
Scope of Work	Businesses in this 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.
Producers	The sector comprised 1,150 nursery producers in June 2015, consisting of 391 under cover producers, and 759 outdoor producers. The sector is dominated by small (40%) or non-employing family operators (55%) ⁸ . There is a small number of medium-size private companies. There is also a small amount of public sector participation in the industry, such as government and municipal nurseries.
Geographical Location	Nursery production occurs across all Australian states. The majority of business activity (77%) is concentrated in New South Wales, Victoria and Queensland.
Automation and Digitisation	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.

Sub-Sector Name	Floriculture Production
Scope of Work	Producers in this sector grow or produce flowers, foliage and seeds, either outdoors or in greenhouses, cold frames, cloth or lath houses. Floriculture production is organised into both undercover and outdoors production systems

⁸ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

Producers	In June 2015 there were 811 floriculture producers in Australia comprising of 174 under cover producers, and 637 outdoor producers. ⁹ Most of these were non-employing, family-owned businesses or small employing operators. The sector has a small number of medium-size floriculture producers.
Geographical Location	While floriculture producers are located in all Australian states, the sector is concentrated in Victoria, New South Wales and Queensland (74%).
Automation and Digitisation	Some producers are using computer-based systems and software to achieve better inventory and production planning, improved marketing and distribution systems.

Sub-Sector Name	Vegetable Growing
Scope of Work	Companies in this 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, grocery stores. Vegetable production is organised into both under cover (hydroponics/greenhouse) and outdoors (field) production systems.
Growers	In June 2015, there were 6,019 vegetable growers in Australia consisting of 830 under cover producers, and 5189 outdoors producers ¹⁰ . 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. The sector also includes over 225 medium-size businesses, growing vegetables particularly outdoors in open fields, and a ten large growers which are generally integrated with logistics and packing activities. Small producers have a significant role in small local markets and also market gardening activity close to the peri-urban fringe.
Geographical Location	Vegetables growers are spread across Australia with the majority located in New South Wales, Queensland, Victoria, South Australia and Western Australia.
Automation and Digitisation	Operators in the vegetable growing 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 sector is also increasingly using controlled atmosphere storage to regulate the temperature, oxygen, carbon dioxide and humidity of storage conditions, so that to supply markets with fresh vegetables out of season.

⁹ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

¹⁰ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

Sub-Sector Name	Fruit and Nut Tree Growing
Scope of Work	The 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, direct to retailers Supermarkets, grocery stores and small fruit markets or to producers for further processing into fruit produce.
Growers	The fruit growing sector is characterised by a large number of operators (totaling 15,321 businesses in June 2015) ¹¹ . 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-scale operators engage additional temporary employees. The sector includes 604 medium-size businesses that employ between 20 and 199 employees and 20 large fruit/nut growers that employ at least 200 employees, with most of these operating as vertically integrated companies into downstream processes.
Geographical Location	Fruit producers are located in regional areas with suitable climate conditions in all Australian states and territories. Temperate, fruit farming activity is concentrated in regional New South Wales, Victoria, South Australia and Tasmania. Tropical fruit growers are predominately located in Far North Queensland, Northern Territory and Western Australia, Tree nuts are produced in South East Queensland, Northern NSW and in temperate climates along the Riverina and Sunraysia regions.
Automation and Digitisation	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 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.

Sub-sector name	Viticulture
Scope of work	The 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 or to fruit and vegetable wholesalers or grape processing / crushing companies.

¹¹ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

Growers	The viticulture sector is characterised by a large number of operators (totaling 6,943 growers in 2015) ¹² . 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 sector includes a small number of medium-size and large grape growers, with some operating as vertically integrated companies into downstream processes.
Geographical location	<p>Vineyards are located in regional irrigable areas with suitable climate 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 South Australia; Sunraysia, Yarra Valley, Mornington Peninsula, Heathcote, Western District, Rutherglen and Beechworth in Victoria; and Hunter Valley, Great Dividing Range, Orange, Forbes, and Griffith in New South Wales.</p> <p>Large growing regions for table grapes include Sunraysia and the Murray Valley in Victoria; the Riverina in NSW; and south-eastern Queensland.</p>
Automation and digitisation	The viticulture sector is characterised by improvement in machinery, particularly mechanical harvesters, and more efficient irrigation systems including drip, micro-spray and mini-sprinkler systems. The 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

Sub-Sector Name	Grain Growing
Scope of Work	The sector includes businesses that grow cereal grains including wheat, rice, oats, rye, barley, corn, peas, millet, and sorghum. Farms in the sector frequently diversify into different cereal cropping activities and sometimes into livestock activities. Cereal crops are harvested and sold to cereal grain wholesalers or, particular varieties, to beef cattle and poultry as animal feedstock.
Producers	The sector comprises 11,927 cereal grain producers, including many small family-owned, non-employer farms (63%) and farms employing less than 20 people. ¹³ The sector has a small number of large producers.

¹² ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

¹³ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

Sub-Sector Name	Grain Growing
Geographical Location	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 New South Wales, Victoria, South Australia, Western Australia and Queensland. The wheat belts regions include the Wimmera and Central West of Victoria, South East of South Australia, Mid-North and Flinders of South Australia, Central West of New South Wales, the Goldfields of Western Australia and Darling Downs Queensland. Rice farms are predominantly located in New South Wales.
Automation and Digitisation	<p>Activity in this sector is characterised by the use of capital intensive equipment such as tractors and irrigation systems, and 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 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 and GIS systems, spectral imaging, or remote sensing, assist grain farmers to determine which crops are best suited in each area.</p>

Sub-Sector Name	Fodder Growing
Scope of Work	This 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.
Growers	The sector includes many small fodder growers, most of which are non-employing businesses ¹⁴ .
Geographical Location	Victoria, New South Wales and Queensland all have significant numbers of fodder growers.
Automation and Digitisation	Fodder crops involves capital intensive irrigation systems and mechanical harvesters.

Sub-Sector Name	Sugar Cane Growing
Scope of Work	The sector includes businesses that grow sugar cane. The crop is sold to sugar manufacturing companies.

¹⁴ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

Producers	The sector consists of 4,928 sugar cane producers ¹⁵ . The majority are small, family-owned non-employing businesses` or employing fewer than 20 people. There is a small presence of medium-size sugar cane growers, which are generally corporates or farmers' cooperatives with vertically integrated operations into downstream sugar cane processing.
Geographical Location	The sector is highly concentrated in Queensland as sugar cane requires specific climate conditions to grow. Australia's major sugar cane region spans the coastal and river plains in Queensland and northern New South Wales.
Automation and Digitisation	Tractors, highly mechanised harvesters and irrigation systems are involved in the sector activity.

Sub-Sector Name	Cotton Growing
Scope of Work	The sector comprises businesses that grow cotton. The crop is sent to cotton ginning ¹⁶ businesses for further processing.
Producers	The sector includes 985 cotton producers. ¹⁷ 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.
Geographical Location	The sector is highly concentrated in New South Wales and Queensland.
Automation and Digitisation	The 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.

Sub-Sector Name	Seed Production
Scope of Work	This sector consists of businesses that produces seeds for crops such as grains, vegetables, fruit, flowers, and oilseeds.
Producers	The sector includes several large global seed production players and many small-scale seed growers.

¹⁵ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

¹⁶ separating the cotton fibres/lint from the cottonseed

¹⁷ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

Geographical Location	Producers are generally located near areas with high concentrations of agricultural activities, particularly in New South Wales, Victoria and Western Australia.
Automation and Digitisation	The sector is characterised by capital-intensive laboratory settings, equipped with biotechnology related infrastructure. X-ray technology is intensively used throughout the research and to gain an understanding of seed structures and internal compositions.

LIVESTOCK FARMING

SUB-SECTOR NAME	LIVESTOCK FARMING
Scope of Work	This 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, 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 animal products such as wool, milk, egg or honey to wholesalers or food processors.
Producers	The sector is characterised by a large number of operators, totaling 88,921 farms in 2015 ¹⁸ . Half are specialised beef cattle farmers. About 75% of livestock farms are non-employing, family-run businesses and 23% employs fewer than 20 people. Few medium-size farms operate in the sector, with some being vertically integrated into meat processing.
Geographical Location	Although livestock farming occurs across Australia, most of the activity is in Queensland, New South Wales, Victoria, Western Australia and South Australia.
Automation and Digitisation	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 the herd health.

MIXED CROP AND LIVESTOCK FARMING

Sub-Sector Name	Mixed Crop and Livestock Farming
Scope of Work	This sector includes farms that grow grain in conjunction with beef cattle or sheep farming activities. Diversification in multiple agriculture sectors

¹⁸ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

	allows farmers to reduce business risks associated to unfavourable weather conditions and volatility of markets and prices.
Producers	The sector consists of a large number of operators, totaling 21,380 mixed crop and livestock farms in 2015. ¹⁹ The majority are small family-owned and operated businesses. There is a small presence of medium-size farms.
Geographical Location	Mixed crop and livestock farming occurs across Australia, however most crop and livestock farming establishments are located in New South Wales, Victoria, Western Australia, South Australia and Queensland.
Automation and Digitisation	Similar to specialised crop and livestock farming, this sector employs a range of highly mechanised equipment and computer-based technology and systems to effectively and efficiently produce their agricultural products

AGRICULTURE SUPPORT SERVICES

Sub-Sector Name	Agriculture Support Services
Scope of Work	Businesses in this sector provide services, including aerial agricultural services, shearing, contract crop harvesting and animal testing to the agriculture sector. This sector includes businesses involved in ginning and trading cotton.
Businesses	There were 1,040 shearing businesses, 38 cotton ginning businesses and 10,465 other agriculture and fishing support services in Australia in 2015 ²⁰ . 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 sector.
Geographical Location	The majority of businesses are located in New South Wales, Victoria and Queensland, close to agricultural farms.
Automation and Digitisation	This sector benefits from the use of new technology and ongoing automation in harvesting and aerial processes.

AGRICULTURAL PRODUCT WHOLESALING

Sub-Sector Name	Agricultural Product Wholesaling
Scope of Work	Businesses in this sector wholesale on behalf of farmers in the following categories through supply of: <ul style="list-style-type: none"> • Fresh fruit and vegetables to fruit and vegetable retailers, supermarkets and grocery stores, or the catering and food services

¹⁹ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

²⁰ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

Sub-Sector Name	Agricultural Product Wholesaling
	<p>sector. Produce is brushed, washed or packaged by either producers or packaging companies.</p> <ul style="list-style-type: none"> • Cereal grains to livestock farms and food processors • Wool to textile producers • Fresh, frozen or processed fish to specialist fish and seafood retailers, supermarkets and grocery stores, food catering services, and restaurants • Other agricultural products. <p>Wholesalers can also be importers and exporters of agricultural product.</p>
Wholesalers	<p>There were 6,708 wholesaling units in the sector in 2015.²¹ About half are non-employing businesses and most of the other half are companies employing less 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.</p>
Geographical Location	<p>Agricultural product wholesalers operate throughout Australia yet the majority are concentrated in the states with most economic activity such as New South Wales, Victoria and Queensland.</p>
Automation and Digitisation	<p>The sector benefits from the use of computerised automation of inventory control and online trading. Radiofrequency identification (RFID) systems, supported by computerised database, 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, facilitate cost control and manage commodity and exchange rate risks.</p> <p>Parts of the sector use specialised commercial chillers capable of maintaining optimal temperatures with a high degree of reliability by allowing for careful setting and monitoring of temperature, humidity, light and carbon dioxide supply.</p> <p>Global positioning systems (GPS) are used to track deliveries, achieve optimal routes and coordinate stock.</p>

²¹ ABS, Counts of Australian Businesses, including entries and exits, June 2015, Cat No 816502

CONSERVATION

Sub-Sector Name	Conservation Operations
Scope of Work	<p>This sector comprises businesses and organisations that operate:</p> <ul style="list-style-type: none"> • Nature reserves and conservation parks, including national parks, state parks and other parks, for the preservation of flora and fauna in their natural environment • Botanical gardens.
Organisations	<p>Nature reserves and conservation parks are operated by government bodies, including local, state and federal government agencies, and non-government organisations. Private organisations also operate in the industry through privately owned and operated parks and gardens, involving a large number of volunteers.</p> <p>Main Organisations²²</p> <p><i>Nature Reserves</i> Parks Victoria Office of Environment and Heritage NSW (through the NSW National Parks and Wildlife Service (NPWS)) Parks Australia Local governments Bush Heritage Australia (BHA).</p> <p><i>Botanical Gardens</i> Royal Botanic Gardens and Domain Trust Royal Botanic Gardens Board Victoria.</p>
Geographical Location	<p>Each state and territory in Australia has government departments responsible for national park and conservation reserves. Also, in each state there is one major public zoo and botanic garden.</p>
Automation and Digitisation	<p>Digital technology is heavily used in the sector, including tracking systems for animals, state-wide databases of flora and fauna, computerised maps and mapping, communication systems, local area networks (LANS) to cover all offices in a state. Computerised asset management systems are also used across the national reserves and conservation parks sector. In addition, fixed-wing aircraft, helicopters and other techniques are used to control and fight fire.</p> <p>Botanic gardens operators use breeding and 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 global positioning technology (GPS).</p>

Sub-Sector Name	Land Care and Management
Scope of Work	<p>Individuals and groups in this 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 such as:</p> <ul style="list-style-type: none"> • Sustainable farm practices • Restoring native habitats and revegetation • Controlling weeds and pests • Developing and sharing local natural resource management skills and knowledge.
Groups	<p>The sector includes Landcare groups, farming systems groups, 'Friends of' groups and Indigenous land management groups. It is estimated 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 but are not always affiliated with a particular Landcare group.²³</p>
Geographical Location	<p>Landcare groups and individuals are represented across all Australian states and regions.</p>

Relevant Stakeholders

The Agriculture, Horticulture, Conservation and Land Management Industry Sector is represented by more than 206 peak organisations at a national level (Table 1 and 2). These organisations include two industry umbrella associations, over 155 industry sectors and sub-sectors associations, including government and non-government organisations responsible for Australian fauna and flora conservation, a small number of associated industry sectors associations, 15 professional associations, 13 industry R&D services bodies, and a number of regulatory bodies and other industry service organisations. The numbers do not include state-based industry associations.

Table 1: Relative Number of the Industry Peak Bodies

Category	Number
Industry Umbrella Associations	2
Industry Sectors Associations	155
Associated Industry Sectors Associations	8
Professional Associations	15
Industry R&D Services Bodies	13
Regulatory Bodies and Other Industry Services	18
Total	206

²³ Department of Agriculture and Water Resources, 2015, Landcare. [www] <http://www.agriculture.gov.au/ag-farm-food/natural-resources/landcare>

Table 2: Peak Industry Sector Organisations

CATEGORIES
INDUSTRY UMBRELLA ASSOCIATIONS
National Farmers' Federation (NFF) Agribusiness Association of Australia Inc. + State Industry Associations
INDUSTRY SECTOR ASSOCIATIONS
AMENITY HORTICULTURE
Arboriculture
Arboriculture Australia International Society of Arboriculture Landscaping Australia Incorporated Tree Contractors Association Australia (TCAA) + State Industry Associations
Indoor Plant Hire and Maintenance
National Interior Plantscape Association
Turf and Sports Turf Management
Australian Golf Course Superintendents Association (AGCSA) Sports Turf Australia (STA) Turf Grass Association of Australia (TGAA) Turf Producers Australia (TPA) Turf Australia + State Industry Associations
PRODUCTION HORTICULTURE
Horticulture Voice of Horticulture + State Industry Associations
Nursery
Nursery and Garden Industry Australia (NGIA) + State Industry Associations
Floriculture
Australian Flower Council Flower Industry Association - Australia Inc. State Industry Associations Wildflowers Australia Wildflowers Australia Network
Mushroom and Vegetable Growing
Australian Asparagus Council Australian Mushroom Growers Association Ltd Australian Sweet Potato Growers Australian Vegetable and Potato Growers Federation AUSVEG Potato Processing Association of Australia Protected Cropping Australia

Onions Australia
+ State/Regional Industry Associations

Grape Growing

Australian Table Grape Association
Wine Grape Growers Australia

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 (SAL)
Cherry Growers Australia Inc.

Citrus Fruit Growing

Citrus Australia

Olive Growing

Australian Olive Association

Other Fruit and Tree Nut Growing

Almond Board of Australia
Australian Banana Growers' Council
Australian Custard Apple Growers Association
Australian Lychee Growers Association
Australian Macadamia Society Ltd
Australian Mango Industry Association
Australian Melon Association Inc.
Australian Pecan Growers Association Inc.
Australian Pineapple Association
Australian Walnut Industry Association
Avocados Australia Ltd
Australian Nut Industry Council
Chestnuts Australia Inc.
Dried Fruits Australia
Passionfruit Australia Inc.
Hazelnut Growers of Australia Inc.
Peanut Company of Australia
Persimmons Australia Inc.
Pistachio Growers Association Inc.
Tropical Exotic Fruit Australia
+ Other State Associations

BROADACRE AGRICULTURE

Oilseeds

Australian Oilseeds Federation
Australian Sunflower Association
Canola Association of Australia

Cereals

Australian Grain Harvesters Association (AGHA)
Barley Australia
Grain Growers
Grain Producers Australia
Grain Trade Australia
Maize Association of Australia
+ State/Regional Industry Associations

Pulses

Australian Mungbean Association
Bean Growers Australia
Pulse Australia
Soy Australia

Sugar Cane

Australian Cane Farmers Association (ACFA)
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 (ADF)
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)
Australian Chicken Growers' Council (ACGC)
Egg Farmers Australia
+ State/Regional Industry Associations

Deer

Deer Industry Association of Australia

Pig

Australian Pig Breeders Association
+ State Industry Associations

Beekeeping

Australian Honey Bee Industry Council Inc. (AHBIC)
Australian Queen Bee Breeders Association
Crop Pollination Association Inc.
Honey Packers & Marketers Association of Australia (Inc.)
National Association of Crop Pollination Associations
+ State 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 (DGSA)
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
Grain Trade Australia
Irrigation
Irrigation Australia
Livestock and Bulk Carriers Association
National Irrigator's Council
Shearing
Shearing Contractors Association of Australia
Transport Services
Wheat Exports Australia
Wool classers' Association of Australia
Wool Classing

Conservation and Land Management

Animal Health Australia
Australian Conservation Foundation
Australian Landcare Council
Australian National Botanic Gardens
Australian Native Plants Society (ANPSA)
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 (INECE)
International Plant Propagators Society Australia
Invasive Plants and Animals Committee
Landcare Australia Ltd
Marine Estate Management Authority
National Aboriginal Lands Managers Association
National Association for Sustainable Agriculture Australia
National Environment Protection Council (NEPC)
National Environmental Law Association
National Landcare Network
National Parks and Nature Reserves
National Parks Australia Council (NPAC)
National Parks Conservation Associations
National Urban Forest Alliance
Parks and Leisure Australia
Parks Australia
Plant Health Australia
Specialist Interest Groups
State and Territory National Parks Association
The Australian Government National Landcare Programme
The Wilderness Society
State/Territory Organisations

Associated Industry Sectors Associations

Australian Livestock & Property Agents Association (ALPA)
Australian Organics Recycling Association (AORA)
Biological Farmers Australia (BFA)
Green Roofs Australasia (GRA)
National Herd Improvement Association of Australia Incorporated
Organic Federation of Australia
Sustainable Gardening Australia (SGA)

Professional Association

Australian Environmental Pest Managers Association
Australian Institute of Horticulture (AIH)
Australian Institute of Landscape Architects (AILA)
Australian Institute of Landscape Designers and Managers
Australian Society of Horticultural Science
Crop Consultants Association

Institute of Australian Consulting Arboriculturists (IACU)
Institute of Australian Geographers
Parks & Leisure Australia (PLA)
State and Territory Weed Societies
The Environment Institute of Australia and New Zealand
Tree Guild of WA (TGWA)
Utility Arborist Association Australia (UAAA)
Weed Society of Victoria
Weed Society of Western Australia

Industry R & D Services

Apple and Pear Australia Ltd
Australian Egg Corporation Limited (AECL)
Australian Farm Institute
Australian Pork Limited (APL)
Australian Wool Innovation (AWI)
Cotton Research and Development Corporation
Fisheries Research and Development Corporation
Grains Research and Development Corporation
Horticulture Innovation Australia
Local Government Tree Resources Association (LGTRA)
Regional Australia Institute (RAI)
Rural Industries Research and Development Corporation
NSW Irrigators' Council (NSWIC)
Dairy Australia
Meat & Livestock Australia Ltd (MLA)

Regulatory Bodies and Other Industry Services

Australian Seeds Authority (ASA)
Wheat Quality Australia
Australia Wool Testing Authority
Corporate Agriculture Australia
PrimeSafe
Rural Skills Australia (RSA)
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

Industry and Occupational Regulations and Standards

Industry Regulations and Standards

The Australian Agriculture, Horticulture, 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 Commonwealth *Gene Technology Act 2000* (Cth) through the Gene Technology Regulator. The regulatory policy seeks to protect the health and safety of people, and the environment. The regulator identifies risks posed by, or as a result of, gene technology, and manages those 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 regulation relevant to the industry includes²⁴:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Hazardous Waste (Regulation of Exports and Imports) Act 1989* (Cth)
- *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* (Cth)
- *Water Act 2007* (Cth), *Water Amendment Act 2008* (Cth), and associated Water Regulations
- *Water Quality - National Water Quality Management Strategy (NWQMS) (2000)*
- *EPHC/NEPC Assessment of Site Contamination National Environment Protection Measure – NEPM 2001*
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000*
- *NHMRC Australian Drinking Water Guidelines 2001*
- *Australian New Zealand Food Standards Code (ANZFSC)*
- *National Residue Survey (NRS)*
- *National Environment Protection Measure (Ambient Air NEPM and Air Toxics NEPM)*

State 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 its environmental effect, particularly in the Murray-Darling Basin, which supports a large proportion of Australia's vegetable crops.

Food Regulations

Food Standards Australia New Zealand (FSANZ) includes 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 food-borne illness associated with seed

²⁴ Horticulture for Tomorrow and Horticulture Australia Limited, 2014, Guidelines for Environmental Assurance in Australian Horticulture. [www] <http://horticulturefortomorrow.com.au/manage/wp-content/uploads/2014/05/Environmental-Assurance-Guidelines-2014-full-version-2.pdf>

sprouts, eggs or egg product. In addition, dairy standards outline the implementation of documented food safety programs for dairy primary production and for the collection, transportation and processing of raw milk to protect public health across all jurisdictions.

The majority of fresh horticultural produce in Australia is grown under industry-based food safety schemes.²⁵ These schemes, and several state 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 government regulations and guidelines include:

- *Food (Plant Products Food Safety Scheme) Regulation (2005)* in New South Wales to provide specific control measures to manage the safe production and supply of seed sprouts, fresh-cut fruit and vegetables and juices.
- *Food Production (Safety) Regulation (2002)* in Queensland sets out requirements for the transport and processing of fresh primary produce.
- NSW Food Authority's *Industry Guide for the Development of a Food Safety Program (High Priority Plant Products Industry)* covers seed sprouts, fresh-cut fruits and vegetables, unpasteurised juice, and vegetables in oil.
- Guidelines for On-Farm Food Safety for Fresh Produce are maintained by the Federal Department of Agriculture and Water Resources

Industry food safety schemes in Australia include:

- HACCP
- Freshcare
- GlobalGAP
- Supermarket quality and food safety schemes.

Grape Growing Legislation

The Australian grape and wine sector is subject to a number of Federal and State legislations, including the Australian Grape and Wine Authority Act 2013 and the Australian Grape and Wine Authority Regulations 1981. 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 legislations 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 governments are responsible for livestock management, disease response and welfare arrangements within their jurisdictions, in terms of both enforcing national standards and agreements, as well as administering state legislation.

²⁵ Food Standards Australia New Zealand (FSANZ), 2014, Horticulture [www]
<http://www.foodstandards.gov.au/code/primaryproduction/horticulture/Pages/default.aspx>

Legislation relating to livestock management includes²⁶:

- *Agricultural and Veterinary Chemicals (Control of Use) Act 1992* (Vic)
- *Agricultural and Veterinary Chemicals (Control of Use) Regulations 2007* (Vic)
- *Impounding of Livestock Act 1994* (Vic)
- *Impounding of Livestock Regulations 2008*
- *Livestock Disease Control Act 1994* (Vic)
- *Livestock Disease Control Regulations 2006*
- *Livestock Management Act 2010* (Vic)
- *Livestock Management Regulations 2011*
- *Prevention of Cruelty to Animals Act 1986* (Vic)
- *Prevention of Cruelty to Animals Regulations 2008*
- *Prevention of Cruelty to Animals (Domestic Fowl) Regulations 2006*
- *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 it is part of a comprehensive national TSE Freedom Assurance Program. The prohibition and the program target livestock producers and other end users of manufactured stock feed, retailers of manufactured stock feed, and stock feed manufacturers. Each Australian state adopted the ruminant feed ban in legislations, indicating feeding prohibition and requirements for labelling and RAM content.

In addition, the industry implements 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 stock feeds, to minimise the possibility of cross-contamination.

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) (Quarantine Act).

In addition, state 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.

²⁶ Agriculture Victoria, NA, Livestock management [www] <http://agriculture.vic.gov.au/agriculture/farm-management/legal-information-for-victorian-landholders/livestock-management>

Live Animal Export Legislation

Two bills were enforced in Australia to amend the *Australian Meat and Livestock 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* and the *Live Animal Export (Slaughter) Prohibition Bill 2014* were introduced to prohibit the export of live-stock for slaughter on or after 1 July 2017 and provide that 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 regime for the conservation of biodiversity.

Industry Codes of Conduct

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

- Horticulture Code of Conduct
- Growing Australian Grain (<http://grainsguide.grainproducers.com.au/>)
- 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
- *WorkCover Code of Practice: Amenity Tree Industry 1998*
- 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 (LPA), which is an on-farm food safety certification program for cattle, sheep and goats
- National Feedlot Accreditation Scheme (NFAS), 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
- Egg Corp Assured (ECA)
- Q-Alpaca, which is a quality assurance program for voluntary use by Australian alpaca breeders and owners
- B-Qual, which is 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, which is the quality assurance program for the Australian stockfeed industry

Employment Laws and Workplace Health and Safety

The horticulture sector provides learning materials to stakeholders to improve occupational health and safety on the property through the Horticulture Safety Guide. The guide teaches how to control the hazards on the property and take the necessary steps to improve safety in the workplace. The guide includes policies and procedures about: hazard identification, risk assessment and control, personal protective equipment, consultation and communication, induction and training, employment of contractors and seasonal workers; environment guidelines related to amenities, traffic, working environment and child safety; and hazard assessment processes regarding plant, farm chemicals, manual handling, working at heights, electricity, confined spaces, workshop, pruning and wine bins.

Regulated Occupations in the Industry

Regulated occupations have legal (or industry) requirements or restrictions to perform the work. Regulated occupations require a license 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 to be registered with the state Building Practitioners Board (*Domestic Building Contracts Act 1995* (Vic)) to carry out large structural landscaping. Qualifications include completion of Certificate III courses in landscape construction or horticulture.

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

Challenges and Opportunities in the Sector

The Australian Agriculture, Horticulture, Conservation and Land Management Industry Sector operates in a dynamic environment shaped by a range of natural factors, as well as policy frameworks at state, national and international levels. Access to free trade and knowledge of market requirements has become increasingly more important, along with developing new and innovative technologies in order to adapt to changes in land and water availability, biosecurity, and changing climatic conditions. Challenges and industry's 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 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 the following amongst others:

- *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 governments have also seen the agricultural and food sectors as critical contributors to local growth and export, leading with policies based on state-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.

Climate Impact on Agricultural Crop

Climate change and soil degradation are some factors that agricultural producers will have to increasingly 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 impact on 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, on the food production productivity. For instance, it is known that wine grapes are very sensitive to subtle shifts in temperature, rain and sunshine. Research predicts that up to 70% of Australia's winegrowing regions will be less suitable for grape growing by 2050. ²⁷

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, ongoing discoveries in biotechnology can benefit the environment through alternative species and hybrids that are salt tolerant and resistant to drought and disease and management of pest species amongst many other benefits to emerging challenges.

The challenge for individual farmers is to capitalise on technology that support 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

²⁷ The University of Melbourne, 2015, Appetite for Change

maintaining, and ideally increasing, agricultural and food production levels given current predictions for the declining availability of freshwater.

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

Market and Trade

Agriculture is an important part of the Australian economy and a competitive net exporter sector, with around two thirds of total production being exported.²⁸ Australia's major agriculture export markets include China, United States, Japan, Europe, Indonesia, Republic of Korea, New Zealand and Malaysia.²⁹ Opportunities to increase market access can extend beyond the free trade agreements, through building branding awareness for Australia to be globally recognised as producers of safe, clean food and fibre products.

Key points on the industry's international trade includes³⁰:

- The value of livestock production is forecast to increase by around 1.8% to \$30.8 billion in 2016-17, following a forecast increase of 13.3% in 2015 - 2016.
- The value of crop production is forecast to increase by 3.7% to \$29.5 billion in 2016 - 2017, following a forecast increase of 5.3% in 2015 - 2016.
- The value of Australian farm exports is expected to be around \$45 billion in 2016 – 2017, a rise of 3%.
- Export earnings in 2016 – 2017 are expected to decrease for beef and veal (down 4%), wheat (down 1%), coarse grains (down 3%), lamb (down 3%) and mutton (down 11%).
- Increased export earnings are expected for wool (up 7%), dairy (up 4%), sugar (up 7%), live feeder/slaughter cattle (up 9%), cotton (up 22%) and canola (up 13%).

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 – 2015 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.³¹

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 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 includes³²:

- A lack of information on local regulations in overseas markets
- Customer payment issues in overseas markets
- Tariffs, quotas and import duties in overseas countries
- A lack of information on local culture, language and business practices
- Customs costs and/or delays
- Licences, permits and product standards in overseas countries
- The value of the Australia dollar

²⁸ Department of Agriculture and Water Resources [www] <http://www.agriculture.gov.au/market-access-trade>

²⁹ Department of Foreign Affairs and trade, 2016, Agriculture [www] <http://dfat.gov.au/trade/topics/pages/agriculture.aspx>

³⁰ ABARES, 2016, Agricultural commodities – vol. 6 no. 1. March quarter 2016

³¹ ABARES, 2016, Agricultural commodities – vol. 6 no. 1. March quarter 2016

³² Australia's International Business Survey, 2014, Industry Report. Agriculture

- Transport/freight costs from Australia to overseas markets.

Research, Innovation and Applied Technology

It is crucial in order to secure future success of the agriculture sector that research and development is 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, to harness the value of the investment in research through extension services. Greater application of technology from research investment will see an 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.³³ 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.

C. EMPLOYMENT

Employment Outlook

The Department of Employment projects³⁴ that total employment in the agriculture, horticulture, conservation and land management industry sector will grow by 4.8% over the five years to November 2019 (Table 3). Employment in agricultural product wholesaling, veterinary services and conservation are anticipated to grow at a much faster rate than in agriculture during that period.

In agriculture, a positive employment growth is anticipated for all sub-sectors in the coming years, except the mushroom and vegetable sector and the fruit tree nut growing sector where this will drop by 4% and 2.3%, respectively. A significant increase in employment is expected in the sheep, beef cattle and grain farming sector (6.2%) and other livestock farming (6.5%).

³³ National Farmers Federation, 2013, Blueprint for Australian Agriculture 2013-2020. [www]
<http://www.nff.org.au/blueprint.html>

³⁴ Department's projections are based on based on the forecasts and projections set out in the Mid-Year Economic and Fiscal Outlook (MYEFO)

Table 3: Department of Employment Industry Projections – five years to November 2019³⁵

Industry Sector	Employment Level	Employment Projections		
	Nov 2014	Nov 2019	Growth	
	('000)	('000)	('000)	(%)
Agriculture	296.6	308.2	11.6	3.9%
Sheep, Beef Cattle and Grain Farming	124.5	132.2	7.7	6.2
Agriculture, nfd	51.1	53.2	2.1	4.1
Fruit and Tree Nut Growing	26.3	25.7	-0.6	-2.3
Dairy Cattle Farming	22.8	24.0	1.2	5.1
Other Livestock Farming	16.2	17.2	1.1	6.5
Agriculture and Fishing Support Services	15.5	15.4	-0.1	-0.7
Mushroom and Vegetable Growing	14.9	14.3	-0.6	-4.0
Nursery and Floriculture Production	10.7	11.1	0.4	3.6
Poultry Farming	7.6	7.8	0.3	3.4
Other Crop Growing	5.0	5.2	0.2	4.1
Agriculture, Forestry and Fishing, nfd	1.9	2.0	0.1	3.7
Deer Farming	0.1	0.1	0.0	4.1
Agricultural Product Wholesaling	21.2	23.6	2.4	11.2
Conservation (Parks and Gardens Operations)	20.1	22.5	2.4	12.1
Total	337.9	354.3	16.4	4.8

Description of Workforce Supply

The agriculture, horticulture, 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 (Figure 1).

Agriculture businesses in particular employ a significant number of people aged between 60 and 80 plus years and a smaller number of people in the age group 20 to 40 years.

Just over half (51%) of the agriculture sector workforce was aged 50 years and over in 2011. Of this group, 19% is expected to have retired from the workforce by 2015. An additional 23% is 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.

³⁵ Department of Employment, Industry Employment Projections, 2015 Report. Release date: March 2015.
<http://lmip.gov.au/default.aspx?LMIP/EmploymentProjections>

Figure 1: Industry Sector Employment by Age Groups in 2011³⁶



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

Figure 2: Occupations and their Relative Number in the Gardening Services Sector³⁷

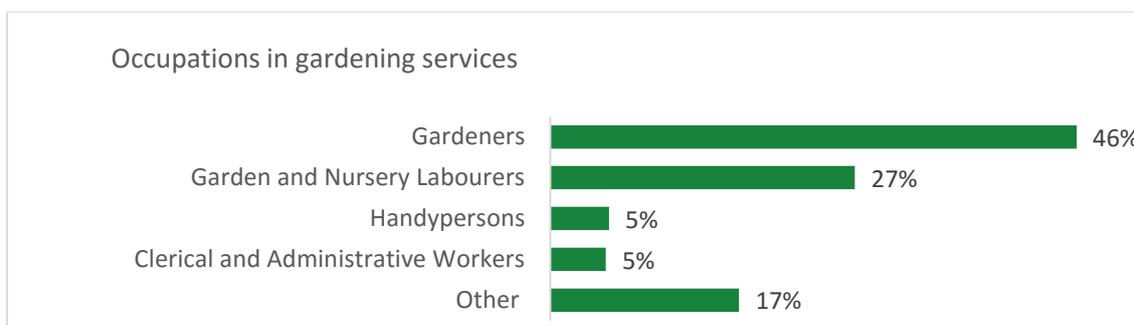
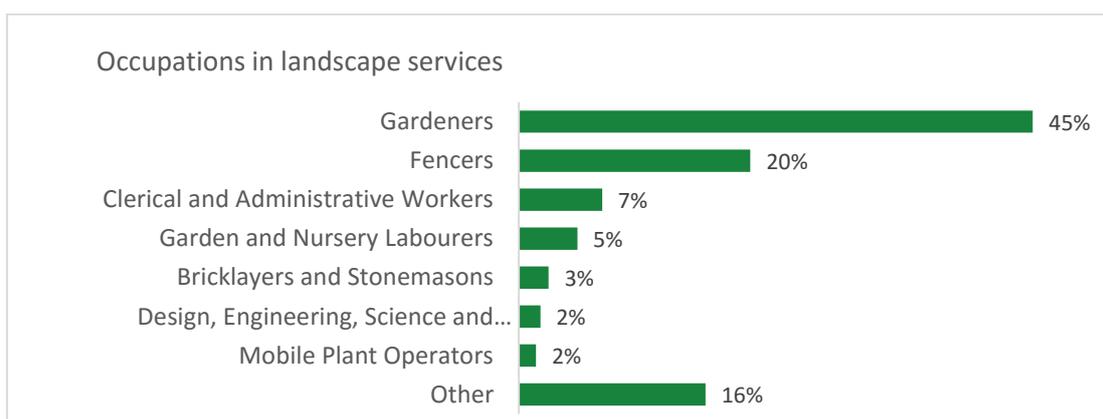


Figure 3: Occupations and their Relative Number in the Landscape Services Sector³⁸

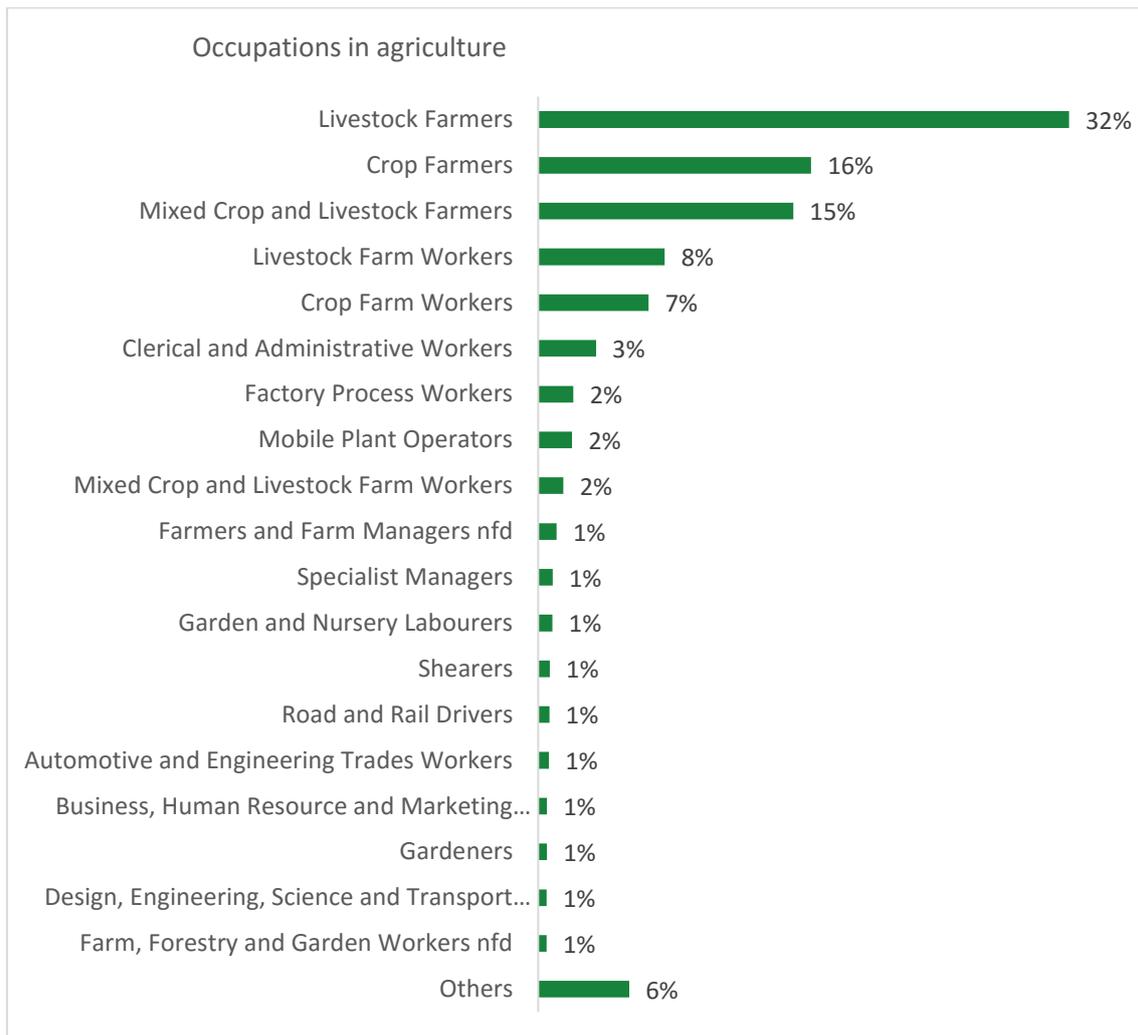


³⁶ 2011 Census of Population and Housing

³⁷ 2011 Census of Population and Housing

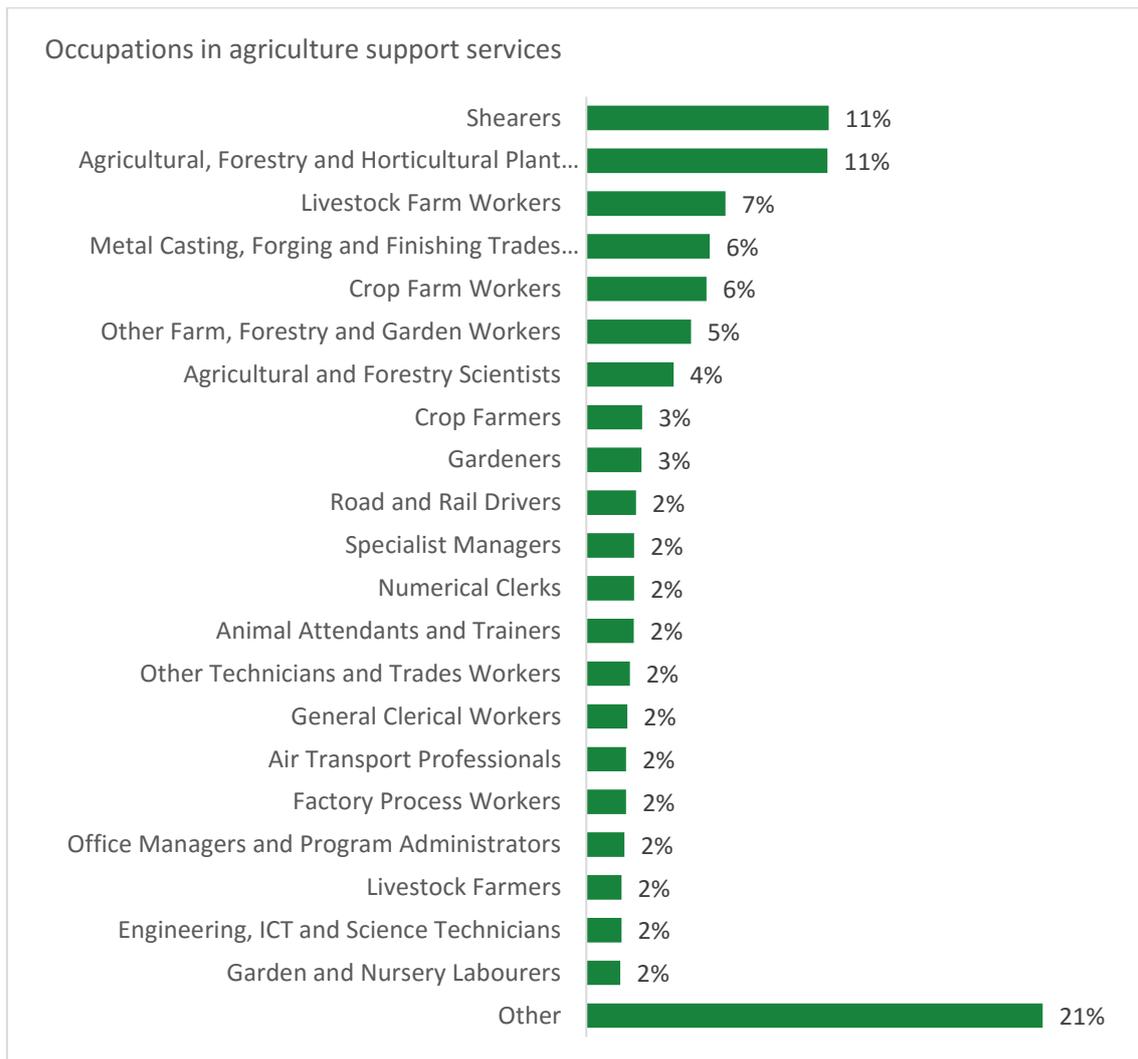
³⁸ 2011 Census of Population and Housing

Figure 4: Occupations and their Relative Number in the Agriculture Sector³⁹



³⁹ 2011 Census of Population and Housing

Figure 5: Occupations and their Relative Number in the Agriculture Support Services Sector⁴⁰



⁴⁰ 2011 Census of Population and Housing

Figure 6: Occupations and their Relative Number in the Agricultural Product Wholesaling Services Sector⁴¹

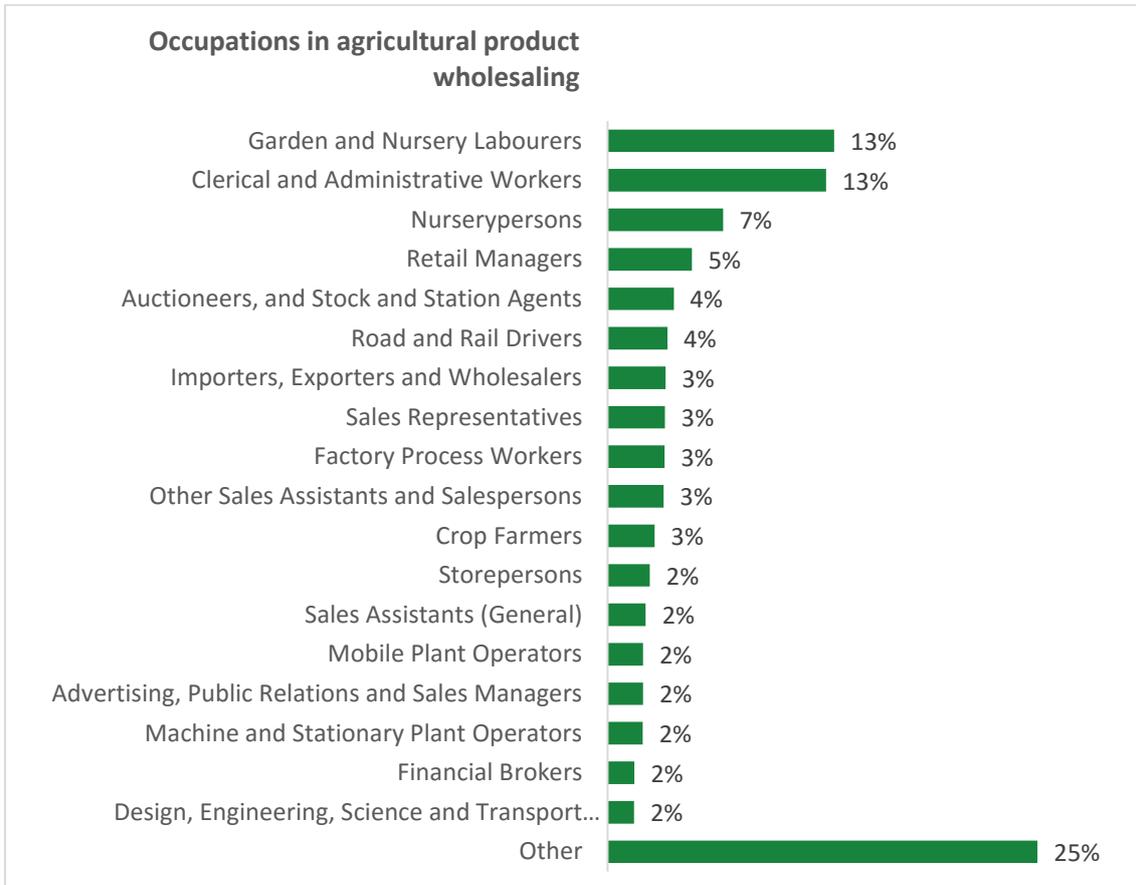
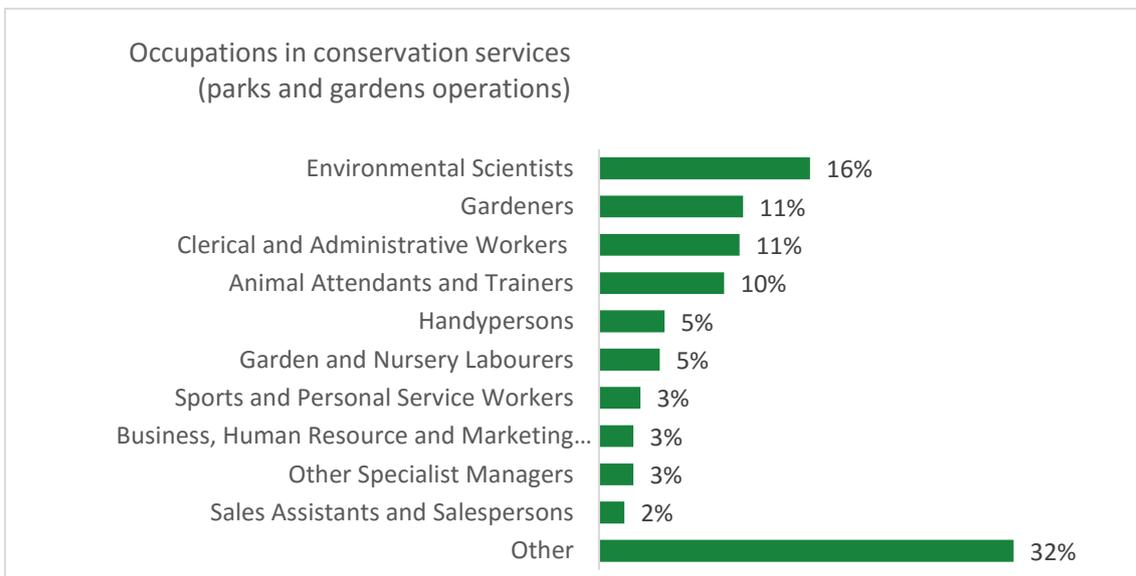


Figure 7: Occupations and their Relative Number in the Conservation Sector⁴²



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

⁴¹ 2011 Census of Population and Housing

⁴² 2011 Census of Population and Housing

shearers, agricultural and horticultural plant operators, nursery persons, gardeners, 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 occurs because gaining industry specific qualifications before employment commences remains a limited choice amongst the young people and other potential new entrants. Thus, external supply of skilled workers is consistently low in the industry. In this condition, the responsibility for engaging young people and existing workers with the sectors, and in specialist training, resides solely with employers. Investing 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 the work limits capacity to offer permanent employment, which makes the demand for labour at peak harvest times to be better suited to overseas workers. The supply of seasonal workers from overseas is influenced by the migration policies in Australia and ongoing pressure on governments and through the supply chain making it harder for farmers to access overseas workers.⁴³

There is little commitment to formal training of seasonal workers from overseas, who may or not may return in following seasons, and little incentive for employers to provide training over and above functional tasks and basic workplace health and safety.

Skilled migrants from Asia and Africa are also a source of labour for the Australian farms. Many become specialist contractors in tasks once carried out by an enterprise's traditional workforce. Many of these possess a rural background, and often require only the contextual skills and knowledge of Australia's climate, its soils, vegetation and animal welfare standards.

Meeting the skill needs of these various groups that supply workforce to the Australian farms becomes a shared responsibility of tertiary sector and local industry bodies and regions to develop targeted responses that meet the skill needs of casual, contract and seasonal workers.⁴⁴

D. SKILLS OUTLOOK

Future changes in workplace and job design are generally driven by innovation at the business and industry level, introduction of new policies and legislations, and business challenges.

At the business level, innovation may involve introduction of new or improved technologies and processes, new or improved ways to deliver services, and new work organisation, including new job demands and job control (i.e. more complex and diversified tasks involving greater autonomy). Work organisation also involves a better interaction between internal and external stakeholders through integration of supportive technologies.

⁴³ National Farmer Federation, 2015, Annual Review 2014–15

⁴⁴ AgriFood, 2015, Environmental Scan 2015

Trends in Workplace Design/Job Design⁴⁵

At a higher level, value-added skills will be driven by higher efficiency targets, innovation and automation / digitisation of some work activities in most workplaces and jobs. In addition, higher level supply chain and logistics skills will be required and skills to adapt and respond to climate change challenges, changing government policies, industry code of practices and WHS procedures. The importance of skills in relation to working with data and data analysis, negotiation, digital marketing and digital commercialisation approaches is growing as well.

In the presence of automation and digitisation, operational employees will be required to spend much less time on operating machinery or processing paperwork and more time on higher value added job functions. Higher level skills will be required of operational employees to support extended job functions and strategic targets. These skills include Science Technology Engineering and Mathematics (STEM) skills, compliance skills, and leadership skills. Specialist managers will require higher level skills to support strategic developments and targets.

Utilisation of more specialist skills with greater complexity⁴⁶ will be driven by growing technological developments and their adoption in the agricultural production systems. Collaborative approaches will enable access to the right mix of specialist skills and the benefits offered by technology.⁴⁷

A new generation of horticultural experts, specialising in areas of government policies, research and garden design and maintenance will also emerge due to an increasing demand for the urban green infrastructure systems.

Key development trends, business challenges and emerging skills gaps and priorities are likely to change jobs and drive capacity building in the agriculture, horticulture, conservation and land management sub-sectors include the examples outlined below.

Agriculture (Including Horticulture, Livestock and Broadacre Farming)

Infrastructure

Northern Australia region, spanning Western Australia, Northern Territory and Queensland, has become a key area of focus for governments enabling a variety of agricultural and infrastructure developments in the future.

Technology

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 in the future. These will support growth in both small scale and large scale agriculture, value added services and crop production, and development of new large-scale and sustainable farming systems. There will also be emerging technologies for bio-products from plant and animal origins, such as new fibres and materials.

Continuous development of biotechnology 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.

⁴⁵ This section is based on feedback from IRC meetings, desktop research and broader stakeholder consultation via the website

⁴⁶ Australian Centre for Plant Functional Genomics, 2015, Agriculture in Australia: growing more than our farming future. [www] <https://theconversation.com/agriculture-in-australia-growing-more-than-our-farming-future-22843>

⁴⁷ Australian Centre for Plant Functional Genomics, 2015, Agriculture in Australia: growing more than our farming future. [www] <https://theconversation.com/agriculture-in-australia-growing-more-than-our-farming-future-22843>

Skills will be required to adapt and respond to climate change challenges, changing government policies, industry code of practices and WHS procedures.

Higher, value-added skills will be driven by higher efficiency targets, innovation and automation/digitisation of some work activities in most agricultural workplaces and jobs. In addition, language literacy and numeracy and digital skills, analytical skills, technology and process-oriented skills, lean and agile manufacturing process skills, knowledge of relevant science, engineering (maintain / improve / design / build) skills, supply chain and logistics skills, WHS compliance skills, government policy compliance skills, operations management skills, risk management skills, leadership skills and communication skills (particularly at the customer interface).

These trends will result in utilisation of more specialist skills driven by growing technological developments and adoption in the agricultural production systems. Emerging skill needs will include spatial and information technologies and the use of sensors and robotics.

There will be changing expectations of these specialist skills. For instance, an agronomist will need the traditional knowledge of cropping systems, fertiliser regimes, field pathology but will also need to know techniques for assessing crop health based on analysis of the light reflected from crops and captured on images generated from drones or satellites.⁴⁸ For example, farmers of the future will be capturing data from even more diverse sources, linking this to genetic information and predictive climate models and using the result to help them decide when to sow their crops, when to apply fertilisers, how to protect crops from disease and when to harvest.⁴⁹

Strategic Planning and Business Management

Recognition at the farm level of the growing importance of developing investment projects, controlling economic resources, and understanding of how to manage human resources, as a way of securing more investment and provide capabilities to manage growing operations. New business models and systems which can manage seasonal risks in the industry are expected to become prevalent.

It is expected there will be a prevalence of new business models and systems that can manage seasonal risks in the industry. Key changes in job and emerging skill needs include strategic planning and business management, risk management and financial planning skills, data analytics and business development including mergers and acquisitions.

Skills improvement in relation to working with data and data analysis, negotiation, digital marketing and digital commercialisation approaches.

Market research, social media, brand strategy and marketing will also become key enabling skills for businesses to reach potential markets.

Biosecurity

Increasing investment is expected at the farm level to demonstrate compliance and market expectations, particularly in relation to animal welfare, on-farm biosecurity and prevention of animal diseases and plant pests, health and safe food, and environment. Emerging skill needs include biosecurity, emergency pest and disease response.

⁴⁸ Australian Centre for Plant Functional Genomics, 2015, Agriculture in Australia: growing more than our farming future. [www] <https://theconversation.com/agriculture-in-australia-growing-more-than-our-farming-future-22843>

⁴⁹ Australian Centre for Plant Functional Genomics, 2015, Agriculture in Australia: growing more than our farming future. [www] <https://theconversation.com/agriculture-in-australia-growing-more-than-our-farming-future-22843>

Supply Chain Management and Exporting

Strategies for better connectivity with, and service to, domestic and international markets will become the norm for farmers, including greater interaction with global supply chains and stronger online presence promoting key features of crop and animal farming in Australia.

Higher level supply chain and logistics skills will be required to support lean, fast, reliable, transparent and collaborative relationships with key suppliers and customers and with other companies, including competition and research organisations.

Emerging skill needs will include global supply chain management and logistics, export readiness and cultural competency including market planning, negotiation and contract management and product innovation and development.

Urban Green Infrastructure Systems

Growing trends for urban green infrastructure systems, involving a rising demand for living walls/vertical gardens, sophisticated rooftop gardens and sustainable open public spaces will drive emerging skills needs for large scale green wall design and installation.

It is expected there will be an emergence of a new generation of horticultural experts, specialising in areas of government policies, research and garden design and maintenance. Formation of these specialists is driven by increasing demand for urban green infrastructure systems. This trend will also require designers, retailers, installers and maintenance workers to have specialist skills and knowledge of irrigation systems to support these emerging features.

Chemical handling and application

The outcomes of the National Agvet Chemical Task Force working group is expected to result in harmonization of regulatory requirements for managing safe use of chemical training and managing spray drifts. Skill gaps may emerge as requirements in each jurisdiction are brought in line with national requirements.

Dairy Management and Leadership

Automated and robotic milking systems with computerized inventory facilitate improved oversight and quality control of processes and products. Skills in management and leadership will be required to ensure business owners utilize available information effectively enabling their businesses to remain competitive.

Workplace Health and Safety

A number of fatalities and injuries occur each year as a result of quad bike usage. Industry has indicated that there is an immediate need to provide training around the safe usage of quad bikes.

Conservation

Biosecurity

Ongoing conservation strategies and programs to control invasive species focused on building resilient ecosystems are being implemented. Emerging skill needs include biosecurity, emergency pest and disease response.

Partnerships and Collaboration

There is development of new, or consolidation of existing, partnerships in Australia and internationally to achieve better scientific outcomes and understanding.

Better cooperation and joint management process are occurring with aboriginal communities to manage the lands and waters in balance with natural processes and cultural traditions.

New models of organisational structure are being implemented to improve service delivery and strengthen the commitment to a safe, collaborative and customer-focused culture.

Technology and Information Management

There is a greater focus on improving digital experiences and information solutions to improve productivity of staff and make it easier for customers to connect with nature reserves, parks, gardens, zoos and aquariums. This trend will drive the need for digital literacy skills of workers.

Innovation and Customer Focus

There is a growth in innovative strategies for conservation and tourism management to create memorable experiences for customers, providing information where, when and how it is wanted, and meeting the changing needs and expectations of the broader Australian and international community.

New concepts and designs that can influence and inspire are being created as visitor attractions and sustainable homes for plants and animals. Emerging skills needs include managing innovation and continuous improvement in response to consumer demands.

Important Skills for the Agriculture, Horticulture and Conservation and Land Management within the next three to five years.	
1	Chemical Handling
2	Business Operations & Leadership
3	Marketing Sales and Strategies
4	Computer Technology (G.I.S & G.P.S)
5	Natural Resource Management
6	Irrigation
7	Biosecurity

Generic workforce skills ranked in order of importance for Agriculture, Horticulture and Conservation and Land Management. (Most important skill =1 least important skill = 12)	
1	Managerial / leadership
2	Financial
3	Technology
4	Data analysis
5	Entrepreneurial
6	Design mindset / Thinking critically / System thinking / Solving problems
7	Communication/ Virtual collaboration / Social intelligence
8	Customer Service/ Marketing
9	STEM (Science Technology Engineering Mathematics)
10	Learning agility / Information Literacy / intellectual autonomy and self-management
11	Environmental and sustainability
12	LLN (Foundation skills of literacy and numeracy)

Other Relevant Skills-Related Insights

Key Priority Skills in the Sector Workforce

The agriculture, horticulture and conservation and land management sectors have nominated key priority skill needs for the workforce / industry sectors in

- managing the safe and effective use of agricultural and veterinary chemicals,
- global supply chain management,
- logistics and online marketing,
- export planning and strategies,
- business management,
- biotechnology area including regulation, adoption and management of biotechnology such as GM cotton and canola
- application of information technologies, sensors and robotics.

Further, the sectors have prioritised a range of emerging skills relating to

- conservation and land management area and
- current practices and skill needs for livestock growing and management,
- broadacre cropping and
- diary production
- biosecurity and pest management in apiculture and new principles

E. IRC Training Product Review Plan 2016 – 2019 for the Agriculture, Horticulture and Conservation and Land Management Industry

The IRC Training Product Review Plan 2016-19 for the Agriculture, Horticulture, Conservation and Land Management Industry Sector is provided in Appendix A.

Explanation

AISC Commissioned Projects

AISC is preparing to commission a project to respond to the recommendations of the ASQA *Training in equine programs in Australia*. This project will involve consultations on a number of training packages including *AHC Agriculture, Horticulture and Conservation, and Land Management*. In particular, the following interdependencies will occur:

Agriculture: Horse Riding and Handling

Units in selected agriculture qualifications require handling and riding of horses. Relevant units will need to be reviewed and updated in conjunction with relevant recommendations from the 2015 ASQA review of training in equine programs and the review of relevant qualifications and units in ACM and RGR.

Performance Horse Management

New Certificate III and Diploma qualifications and units in performance horse management were developed for AHC. However, these will need to be reviewed and updated in conjunction with relevant recommendations from the 2015 ASQA review of training in equine programs and the review of relevant qualifications and units in *ACM Animal Care and Management* and *RGR Racing Training Packages*. Consideration also needs to be given as to whether the performance horse qualifications are better placed in the AHC or ACM Training Packages.

Potentially Contentious Review of Horse Handling and Riding.

The commissioning of this project will see the start of a potentially contentious review of horse handling and riding. Systemic safety issues were identified in the New South Wales Coroner's report into a horse riding accident in 2009 during training at a Technical and Further Education (TAFE) New South Wales institute. Subsequent recommendations impacting VET delivery and assessment are contained in the 2015 *ASQA Training in Equine Programs in Australia*.

Due to the prominence of this issue and the importance to a range of industry sectors, it is anticipated that comprehensive consultation with a wide range of stakeholders will need to occur in order to produce fit for purpose qualifications and units in the AHC Training Package, taking into account the needs of users across AHC, ACM and RGR training packages.

Conservation and Land Management

The rise in areas requiring conservation management as well as the increased use of technology has produced a need for the development of new units in following areas:

- Manage remote solar power supply system
- Manage public access and activities in wilderness areas
- Working around power lines
- Interpreting and recognising geology and land forms

- Using camera traps
- Review and update existing pest management units in line with new national policies for wild dog trapping.

Time Critical Issues and Interdependencies

Chemical Handling Application

The Council of Australian Governments (COAG) in response to the 2008 report by the Productivity Commission on the regulation of chemicals and plastics was a key driver of developing a single national framework to improve the regulation of agvet chemicals. A National Agvet Chemical Task Force with a working group (Minimum Training and Licensing Working Group) is looking at developing a more harmonised approach to chemical training requirements, including a review of state based regulatory frameworks and future developments in managing spray drift risks. The IRC responsible for this training package will undertake a review of qualifications and units of competency based on the recommendations of the task force.

Landscape

AHC42016 Certificate IV in Landscape & AHC50616 Diploma of Landscape Design needs urgent review to address issues expressed by the LNA Master Landscapers Association that there are no entry requirements. The Association have indicated that it was intended that AHC30916 Certificate III in Landscape Construction would be a pre-requisite for AHC42016 Certificate IV Landscaping and AHC42016 Certificate IV in Landscape would be a pre-requisite for AHC50616 Diploma of Landscape Design as part of the dedicated articulation pathway.

Machinery Operation and Maintenance

Current units around quad bikes, tractors, two wheel and side by side vehicles require review in terms of safe operation.

The use of drones in across all sectors is an emerging technology that will need to be addressed. There is the potential for new units to be delivered around the operation of drones in AHC.

Agriculture: Dairying

The *Certificate III in Agriculture (Dairy Production)* and the specialist dairy units have been transitioned to comply with the *Standards for Training Packages* with minimal changes. The 2015 *Agriculture, Horticulture and Conservation, and Land management Training Package Case for Endorsement* prepared by AgriFood Skills Australia reports that Dairy Australia is proposing to carry out a comprehensive review of dairy vocational training in 2016, following which, training package components will require a more comprehensive review in terms of emerging and changing job roles.

Irrigation

A review of all irrigation units to is needed ensure that the 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 particular needs of the student.

AHC51616 Diploma of Irrigation Management needs urgent review to address issues that it has a narrow and limiting focus. A review of wider range of irrigation practitioners and designers at AQF level 5 is required.

Advanced horticulture practices need to be included in AQF level 5 and 6 units for *AHC50416 Diploma of Horticulture*, *AHC60216 Advanced Diploma of Horticulture*. Approximately five new horticulture units are required.

Production Nursery

The Nursery and Garden Industry NSW and ACT endorsed the current AHC package on the condition that an urgent review of production nursery qualifications was required due to short time frames for Industry consultation in 2015. The Industry indicated that the qualifications are too chemical orientated and not holistic enough. Industry is also concerned with the large biosecurity component in electives. Nursery and Garden Industry NSW and ACT has stated that the qualifications do not match to the job role expectations. Integrated pest management units were also indicated as an area that required improvement. A review of the AHC40316 Certificate IV in Production Horticulture and AHC30616 Certificate III in Production Horticulture is requested to be undertaken and that the industry is included in the consultation process.

Interdependencies

Arboriculture

Work to date for AHC included streamlined Certificate II and III qualifications, the introduction of a new Certificate IV qualification, significant revision to the Diploma, and the introduction of new qualifications at the Advanced Diploma and Graduate Certificate levels. Arboriculture is a high risk activity with many parallels to skills required in the forest and wood products sector.

Over the past few years industry stakeholders, represented by the peak industry association, Arboriculture Australia, raised considerations that arboriculture be recognized as part of the forest and wood products industry and that qualifications be included in the *FWP Forest and Wood Products Training Package*. There are current concerns about the assessment requirements of needing log book to log 200 hours of tree climbing in tree climbing units (AHCARB307 and AHCARB312). RTO's have expressed concern over implementation and monitoring of logged hours.

Training products scheduled for review more than once in four years

The developer does not anticipate reviewing any products more than once in the four year period unless specific improvement issues are raised by industry.

F. IRC Signoff

This Workplan was agreed as the result of a properly constituted Rural and Related Industry Reference Committee decision.

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



(Signature of Chair)



(Print Name of Chair)



(Date)

Appendix 1

IRC Training Product Review Plan 2016 -2019 for the Agriculture, Horticulture and Conservation and Land Management Industry

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

Date submitted to Department of Education and Training: 29th September 2016

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
2016						
2016	Agriculture, Horticulture and Conservation and Land Management	AHC	Historical issues: Activity to fix minor wording and content changes across a range of units. There are a range of issues that need clarification and need to be addressed from a range of units			
2016			<p>Irrigation Units: Review of units and qualifications to ensure that they meet the current needs of industry. Ensure that there is a clear distinction in units between pressurised irrigation operations and gravity fed irrigation systems. The two types of irrigation should not be merged into similar units as this does reflect how industry operates.</p> <p>Certificate II in Irrigation Certificate III in Irrigation Certificate IV in Irrigation Diploma of Irrigation Management</p>	<p>AHC21116 AHC32416 AHC41116 AHC51616</p>	<p>Assist with low volume irrigation operations Assist with pressurised irrigation operations Assist with pump and flow control device operations Assist with surface irrigation operations - Current Assist with the operation of pressurised irrigation Audit irrigation systems Design irrigation system maintenance and monitoring programs Design irrigation, drainage and water treatment systems Determine hydraulic parameters for an irrigation system Develop an irrigation and drainage management plan Establish and maintain an irrigation-related environmental protection program Evaluate water supply for irrigation Implement a maintenance program for an irrigation system Implement an irrigation schedule Implement an irrigation-related environmental protection program Install irrigation pumps Install irrigation systems Install pressurised irrigation systems Interpret and apply irrigation designs</p>	<p>AHCIRG215 AHCIRG217 AHCIRG218 AHCIRG216 AHCIRG202A AHCIRG501 AHCIRG502 AHCIRG503 AHCIRG402 AHCIRG504 AHCIRG505 AHCIRG426 AHCIRG301A AHCIRG327 AHCIRG404 AHCIRG309 AHCIRG302A AHCIRG331 AHCIRG415</p>

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Interpret irrigation plans and drawings Maintain pressurised irrigation systems Manage a moving sprinkler irrigation system Manage irrigation systems Manage surface irrigation systems Measure irrigation delivery system performance Monitor soils under irrigation Operate and maintain gravity fed irrigation systems Operate and maintain irrigation pumping systems Operate and maintain moving irrigation system Operate irrigation injection equipment Operate irrigation technology Operate pressurised irrigation systems Operate pressurised irrigation systems Plan on-site irrigation system installation and construction work Schedule irrigations Select and manage pumping systems for irrigation Supervise irrigation system installation Supervise irrigation system maintenance Supervise on-site irrigation installation and construction work Support irrigation work Troubleshoot irrigation systems	AHCIRG315 AHCIRG333 AHCIRG422 AHCIRG433 AHCIRG434 AHCIRG303 AHCIRG308 AHCIRG334 AHCIRG310 AHCIRG335 AHCIRG326 AHCIRG325 AHCIRG332 AHCIRG305A AHCIRG406A AHCIRG408 AHCIRG410 AHCIRG431 AHCIRG432 AHCIRG407A AHCIRG101 AHCIRG306
2016	Agriculture, Horticulture and Conservation and Land Management	AHC	Arboriculture Review of assessment conditions for tree climbing units where it is stated in 'assessment conditions' that assessment must include a log record of 200 hours of climbing. RTOs are concerned about the practicality of delivery.	AHC30816 AHC20416	Use advanced climbing techniques Use standard climbing techniques to access trees	AHCARB307 AHCARB312
2016		AHC	Agricultural Chemicals and Veterinary Medicines Rural and Related Industries Standing Committee strongly recommends that training and assessment related to chemical application be made a priority		Chemical handling and application Comprehensive review of units and packaging in terms of risk framework for managing the safe and effective use of agricultural and veterinary chemicals, following National Agvet Chemical Task Force working group review into harmonised approach to chemical training requirements, including a review of state based regulatory frameworks and future developments in managing spray drift risks.	

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
	Agriculture, Horticulture and Conservation and Land Management	AHC	Landscape Design Review qualification entry requirements in response to feedback that existing qualifications, Certificate IV and Diploma have no entry requirements and does not meet industry expectations.	AHC42016 AHC50616		
			Review CLM, biosecurity and pest management and seed units (172) and the qualifications that they sit in: Conservation and land management, including aboriginal sites work indigenous land management, community coordination and facilitation, lands parks and wildlife, natural area restoration and natural resource management Biosecurity response and pest and weed management Seed production, processing and testing		Unit Sector: Emergency Response (BER) Work effectively in an emergency disease or plant pest response Carry out emergency disease or plant pest control procedures at infected premises Carry out movement and security procedures Plan and supervise control activities on infected premises Carry out field surveillance for a specific emergency disease or plant pest Manage active operational emergency disease or plant pest sites Manage the implementation of an emergency disease or plant pest control program Plan and oversee an emergency disease or plant pest control program Unit Sector: Biosecurity (BIO) Inspect and clean machinery for plant, animal and soil material Follow site quarantine procedures Identify and report unusual disease or plant pest signs Apply biosecurity measures Plan and implement a farm or enterprise biosecurity plan Unit Sector: Pest Management (PMG) Treat weeds Treat plant pests, diseases and disorders Work effectively in a pest management environment Control weeds Control plant pests, diseases and disorders Use firearms to humanely destroy animals Survey pests Determine pest control techniques Apply animal trapping techniques Implement pest management strategies Apply pest animal control techniques Prepare, monitor and maintain biological agents Use firearms for pest control activities from aircraft	AHCBER301 AHCBER303 AHCBER304 AHCBER401 AHCBER402 AHCBER501 AHCBER502 AHCBER601 AHCBIO201 AHCBIO202 AHCBIO302 AHCBIO305 AHCBIO403 AHCPMG201 AHCPMG202 AHCPMG203 AHCPMG301 AHCPMG302 AHCPMG304 AHCPMG305 AHCPMG306 AHCPMG307 AHCPMG308 AHCPMG309 AHCPMG310 AHCPMG311

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Implement a pest management plan	AHCPMG409
					Implement the pest monitoring and evaluation plan	AHCPMG410
					Ensure compliance with pest legislation	AHCPMG411
					Develop a pest management plan	AHCPMG412
					Define the pest problem	AHCPMG413
					Apply predator trapping techniques	AHCPMG414
					Manage the implementation of legislation	AHCPMG506
					Develop a regional pest management plan	AHCPMG507
					Develop a system to monitor and evaluate the pest management plan	AHCPMG508
					Investigate a pest control failure	AHCPMG509
					Develop a pest survey strategy	AHCPMG510
					Unit Sector: Seed Production (SDP)	
					Undertake preparation of land for seed crop production	AHCSDP301
					Establish seed crops	AHCSDP302
					Maintain seed crops	AHCSDP303
					Harvest seed crops	AHCSDP304
					Plan a seed crop establishment program	AHCSDP401
					Supervise seed crop establishment	AHCSDP402
					Plan and implement seed crop maintenance	AHCSDP403
					Supervise seed crop harvesting	AHCSDP404
					Inspect a seed crop for quality assurance purposes	AHCSDP405
					Unit Sector: Seed Testing (SDT)	
					Prepare a working sample	AHCSDT301
					Identify seeds	AHCSDT302
					Perform a fluorescence test on seeds	AHCSDT303
					Perform a seed purity analysis	AHCSDT304
					Perform a seed moisture test	AHCSDT305
					Perform a seed germination test	AHCSDT306
					Perform a 'Determination of Other Seeds by Number' test	AHCSDT307
					Maintain a quarantine approved laboratory	AHCSDT401
					Prepare and maintain a seed reference collection	AHCSDT402
					Perform an Anguina test on annual ryegrass seed	AHCSDT403
					Develop and implement laboratory policy and procedures	AHCSDT404
					Handle and store quarantinable seeds	AHCSDT405
					Undertake internal audits in a seed laboratory	AHCSDT406
					Perform an endophytic seed test	AHCSDT407

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Perform an electrophoresis test on a seed sample Perform a tetrazolium test Perform a seed vigour test Perform a 1000 seed weight test	AHCSDT408 AHCSDT409 AHCSDT410 AHCSDT411
					Unit Sector: Seed Processing (SPO) Operate a screen cleaner for seed processing Operate an indent cylinder Operate a gravity table Operate seed modification machinery Operate seed treatment machinery Operate specialised seed processing machinery Handle, package and store commercial quantities of seed Sample seed before and after processing	AHCSP0301 AHCSP0302 AHCSP0303 AHCSP0304 AHCSP0305 AHCSP0306 AHCSP0307 AHCSP0308
					Unit Sector: Aboriginal Sites Work (ASW) Protect places of Aboriginal cultural significance Relate Aboriginal culture to sites work Identify and record Aboriginal sites, objects and cultural landscapes Identify Indigenous culturally significant plants Work with Aboriginal ceremonial secret sacred materials Use technology in Aboriginal sites work Support the documentation of Aboriginal cultural landscapes Apply cultural significance to Aboriginal sites and landscapes Interpret Aboriginal cultural landscape Move and store Aboriginal cultural material Maintain an Aboriginal cultural site Apply knowledge of relevant legislation to Aboriginal sites work Survey and report on Aboriginal cultural sites	AHCASW301 AHCASW302 AHCASW303 AHCASW304 AHCASW305 AHCASW306 AHCASW307 AHCASW308 AHCASW309 AHCASW310 AHCASW312 AHCASW313 AHCASW501
					Unit Sector: Community Coordination and Facilitation (CCF) Prepare project acquittal Report on project Obtain and manage sponsorship Contribute to association governance Develop community networks Facilitate ongoing group development Obtain resources from community and groups	AHCCCF401 AHCCCF402 AHCCCF403 AHCCCF404 AHCCCF405 AHCCCF406 AHCCCF407

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Promote community programs	AHCCCF408
					Participate in assessments of project submissions	AHCCCF409
					Support individuals in resource management change processes	AHCCCF410
					Develop approaches to include cultural and human diversity	AHCCCF411
					Coordinate board or committee elections	AHCCCF412
					Service committees	AHCCCF413
					Coordinate fundraising activities	AHCCCF414
					Coordinate social events to support group purposes	AHCCCF415
					Present proposed courses of action to meeting	AHCCCF416
					Evaluate project submissions	AHCCCF501
					Facilitate development of group goals and projects	AHCCCF502
					Promote group formation and development	AHCCCF503
					Support group and community changes in resource management	AHCCCF504
					Contribute to regional planning process	AHCCCF505
					Manage the incorporation of a group	AHCCCF506
					Coordinate the development of regional plans	AHCCCF601
					Unit Sector: Indigenous Land Management (ILM)	
					Maintain cultural places	AHCILM201
					Observe and report plants or animals	AHCILM202
					Record information about Country	AHCILM203
					Provide appropriate information on cultural knowledge	AHCILM302
					Work with an Aboriginal Community or organisation	AHCILM305
					Follow Aboriginal cultural protocols	AHCILM306
					Implement Aboriginal cultural burning practices	AHCILM307
					Identify traditional customs and land rights for an Indigenous Community	AHCILM308
					Protect places of cultural significance	AHCILM401
					Report on place of potential cultural significance	AHCILM402
					Contribute to the proposal for a negotiated outcome for a given area of Country	AHCILM403
					Record and document Community history	AHCILM404
					Develop work practices to accommodate cultural identity	AHCILM405
					Conduct field research into natural and cultural resources	AHCILM501
					Develop conservation strategies for cultural resources	AHCILM502
					Manage restoration of cultural places	AHCILM503
					Develop strategies for Indigenous land or sea management	AHCILM504
					Map relationship of business enterprise to culture and Country	AHCILM505
					Operate within Community cultures and goals	AHCILM506
					Propose a negotiated outcome for a given area of Country	AHCILM508

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Plan for successful cultural practice at work Manage cultural processes in an Indigenous organisation	AHCILM510 AHCILM601
					Unit Sector: Lands, Parks and Wildlife (LPW) Supervise park visitor activities Construct access tracks Carry out inspection of designated area Perform diving for scientific purposes Undertake sampling and testing of water Process applications for changes in land use Implement land and sea management practices Inspect and monitor cultural places Produce maps for land management purposes Monitor biodiversity Develop a management plan for a designated area Assess applications for legislative compliance Implement natural and cultural resource management plans Coordinate the preparation of a regional resource management plan	AHCLPW301 AHCLPW303 AHCLPW304 AHCLPW305 AHCLPW306 AHCLPW401 AHCLPW402 AHCLPW403 AHCLPW404 AHCLPW405 AHCLPW501 AHCLPW503 AHCLPW505 AHCLPW601
					Unit Sector: Natural Area Restoration (NAR) Support natural area conservation Support native seed collection Carry out natural area restoration works Maintain wildlife habitat refuges Maintain natural areas Collect and preserve biological samples Implement revegetation works Undertake direct seeding Collect native seed Conduct photography for fieldwork Read and interpret maps Supervise natural area restoration works Plan the implementation of revegetation works Manage natural areas on a rural property Conduct biological surveys Design a natural area restoration project Manage natural area restoration programs Plan river restoration works	AHCNAR101 AHCNAR102 AHCNAR201 AHCNAR202 AHCNAR301 AHCNAR302 AHCNAR303 AHCNAR304 AHCNAR305 AHCNAR306 AHCNAR307 AHCNAR401 AHCNAR402 AHCNAR501 AHCNAR502 AHCNAR503 AHCNAR504 AHCNAR505

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Develop and implement sustainable land use strategies Unit Sector: Natural Resource Management (NRM) Plan and implement a biosecurity program Develop a coastal rehabilitation strategy Develop a water quality monitoring program Support the implementation of waterways strategies Interpret and report on catchment hydrology Provide technical advice on sustainable catchment management Plan and monitor works projects in catchments and waterways Manipulate and analyse data within geographic information systems Investigate suspected breaches of natural resource management legislation	AHCNAR506 AHCNRM401 AHCNRM501 AHCNRM502 AHCNRM503 AHCNRM504 AHCNRM505 AHCNRM506 AHCNRM507 AHCNRM508
2017						
	Agriculture, Horticulture and Conservation and Land Management	AHC	Machinery Operation and Maintenance Current units around quad bikes, tractors, two wheel and side by side vehicles require review in terms of safe operation. The use of drones in across all sectors is an emerging technology that will need to be addressed. Potential for new units to be delivered around the operation of drones in AHC.		Operate quad bikes Operate tractors Operate vehicles Operate side by side utility vehicles Operate Drones (new Unit)	AHCMOM212 AHCMOM202 AHCMOM205 AHCMOM211 TBA
	Agriculture, Horticulture and Conservation and Land Management	AHC	A review of production nursery Qualifications as per industry advice that they do not meet the needs of Industry. Certificate IV in Production Horticulture Certificate III in Production Horticulture.	AHC40316 AHC30616		

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
	Agriculture, Horticulture and Conservation and Land Management	AHC	Supply chain management Develop qualification/s and/or skill sets for global supply chain management and logistics including rapid expansion of fast moving consumer goods (FMCG) channels and online marketing (wholesale and retail)	TBA	To be identified during business case review for global chain logistics across all sectors	
	Agriculture, Horticulture and Conservation and Land Management	AHC	How to export Food & Livestock to Asian markets and logistics Develop/update qualifications, skill sets and units covering skills for export readiness (including logistics market planning, negotiation and contract management, cultural competency and an awareness of Asian market preferences for products, presentation and transportation).	TBA	To be identified during business case review	
			Review Agribusiness to see if there are skills gaps Ensure that “enabling technologies” are appropriately addressed in qualifications. Develop qualification/s , skill sets and units for equipping owners and senior managers with skills for 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.	TBA	To be identified during business case review	
			Biotechnology Develop qualifications, skill sets and/or units for skills related to the regulation,	TBA	To be identified during business case review	

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
			adoption and management of biotechnology, such GM cotton and canola.			
	Agriculture, Horticulture and Conservation and Land Management	AHC	Product innovation and development Develop qualifications, skill sets and/or units for skills related to innovation and product development.	N/A	Product innovation and development Develop 4 x UOCs for supporting, managing and leading product innovation in agriculture, horticulture and CLM industries New unit: support product innovation New unit: manage the implementation of product innovations New unit: initiate and lead industry innovation New unit: lead industry innovative thinking and practice	TBA TBA TBA TBA
			Applied technology (STEM) Review and update qualifications, skills sets and/or units for use of spatial and information technologies, sensors and robotics for environmental monitoring, precision agriculture/horticulture traceability		Applied technology Review and update skills for use of: Data analysis spatial and information technologies, sensors and robotics for environmental monitoring, precision agriculture/horticulture and traceability controlled atmosphere storage Drone operation	
			Livestock Review qualification structures in response to feedback that existing qualifications are not flexible enough to meet needs of all industry sectors Certificate II in Agriculture Certificate III in Agriculture Certificate IV in Agriculture Diploma of Agriculture	AHC20116 AHC30116 AHC40116 AHC50115		
	Agriculture, Horticulture and Conservation and Land Management	AHC	Broadacre cropping Review of qualification structures to ensure it is sufficiently flexible to meet the needs of all industry sectors Certificate II in Agriculture Certificate III in Agriculture Certificate IV in Agriculture Diploma of Agriculture	AHC20116 AHC30116 AHC40116 AHC50116		

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
			Beekeeping Review biosecurity and pest management content Certificate III in Beekeeping Basic Introduction to Beekeeping Skill Set	AHC32016 TBA	Support beekeeping work Use a bee smoker Open and reassemble a beehive Construct and repair beehives Manage honey bee swarms Manipulate honey bee brood Requeen a honey bee colony Remove a honey crop from a hive Extract honey Manage pests and disease within a honey bee colony Collect and store propolis Perform queen bee artificial insemination Produce and harvest royal jelly Provide bee pollination services Select and establish an apiary site Trap and store pollen Rear queen bees	AHCBEK201 AHCBEK202 AHCBEK203 AHCBEK204 AHCBEK301 AHCBEK302 AHCBEK303 AHCBEK304 AHCBEK305 AHCBEK306 AHCBEK401 AHCBEK402 AHCBEK403 AHCBEK404 AHCBEK405 AHCBEK406 AHCBEK407
2017	Agriculture, Horticulture and Conservation and Land Management	AHC	Dairy Production Review qualification suitability for current and emerging job roles, including dairy management, in line with Dairy Australia 2016 review of dairy vocational training. Certificate III in Agriculture (Dairy Production)	AHC30216	Coordinate milking operations Implement animal health control programs Implement feeding plans for livestock Rear newborn and young livestock Implement procedures for calving Milk livestock Operate a dairy recycling system Manage milking shed routine Administer medication to livestock Maintain livestock water supplies Identify and draft livestock Coordinate artificial insemination and fertility management of livestock Prepare for and implement natural mating of livestock Coordinate and monitor livestock transport Service and repair bores and windmills Transport farm produce or bulk materials Maintain and monitor feed stocks Castrate livestock Mix and mill standard stock feed Collect, store and administer colostrum	AHCDRY301 AHCLSK309 AHCLSK311 AHCLSK318 AHCLSK329 AHCDRY201 AHCDRY302 AHCDRY401 AHCLSK301 AHCLSK305 AHCLSK308 AHCLSK312 AHCLSK315 AHCLSK320 AHCLSK321 AHCLSK322 AHCLSK323 AHCLSK325 AHCLSK326 AHCLSK327

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Remove and facilitate reuse of effluent and manure from an intensive production system	AHCLSK328
					Comply with industry animal welfare requirements	AHCLSK331
2017		AHC	<p>Review Agriculture: Cropping and Production units (159) Broadacre cropping, livestock, milk harvesting, organic production, poultry production, pork production, shearing, wool</p> <p>Note: review of dairy units is a priority project above.</p>		<p>Unit Sector: Broad acre cropping (BAC)</p> Support agricultural crop work Assist agricultural crop establishment Assist agricultural crop maintenance Assist agricultural crop harvesting Prepare grain storages Conserve forage Establish pastures and crops for livestock production Prepare to receive grains and seeds Test grains and seeds on receipt Undertake preparation of land for agricultural crop production Establish agricultural crops Maintain agricultural crops Undertake agricultural crop harvesting activities Maintain pastures and crops for livestock production Manage pastures for livestock production Plan a pasture establishment program Supervise agricultural crop establishment Plan and implement agricultural crop maintenance Supervise agricultural crop harvesting Maintain grain quality in storage Save, prepare and store agricultural seed Manage agricultural crop production Manage forage conservation Manage integrated crop and pasture production Plan and manage a stored grain program Plan and manage long-term weed, pest or disease control in crops Manage the harvest of crops Develop production plans for crops Apply plant biology to agronomic practices	AHCBAC101 AHCBAC201 AHCBAC202 AHCBAC203 AHCBAC204 AHCBAC301 AHCBAC302 AHCBAC303 AHCBAC304 AHCBAC305 AHCBAC306 AHCBAC307 AHCBAC308 AHCBAC310 AHCBAC401 AHCBAC402 AHCBAC403 AHCBAC404 AHCBAC405 AHCBAC406 AHCBAC407 AHCBAC408 AHCBAC502 AHCBAC503 AHCBAC504 AHCBAC505 AHCBAC506 AHCBAC507 AHCBAC508
					<p>Unit Sector: Livestock (LSK)</p> Support extensive livestock work Support intensive livestock work Assist with feeding in a production system	AHCLSK101 AHCLSK102 AHCLSK201

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Care for health and welfare of livestock	AHCLSK202
					Carry out birthing duties	AHCLSK203
					Carry out regular livestock observation	AHCLSK204
					Handle livestock using basic techniques	AHCLSK205
					Identify and mark livestock	AHCLSK206
					Load and unload livestock	AHCLSK207
					Monitor livestock to parturition	AHCLSK208
					Monitor water supplies	AHCLSK209
					Muster and move livestock	AHCLSK210
					Provide feed for livestock	AHCLSK211
					Clean out production sheds	AHCLSK213
					Maintain production growing environments	AHCLSK214
					Carry out alpaca handling and husbandry operations	AHCLSK215
					Clean and maintain livestock pens	AHCLSK216
					Apply animal welfare principles to handling and husbandry of livestock	AHCLSK217
					Mate and monitor reproduction of alpacas	AHCLSK302
					Carry out post-mortem examination of livestock	AHCLSK304
					Coordinate and monitor production performance	AHCLSK306
					Care for and train working dogs	AHCLSK324
					Monitor animals in intensive production systems	AHCLSK332
					Monitor pen condition and ration suitability	AHCLSK333
					Plan, prepare and conduct mulesing procedures	AHCLSK334
					Conduct dropped ovary technique procedures for spaying cattle	AHCLSK335
					Arrange livestock purchases	AHCLSK412
					Design livestock handling facilities	AHCLSK413
					Arrange transport for farm produce or livestock	AHCLSK414
					Oversee alpaca farm activities	AHCLSK415
					Manage livestock production	AHCLSK501
					Arrange marketing of livestock	AHCLSK502
					Develop and implement a breeding strategy	AHCLSK503
					Develop livestock health and welfare strategies	AHCLSK504
					Develop production plans for livestock	AHCLSK505
					Design livestock effluent systems	AHCLSK506
					Plan, monitor and evaluate strategies to improve livestock through genetics	AHCLSK507
					Unit Sector: Milk Harvesting (MKH)	
					Carry out minor service of milking equipment	AHCMKH301
					Service and repair milking equipment	AHCMKH303

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Monitor and establish milking machine cleaning Mechanically test milking machines Carry out cleaning-time tests of milking machines Design and fabricate milking equipment installations Design and install enterprise milk cooling and storage Install milking equipment Performance test milking machines	AHCMKH304 AHCMKH305 AHCMKH401 AHCMKH402 AHCMKH403 AHCMKH404 AHCMKH405
					Unit Sector: Organic Production (ORG) Support organic production Manage biodynamic production Manage organic livestock production Manage organic soil improvement Arrange selling through community based marketing Implement sustainable practices in the organic farm based business Oversee compliance with an organic certification scheme Manage a landless organic production system Manage on farm composting Develop an organic management plan Prepare the enterprise for organic certification Design and document an organic farm landscape Develop and manage a community based marketing supply chain Develop and monitor a sustainable production plan Manage an agroecology production system	AHCORG101 AHCORG401 AHCORG402 AHCORG403 AHCORG404 AHCORG405 AHCORG406 AHCORG407 AHCORG408 AHCORG501 AHCORG502 AHCORG503 AHCORG504 AHCORG505 AHCORG506
					Unit Sector: Poultry (PLY) Collect store and handle eggs from breeder flocks Maintain health and welfare of poultry Set up shed for placement of day-old chickens Collect and pack eggs for human consumption Grade and pack eggs for human consumption Catch and load poultry Identify and sex poultry Artificially inseminate poultry Brood poultry Incubate eggs Beak tip poultry Clean and disinfect poultry production sheds	AHCPPLY201 AHCPPLY202 AHCPPLY203 AHCPPLY204 AHCPPLY205 AHCPPLY206 AHCPPLY207 AHCPPLY301 AHCPPLY302 AHCPPLY304 AHCPPLY305 AHCPPLY306

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Implement and monitor biosecurity measures in poultry production	AHCPY307
					Unit Sector: Pork (PRK)	
					Care for health and welfare of pigs	AHCPRK201
					Move and handle pigs	AHCPRK203
					Care for weaner pigs	AHCPRK204
					Care for health and welfare of outdoor pigs	AHCPRK205
					Conduct outdoor pig operations	AHCPRK206
					Pregnancy test pigs	AHCPRK301
					Treat rectal prolapse in pigs	AHCPRK302
					Artificially inseminate pigs	AHCPRK303
					Mate pigs and monitor dry sow performance	AHCPRK304
					Care for grower and finisher pigs	AHCPRK305
					Monitor and maintain outdoor pig production	AHCPRK306
					Implement a feeding strategy for pig production	AHCPRK401
					Maintain outdoor pig production environment	AHCPRK402
					Unit Sector: Shearing (SHG)	
					Crutch sheep	AHCSHG201
					Assist in preparing for shearing and crutching	AHCSHG202
					Shear sheep to novice level	AHCSHG203
					Shear sheep to improver level	AHCSHG204
					Grind combs and cutters for machine shearing	AHCSHG205
					Prepare hand piece and downtube for machine shearing	AHCSHG206
					Shear goats	AHCSHG207
					Shear alpacas	AHCSHG208
					Support alpaca shearing operations	AHCSHG209
					Undertake basic shearing and crutching	AHCSHG210
					Prepare livestock for shearing	AHCSHG301
					Prepare combs and cutters for machine shearing	AHCSHG302
					Maintain and service shearing hand pieces	AHCSHG303
					Shear sheep to professional level	AHCSHG304
					Maintain consistent shearing performance	AHCSHG305
					Carry out post-shearing procedures	AHCSHG306
					Plan and prepare for alpaca shearing	AHCSHG307
					Apply advanced shearing techniques	AHCSHG401
					Conduct equipment experting for machine shearing	AHCSHG402
					Account for shearing shed supplies	AHCSHG403

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Arrange employment for shearing operations Prepare shearing team wages Unit Sector: Wool (WOL) Support woolshed activities Pen sheep Perform board duties Carry out wool pressing Undertake basic skirting of alpaca fleece Appraise wool using industry descriptions Prepare wool based on its characteristics Prepare fleece wool for classing Prepare skirtings and oddments Supervise clip preparation Document a wool clip Prepare facilities for shearing and crutching Press wool for a clip Perform shed duties Class goat fibre Class alpaca fleece Determine wool classing strategies Use individual fleece measurements to prepare wool for sale Plan, implement and review wool harvesting and clip preparation Establish work routines and manage wool harvesting and preparation staff Class fleece wool	AHCSHG405 AHCSHG406 AHCWOL101 AHCWOL201 AHCWOL202 AHCWOL203 AHCWOL204 AHCWOL301 AHCWOL303 AHCWOL304 AHCWOL305 AHCWOL306 AHCWOL307 AHCWOL308 AHCWOL310 AHCWOL311 AHCWOL312 AHCWOL313 AHCWOL401 AHCWOL402 AHCWOL403 AHCWOL404 AHCWOL405
2018						
	Agriculture, Horticulture and Conservation and Land Management	AHC	Rural crime prevention Review and update crime prevention principles and practices at a range of AQF levels. Qualifications to be identified during preparation of business case.		Embed crime prevention principles and practices into select units. Units to be identified during preparation of business case.	TBA
			Permaculture Review the impact and industry satisfaction with Permaculture qualifications developed in 2015 and released 2016		Observe permaculture principles and work practices Support resource conservation practices Support plant care in a permaculture system Support animal care in a permaculture system Assist with maintaining structures in a permaculture system	AHCPER101 AHCPER102 AHCPER103 AHCPER104 AHCPER105

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
			Certificate I in Permaculture	AHC10416	Work effectively in permaculture	AHCPER201
			Certificate II in Permaculture	AHC21716	Harvest, treat and store seed	AHCPER202
			Certificate III in Permaculture	AHC33816	Record information about the local bioregion	AHCPER203
			Certificate IV in Permaculture	AHC42116	Check and operate permaculture water systems	AHCPER204
			Diploma of Permaculture	AHC52116	Prepare and store permaculture products	AHCPER205
			Permaculture Demonstrator Skill Set	AHCSS000	Plant and maintain permaculture crops	AHCPER206
				48	Care for animals in a permaculture system	AHCPER207
					Harvest permaculture crops	AHCPER208
					Recognise characteristics of integrated plant and animal systems	AHCPER209
					Operate within community projects	AHCPER210
					Recognise threats and create opportunities in a permaculture system	AHCPER211
					Use and maintain garden hand tools and equipment	AHCPER212
					Assist with basic earth shaping for nutrient capture and storage	AHCPER213
					Propagate plants for a permaculture garden system	AHCPER214
					Assist with garden soil health and plant nutrition	AHCPER215
					Research and communicate information on permaculture principles and practices	AHCPER301
					Develop recommendations for integrated plant and animal systems	AHCPER302
					Maintain integrated plant and animal systems	AHCPER303
					Carry out animal care, maintenance and treatment programs in a permaculture system	AHCPER304
					Implement crop maintenance and harvesting programs for permaculture systems	AHCPER305
					Use weedy plants in a permaculture system	AHCPER306
					Establish a rural permaculture system	AHCPER307
					Establish an urban permaculture system	AHCPER308
					Install and maintain permaculture water systems	AHCPER309
					Install structures for permaculture systems	AHCPER310
					Kill and dress small livestock for domestic consumption	AHCPER311
					Plan organic garden and orchard systems	AHCPER312
					Coordinate preparation and storage of permaculture products	AHCPER313
					Read and interpret property maps and plans	AHCPER314
					Coordinate community projects	AHCPER315
					Select plant and animal species for permaculture systems	AHCPER316
					Build with earth, straw and reclaimed materials	AHCPER317
					Plan propagation activities for a permaculture system	AHCPER318
					Test, improve and maintain healthy soil in a permaculture system	AHCPER319
					Manage plant pests, diseases and disorders in a permaculture system	AHCPER320
					Demonstrate permaculture practices to small groups of learners	AHCPER321
					Provide advice on permaculture principles and practices	AHCPER401

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Design a rural permaculture system Design an urban permaculture system Plan and implement permaculture works Select appropriate technology for a permaculture system Identify and analyse bioregional characteristics and resources Design harvesting and storage systems for permaculture products Implement and monitor animal health and welfare programs for a permaculture system Manage a permaculture seed bank Recommend approaches for sustainable community and bioregional development Operate within a sustainable community and bioregional development program Operate within a permaculture aid and development program Evaluate suitability of species as solutions for permaculture applications Carry out permaculture field research Design an integrated permaculture system Develop a strategic plan for a permaculture project or enterprise Manage a permaculture project or enterprise Plan and supervise the implementation of permaculture project works Develop a relocalisation or transition project Research and interpret requirements for a permaculture project Manage a permaculture aid and development project Design permaculture structures and features Prepare a sustainable community and bioregional development strategy Facilitate participatory planning and learning activities Plan community governance and decision-making processes	AHCPER402 AHCPER403 AHCPER404 AHCPER405 AHCPER406 AHCPER407 AHCPER408 AHCPER409 AHCPER410 AHCPER411 AHCPER412 AHCPER413 AHCPER501 AHCPER502 AHCPER503 AHCPER504 AHCPER505 AHCPER506 AHCPER507 AHCPER508 AHCPER509 AHCPER510 AHCPER511 AHCPER512
2018	Agriculture, Horticulture and Land Conservation and management.	AHC	Review drainage & irrigation and horticulture units (189) Drainage & irrigation Horticulture Production Horticulture		Unit Sector: Composting (COM) Assess and receive raw materials for composting Recognise and respond to fire emergencies on a composting site Recognise raw materials, production processes and products on a composting site Operate compost processing plant, machinery and equipment Dispatch materials and composted product Operate a compost bagging process Develop a composting recipe Plan and schedule compost production Identify and secure raw materials supply for compost production	AHCCOM201 AHCCOM202 AHCCOM203 AHCCOM301 AHCCOM302 AHCCOM303 AHCCOM401 AHCCOM402 AHCCOM501

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Unit Sector: Drainage (DRG) Maintain drainage systems Install drainage systems Measure drainage system performance Troubleshoot drainage systems Maintain and repair irrigation drainage systems Coordinate and supervise installation of an irrigation drainage system Monitor and control irrigation drainage systems Design drainage systems Unit Sector: Hydroponics (HYD) Implement a maintenance program for hydroponic systems Install hydroponic systems Develop a plan for a hydroponic system Unit Sector: Irrigation (IRG) Support irrigation work Assist with low volume irrigation operations Assist with surface irrigation operations Assist with pressurised irrigation operations Assist with pump and flow control device operations Measure irrigation delivery system performance Troubleshoot irrigation systems Monitor soils under irrigation Install irrigation pumps Operate and maintain irrigation pumping systems Interpret irrigation plans and drawings Operate irrigation technology Operate irrigation injection equipment Implement an irrigation schedule Install pressurised irrigation systems Operate pressurised irrigation systems Maintain pressurised irrigation systems Operate and maintain gravity fed irrigation systems Operate and maintain moving irrigation system Determine hydraulic parameters for an irrigation system Implement an irrigation-related environmental protection program	AHCDRG201 AHCDRG301 AHCDRG302 AHCDRG303 AHCDRG304 AHCDRG401 AHCDRG402 AHCDRG501 AHCHYD301 AHCHYD302 AHCHYD501 AHCIRG101 AHCIRG215 AHCIRG216 AHCIRG217 AHCIRG218 AHCIRG303 AHCIRG306 AHCIRG308 AHCIRG309 AHCIRG310 AHCIRG315 AHCIRG325 AHCIRG326 AHCIRG327 AHCIRG331 AHCIRG332 AHCIRG333 AHCIRG334 AHCIRG335 AHCIRG402 AHCIRG404

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Schedule irrigations	AHCIRG408
					Select and manage pumping systems for irrigation	AHCIRG410
					Interpret and apply irrigation designs	AHCIRG415
					Manage a moving sprinkler irrigation system	AHCIRG422
					Evaluate water supply for irrigation	AHCIRG426
					Supervise irrigation system installation	AHCIRG431
					Supervise irrigation system maintenance	AHCIRG432
					Manage irrigation systems	AHCIRG433
					Manage surface irrigation systems	AHCIRG434
					Audit irrigation systems	AHCIRG501
					Design irrigation system maintenance and monitoring programs	AHCIRG502
					Design irrigation, drainage and water treatment systems	AHCIRG503
					Develop an irrigation and drainage management plan	AHCIRG504
					Establish and maintain an irrigation-related environmental protection program	AHCIRG505
					Unit Sector: Landscape (LSC)	
					Support landscape work	AHCLSC101
					Assist with landscape construction work	AHCLSC201
					Construct low-profile timber or modular retaining walls	AHCLSC202
					Install aggregate paths	AHCLSC203
					Lay paving	AHCLSC204
					Install tree protection devices	AHCLSC205
					Set out site for construction works	AHCLSC301
					Construct landscape features using concrete	AHCLSC302
					Construct brick and block structures and features	AHCLSC303
					Erect timber structures and features	AHCLSC304
					Construct stone structures and features	AHCLSC305
					Implement a paving project	AHCLSC306
					Implement a retaining wall project	AHCLSC307
					Install metal structures and features	AHCLSC308
					Install water features	AHCLSC309
					Implement a tree transplanting program	AHCLSC310
					Supervise landscape project works	AHCLSC401
					Survey and establish site levels	AHCLSC501
					Manage landscape projects	AHCLSC502
					Manage a tree transplanting program	AHCLSC503

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Unit Sector: Nusery (NSY) Support nursery work Pot up plants Care for nursery plants Undertake propagation activities Maintain indoor plants Maintain nursery plants Receive and dispatch nursery products Install and maintain plant displays Deliver and promote sales of plants Prepare specialised plants Implement a propagation plan Operate fertigation equipment Plan a growing-on program Plan a propagation program	AHCNSY101 AHCNSY201 AHCNSY202 AHCNSY203 AHCNSY204 AHCNSY301 AHCNSY302 AHCNSY303 AHCNSY304 AHCNSY305 AHCNSY306 AHCNSY307 AHCNSY401 AHCNSY402
					Unit Sector: Plants culture and management (PCM) Recognise plants Collect, prepare and preserve plant specimens Fell small trees Implement a plant nutrition program Provide information on plants and their culture Identify plant specimens Report on health and condition of trees Recommend plants and cultural practices Develop a soil health and plant nutrition program Implement an integrated pest management program Diagnose plant health problems Collect and classify plants Specify plants for landscapes Design specialised landscape Conduct environment and food safety risk assessment of plant nutrition and soil fertility programs Develop an integrated pest management program Develop and implement a plant health management strategy	AHCPCM201 AHCPCM202 AHCPCM203 AHCPCM301 AHCPCM302 AHCPCM303 AHCPCM304 AHCPCM401 AHCPCM402 AHCPCM403 AHCPCM501 AHCPCM502 AHCPCM503 AHCPCM504 AHCPCM505 AHCPCM506 AHCPCM601
					Unit Sector: Parks and gardens (PGD) Support gardening work	AHCPGD101

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Plant trees and shrubs	AHCPGD201
					Prepare and maintain plant displays	AHCPGD202
					Prune shrubs and small trees	AHCPGD203
					Transplant small trees	AHCPGD204
					Prepare a grave site	AHCPGD205
					Conduct visual inspection of park facilities	AHCPGD206
					Implement a plant establishment program	AHCPGD301
					Plan and maintain plant displays	AHCPGD302
					Perform specialist amenity pruning	AHCPGD303
					Implement a landscape maintenance program	AHCPGD304
					Conduct operational inspection of park facilities	AHCPGD305
					Implement a maintenance program for an aquatic environment	AHCPGD306
					Design plant displays	AHCPGD401
					Plan a plant establishment program	AHCPGD402
					Manage plant cultural practices	AHCPGD501
					Plan the restoration of parks and gardens	AHCPGD502
					Manage parks and reserves	AHCPGD503
					Develop and implement a streetscape management plan	AHCPGD504
					Conduct comprehensive inspection of park facilities	AHCPGD505
					Unit Sector: Production Horticulture (PHT)	
					Support horticultural production	AHCPHT101
					Plant horticultural crops	AHCPHT201
					Carry out canopy maintenance	AHCPHT202
					Support horticultural crop harvesting	AHCPHT203
					Undertake field budding and grafting	AHCPHT204
					Carry out post-harvest operations	AHCPHT205
					Handle and move mushroom boxes	AHCPHT206
					Perform mushroom substrate process tasks	AHCPHT207
					Water mushroom crops	AHCPHT208
					Produce trellis dried grapes	AHCPHT209
					Carry out a crop regulation program	AHCPHT301
					Implement a post-harvest program	AHCPHT303
					Harvest horticultural crops mechanically	AHCPHT304
					Regulate crops	AHCPHT305
					Establish horticultural crops	AHCPHT306
					Prepare raw materials and compost feedstock	AHCPHT307
					Prepare value added compost-based products	AHCPHT308

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Supervise mushroom substrate preparation Coordinate horticultural crop harvesting Assess olive oil for style and quality Develop a crop regulation program Develop harvesting and processing specifications to produce an olive oil Implement and monitor a horticultural crop harvesting program Manage mushroom substrate preparation Control Phase II mushroom substrate process Manage mushroom crop development Oversee vineyard practices Develop a horticultural production plan Manage a controlled growing environment Develop a grape production plan Evaluate wine Manage a wine making process	AHCPHT309 AHCPHT310 AHCPHT401 AHCPHT402 AHCPHT403 AHCPHT404 AHCPHT405 AHCPHT406 AHCPHT407 AHCPHT408 AHCPHT502 AHCPHT503 AHCPHT504 AHCPHT505 AHCPHT506
					Unit Sector: Soil and media (SOL) Assist with soil or growing media sampling and testing Prepare growing media Implement soil improvements for garden and turf areas Sample soils and interpret results Develop a soil use map for a property Prepare acid sulphate soil management plans Supervise acid sulphate soil remediation and management projects Monitor and manage soils for production projects Manage soils to enhance sustainability Manage erosion and sediment control Develop and manage a plan to reclaim land affected by salinity	AHCSOL202 AHCSOL301 AHCSOL303 AHCSOL401 AHCSOL402 AHCSOL403 AHCSOL404 AHCSOL501 AHCSOL502 AHCSOL503 AHCSOL504
					Unit Sector: Turf (TRF) Support turf work Assist with turf construction Prepare turf surfaces for play Renovate grassed areas Support turf establishment Construct turf playing surfaces Establish turf Implement a grassed area maintenance program	AHCTRF101 AHCTRF201 AHCTRF202 AHCTRF203 AHCTRF204 AHCTRF301 AHCTRF302 AHCTRF303

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Monitor turf health Renovate sports turf Develop a sports turf maintenance program Plan and implement sports turf renovation Plan the establishment of sports turf playing surfaces Manage sports turf renovation programs Develop sports turf management programs Manage sports turf facility assets Unit Sector: Water (WAT) Set up, operate and maintain water delivery systems for compost Monitor and operate water treatment processes Design water treatment systems Manage water systems	AHCTRF304 AHCTRF305 AHCTRF401 AHCTRF402 AHCTRF501 AHCTRF502 AHCTRF503 AHCTRF504 AHCWAT201 AHCWAT301 AHCWAT501 AHCWAT502
2019						
2019	Agriculture, Horticulture and Conservation and Land Management.	AHC	Review agribusiness/business, machinery, work, safety and sustainability units (176) <ul style="list-style-type: none"> • Agribusiness. business • General work (including design, explosives, fire, merchandising and sales) • Specialist animal units including artificial insemination, deer, fauna • WHS, sustainability, soil and water conservation, • Machinery operations and maintenance and infrastructure 		Unit Sector: Agribusiness (AGB) Keep production records for a primary production business Plan and implement property improvement Analyse and interpret production data Keep financial records for primary production business Develop climate risk management strategies Plan and manage infrastructure requirements Plan and monitor production processes Plan production for the whole business Develop a whole farm plan Manage application technology Select and use agricultural technology Improve agricultural sustainability using renewable energy and recycle systems Select and implement a Geographic Information System (GIS) for sustainable agricultural systems Implement the introduction of biotechnology into the production system Develop and manage a plan for sustainable production reflecting sustainable production principles Develop export markets for produce Manage estate planning Manage the production system Analyse business performance Manage business capital	AHCAGB301 AHCAGB401 AHCAGB402 AHCAGB403 AHCAGB501 AHCAGB502 AHCAGB503 AHCAGB504 AHCAGB505 AHCAGB506 AHCAGB507 AHCAGB508 AHCAGB509 AHCAGB510 AHCAGB511 AHCAGB601 AHCAGB602 AHCAGB603 AHCAGB604 AHCAGB605

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Manage price risk through trading strategy	AHCAGB606
					Unit Sector: Artificial Insemination (AIS)	
					Assist with artificial insemination procedures	AHCAIS201
					Collect semen	AHCAIS301
					Process and store semen	AHCAIS302
					Artificially inseminate livestock	AHCAIS303
					Supervise artificial breeding and embryo transfer programs	AHCAIS401
					Unit Sector: Business (BUS)	
					Use hand held e-business tools	AHCBUS301
					Administer finance, insurance and legal requirements	AHCBUS401
					Cost a project	AHCBUS402
					Operate within a budget framework	AHCBUS404
					Participate in an e-business supply chain	AHCBUS405
					Manage staff	AHCBUS501
					Market products and services	AHCBUS502
					Negotiate and monitor contracts	AHCBUS503
					Prepare estimates, quotes and tenders	AHCBUS504
					Develop and review a business plan	AHCBUS506
					Monitor and review business performance	AHCBUS507
					Prepare and monitor budgets and financial reports	AHCBUS508
					Develop and implement business structures and relationships	AHCBUS509
					Manage finance, insurance and legal requirements	AHCBUS510
					Manage capital works	AHCBUS601
					Review land management plans and strategies	AHCBUS602
					Develop and review a strategic plan	AHCBUS603
					Design and manage the enterprise quality management system	AHCBUS604
					Manage human resources	AHCBUS605
					Develop a monitoring, evaluation and reporting program	AHCBUS606
					Implement a monitoring, evaluation and reporting program	AHCBUS607
					Manage risk	AHCBUS608
					Unit Sector: Common (CMN)	
					Adapt to work requirements in the agrifood industry	AHCCMN101
					Apply effective work practices	AHCCMN102
					Demonstrate care and apply safe practices at work	AHCCMN103
					Contribute to animal care through work activities	AHCCMN201

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Contribute to work activities to produce food	AHCCMN202
					Unit Sector: Deer (DER) Handle, store and grade deer velvet Comply with deer industry national velvet accreditation requirements Harvest deer velvet	AHCDER401 AHCDER501 AHCDER502
					Unit Sector: Design (DES) Design sustainable landscapes Prepare a landscape design Assess landscape sites Design for construction of landscape features	AHCDES501 AHCDES502 AHCDES503 AHCDES504
					Unit Sector: Explosives (EXP) Handle and store explosives Identify and select explosive products	AHCEXP301 AHCEXP302
					Unit Sector: Fauna (FAU) Recognise fauna Respond to wildlife emergencies Manage fauna populations	AHCFAU201 AHCFAU301 AHCFAU501
					Unit Sector: Fire (FIR) Assist with prescribed burning Manage wildfire hazard reduction programs Plan prescribed burning for fuel, ecological and cultural resource management Carry out basic electric fencing operations Install, maintain and repair farm fencing Maintain properties and structures Fabricate and repair metal or plastic structures Implement property improvement, construction and repair Plan and construct an electric fence Plan and construct conventional fencing Install and terminate extra low voltage wiring systems	AHCFIR201 AHCFIR501 AHCFIR502 AHCINF201 AHCINF202 AHCINF203 AHCINF204 AHCINF301 AHCINF302 AHCINF303 AHCINF304
					Unit Sector: Merchandising and Sales (MER) Process customer complaints Provide advice on hardware products	AHCMER301 AHCMER302

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Sell products and services	AHCMER303
					Recommend irrigation products and services	AHCMER304
					Coordinate customer service and networking activities	AHCMER401
					Provide advice and sell machinery	AHCMER402
					Provide advice and sell farm chemicals	AHCMER403
					Provide advice on agronomic products	AHCMER404
					Provide advice on livestock products	AHCMER405
					Provide information on fertilisers and soil ameliorants	AHCMER406
					Provide irrigation sales and service	AHCMER407
					Develop a sales strategy for rural products	AHCMER501
					Unit Sector: Machinery operation and maintenance (MOM)	
					Assist with routine maintenance of machinery and equipment	AHCMOM101
					Operate two wheel motorbikes	AHCMOM201
					Operate tractors	AHCMOM202
					Operate basic machinery and equipment	AHCMOM203
					Undertake operational maintenance of machinery	AHCMOM204
					Operate vehicles	AHCMOM205
					Conduct grader operations	AHCMOM206
					Conduct front-end loader operations	AHCMOM207
					Conduct excavator operations	AHCMOM208
					Conduct dozer operations	AHCMOM209
					Conduct scraper operations	AHCMOM210
					Operate side by side utility vehicles	AHCMOM211
					Operate quad bikes	AHCMOM212
					Operate and maintain chainsaws	AHCMOM213
					Operate cane haulage vehicle	AHCMOM214
					Coordinate machinery and equipment maintenance and repair	AHCMOM301
					Perform machinery maintenance	AHCMOM302
					Operate machinery and equipment	AHCMOM304
					Operate specialised machinery and equipment	AHCMOM305
					Ground spread fertiliser and soil ameliorant	AHCMOM306
					Operate a cane harvester	AHCMOM307
					Operate broadacre and row crop harvest machinery and equipment	AHCMOM308
					Operate broadacre sowing machinery and equipment	AHCMOM309
					Operate land-forming machinery and equipment	AHCMOM310
					Operate precision control technology	AHCMOM311
					Operate row crop planting and seeding machinery and equipment	AHCMOM312

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Operate mobile irrigation machinery and equipment Transport machinery Operate chemical application machinery and equipment Refuel machinery or vehicle Conduct major repair and overhaul of machinery and equipment Supervise maintenance of property, machinery and equipment Manage machinery and equipment Implement a machinery management system Analyse machinery options	AHCMOM313 AHCMOM314 AHCMOM315 AHCMOM316 AHCMOM401 AHCMOM402 AHCMOM501 AHCMOM502 AHCMOM601
					Unit Sector: Soil and Water Conservation (SAW) Conduct erosion and sediment control activities Construct conservation earthworks Implement erosion and sediment control measures Set out conservation earthworks Supervise implementation of conservation earthworks plans Design control measures and structures Plan erosion and sediment control measures Plan conservation earthworks	AHCSAW201 AHCSAW301 AHCSAW302 AHCSAW401 AHCSAW403 AHCSAW501 AHCSAW502 AHCSAW503
					Unit Sector: Sustainability (SUS) Develop and manage a plan for sustainable supply and use of water on a farm Develop and manage a plan to improve biodiversity on a farm	AHCSUS501 AHCSUS502
					Unit Sector: Work Health and Safety (WHS) Work safely Participate in work health and safety processes Contribute to work health and safety processes Maintain work health and safety processes Manage work health and safety processes	AHCWHS101 AHCWHS201 AHCWHS301 AHCWHS401 AHCWHS501
					Unit Sector: Work (WRK) Maintain the workplace Observe and report on weather Observe environmental work practices Operate in isolated and remote situations Work effectively in the industry Participate in workplace communications	AHCWRK101 AHCWRK201 AHCWRK202 AHCWRK203 AHCWRK204 AHCWRK205

Planned review start	TP name	TP code	Qualification name	Qualification code	Unit of competency name	Unit of competency code
					Observe enterprise quality assurance procedures	AHCWRK206
					Collect and record production data	AHCWRK207
					Provide information on products and services	AHCWRK208
					Participate in environmentally sustainable work practices	AHCWRK209
					Collect samples for a rural production or horticulture monitoring program	AHCWRK301
					Monitor weather conditions	AHCWRK302
					Respond to emergencies	AHCWRK303
					Respond to rescue incidents	AHCWRK304
					Coordinate work site activities	AHCWRK305
					Comply with industry quality assurance requirements	AHCWRK306
					Develop and apply fertiliser and soil ameliorant product knowledge	AHCWRK307
					Handle bulk materials in storage area	AHCWRK308
					Apply environmentally sustainable work practices	AHCWRK309
					Provide on-job training support	AHCWRK310
					Conduct site inspections	AHCWRK311
					Implement and monitor quality assurance procedures	AHCWRK401
					Provide information on issues and policies	AHCWRK402
					Supervise work routines and staff performance	AHCWRK403
					Implement and monitor environmentally sustainable work practices	AHCWRK405
					Plan, implement and review a quality assurance program	AHCWRK501
					Collect and manage data	AHCWRK502
					Prepare reports	AHCWRK503
					Assess new industry developments	AHCWRK504
					Manage trial and research material	AHCWRK505
					Implement professional practice	AHCWRK507
					Interpret legislation	AHCWRK508
					Provide specialist advice to clients	AHCWRK509
					Audit site operations	AHCWRK510
					Develop workplace policy and procedures for sustainability	AHCWRK511
					Monitor projects in a program	AHCWRK601
					Lead and manage community or industry organisations	AHCWRK602
					Design and conduct a field-based research trial	AHCWRK603