Agribusiness, Food and Fibre Industries Skills Report

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Acknowledgement of the Work of IRCs

We acknowledge the work of the members of Industry Reference Committees (IRCs) in the preparation of this report and continuing phases of this project. Their voluntary participation and provision of intelligence, data and information makes the compilation of this information possible.

Information in this report has been developed from six years of contributions from the IRCs.

Acknowledgement of Country

Aboriginal and Torres Strait Islander peoples have a proud and continuous connection to Australia's land and waters. We acknowledge the Traditional Owners and custodians, and the continuing connection of Aboriginal and Torres Strait Islander peoples to the lands, waters and communities. We pay our respects to Elders and Leaders, past and present, and to all Aboriginal and Torres Strait Islander peoples who have supported our work.

We acknowledge the importance of learning from Aboriginal and Torres Strait Islander peoples' unique history of land and ecosystem management, art, culture and society. Their connections are particularly important given our involvement in work directly connected to utilisation, care and stewardship of Australia's land, waters and ecosystems, and the animals, trees and plants that inhabit them.

The IRCs and Skills Impact have been working to develop improved participation of Aboriginal and Torres Strait Islander enterprises, businesses, communities and peoples in our work. We will continue to work to develop strong, mutually beneficial relationships with Aboriginal and Torres Strait Islander partners who can help us deliver better outcomes for Aboriginal and Torres Strait Islander peoples, recognising their motivation and abilities in improving quality of life, employment opportunities and skills outcomes in their communities and across Australia.

Purpose

Skills Impact has prepared this Agribusiness, Food and Fibre Industries Skills Report at the request of 12 Industry Reference Committees (IRCs), whose role is to consider industry skills requirements in the development and review of training packages (see below for the industry and training package

This Industries Skills Report is designed to assist collaboration across industries and the streamlining and reform of the Australian skills and VET system. This may aid the implementation of the Skills Minister's Priorities by supporting:

- greater labour mobility through stronger recognition of cross-sector and transferable skills
- better use of industry and educator expertise to promote better quality outcomes
- improved pathways advice to encourage lifelong learning and build peoples' labour market resilience
- Australia's capacity to grow, compete and thrive in the global economy, especially in context of the concurrent impacts of COVID-19, automation and digital transformation on the skills required for jobs now and into the future.

This document reports on the many commonalities in the skills and knowledge required in the Agribusiness, Food and Fibre Industries, and the similar issues that they face. The current structures governing the vocational education and training (VET) training package and IRC system make these commonalties difficult to identify. In presenting prevalent issues and responses common across all Agribusiness, Food and Fibre Industries, this document can be used as a resource for supporting the increasing levels of diversity within businesses, as well as the move to Industry Clusters as part of the Australian Government's skills reform agenda[1]. It provides insights into opportunities for skills development in a more holistic fashion than is possible when working across eight training packages and 12 IRCs individually.

The IRCs requested that this report be prepared to support improvements in the skills system, including work on:

- industry workforce planning and strategies to address workforce shortages
- documenting shared standards and regulations across industries to support end-to-end systems planning and avoid duplication
- the provision of evidence, data and intelligence to add value for industries beyond a narrow focus on training package development, and to inform future Industry Clusters or similar bodies approved to undertake work within the Australian skills and VET system
- creating foundations for potential qualification reforms with a greater emphasis on skills families and portable skills
- identifying shared 'skills domains' to aid in simplifying and streamlining national VET qualifications across industry groupings.

Method & Structure

Industry Reference Committees (IRCs) oversee the work of Skills Service Organisations (SSOs) in the collection and analysis of industry intelligence, which is used to:

- identify industry skills needs and challenges

[1] Australian Government (2022): *Skills Reform*; https://www.skillsreform.gov.au/; viewed 02/03/2022.

- identify issues and potential improvements to the Skills and VET system
- provide the basis for work to update VET training products
- provide an information source for industry to assist with business, workforce, skills and training planning.

The information in this report has been collated from a variety of sources identified by IRC members and industry stakeholders who have participated in engagements with Skills Impact. It also utilises data and information sourced from official sources and major commercial providers through the assistance of the Australian Government Department of Education, Skills and Employment (DESE).

Coverage

This Industries Skills Report identifies common and shared issues across the Agribusiness, Food and Fibre Industries. This group of industries comprises:

- Agribusiness:
    - including agriculture, horticulture, ecosystem management, animal care, aquaculture, fishing, racing, and business leadership and management.
- Food:
    - including food processing, baking, beverage production, brewing, distilling, wine, meat and seafood.
- Forestry and fibre:
    - including forest management and harvesting, pulp and paper, timber processing and products, building and furnishing solutions.

This report has been prepared on behalf of the Industry Reference Committees (IRCs), listed below, that cover the Agribusiness, Food and Fibre Industries. IRCs are the formal channel for considering industry skills requirements in the development and review of training packages.

1. Agriculture and Production Horticulture
2. Amenity Horticulture, Landscaping, and Conservation & Land Management
3. Animal Care and Management
4. Aquaculture and Wild Catch
5. Food and Beverage
6. Forest Management and Harvesting
7. Meat Industry
8. Pharmaceutical Manufacturing
9. Pulp and Paper
10. Racing and Breeding
11. Timber and Wood Processing
12. Timber Building Solutions

Overview of the Agribusiness, Food and Fibre Industries and Skills System

'Agribusiness, Food and Fibre' includes the full range of industries, sectors and occupations currently within the responsibilities of Industry Reference Committees being assisted by Skills Impact (see Coverage above)

The Agribusiness, Food and Fibre Industries cover: broad acre cropping; livestock; production horticulture; amenity horticulture; ecosystem management (conservation and land management); landscaping and arboriculture; animal care and management; racing and breeding; Industry business leadership and management; food processing, baking and beverage production; meat; seafood, including aquaculture and wild catch; alcoholic beverage manufacture, including viticulture and wine; non-alcoholic beverage manufacture; forest management and harvesting; pulp and paper, including packaging and hygiene products; timber and wood processing; and timber building solutions, including furniture.

Most of these industries are categorised by the Australian Bureau of Statistics (ABS) under the Australian and New Zealand Standard Industrial Classification (ANZSIC) division 'Agriculture, forestry and fishing'. Consequently, this division is used in various reports published by research organisations; notably, for statistics presented in this report, it is used for data collection by the National Centre for Vocational Education Research (NCVER). Each of the industries, sectors and occupations covered by this division are included in the Agribusiness, Food and Fibre Industry Cluster, which also has coverage not appropriately quantified in official data sources.

For historical and administrative reasons, there is a great deal more data and statistical information available for agriculture than for other sectors within Agribusiness, Food and Fibre. This is reflected in the evidence base used in this report, which frequently utilises agriculture statistics to support broader stakeholder feedback and evidence.

The National Skills Agreement and Skills Ministers Priorities

Australia's Skills Ministers have been working with industries to look at innovative ways of helping them access the skills and training needed for future growth. Skills Ministers have been seeking not only to reform the Vocational Education and Training (VET) system but develop foundations for delivering the fit-for-purpose skills needed by Australian industries to successfully navigate rapidly changing international markets, workplace tasks and technological developments.

A key focus has been on new arrangements for industry engagement to inform the design and prioritisation of training, including across education types. The Ministers have approved an Industry Cluster approach designed to:

1. Strengthen the role of industry and employers in the VET system
2. Improve VET qualifications
3. Support high-quality training delivery

The Industry Cluster model was developed in the context of the National Skills Agreement. While there are a number of objectives identified under the agreement, the Industry Cluster model may be critical to:

1. developing and funding nationally accredited micro-credentials and individual skill sets, in addition to full qualifications, and supporting lifelong learning through an integrated tertiary education system
2. promoting apprenticeships and other employment-based training, including pre-apprenticeships, and undertaking reforms to boost geographic mobility and labour supply

3. strengthening VET pathways for secondary school students and improving the quality and vocational relevance of VET in schools
4. working with the National Careers Institute (NCI) to reduce the proliferation of careers information available, and supporting the NCI to provide access to career information that best enables people to make decisions about learning, training and employment pathways.

The initial development of Industry Clusters has been based on the ANZSIC classifications and on existing training package configurations. It is clear that the Skills Ministers are considering this model as a way of encompassing a broader range of skills and training opportunities.

Defining Characteristics of the Agribusiness, Food and Fibre Industries

Industry bodies have been working to identify the scope of the Agribusiness, Food and Fibre Industries with a view to meeting the needs of a modern Australian skills system. This work started with the identification of industries in the National Agricultural Workforce Strategy, which was released in 2021 and subsequently endorsed by the Federal Government. Principal industry bodies include three industry leaders identified in the National Agriculture Workforce Strategy: the National Farmers Federation, Australian Forest Products Association and Seafood Industry Australia.

Given this strategy reflects government policy for the sector, the industry bodies worked with stakeholders to further refine proposals for an Industry Cluster and scope of operations to ensure the success of the strategy and to begin the process of incorporating the priorities of the Australian Skills Ministers.

The National Agricultural Workforce Strategy identified the characteristics of the industries associated with Agribusiness, Food and Fibre using a high-level value chain approach. This approach has been refined, and industry bodies and employers have identified the following characteristics of Agribusiness, Food and Fibre:

Whole of value chain approach

A key feature of the Agribusiness, Food and Fibre Industries, which distinguish them from other industries, is the need to ensure the continuity of end-to-end systems, from planning through to final consumption, in almost every sector. These industries deal with animals and plants, and their products that are consumed by, or critical to, human, animal and plant sustainability and lifestyles.

Biosecurity, invasive species and pest control

Another key feature of the Agribusiness, Food and Fibre Industries that distinguish them from other industries is the critical importance of biosecurity, including infection control and dealing with invasive species and pests. This factor is being increasingly recognised in the 21st century, which has already seen outbreaks of avian and equine influenza, Ebola virus, bovine spongiform encephalopathy (BSE) and major changes in Australia's marine life, as well as the zoonotically transmitted COVID-19.

Sustaining plants and animals

The foundation of Agribusiness, Food and Fibre is the cultivation, growth and utilisation of living, biological organisms. In common with industries relating to human health and services, there is an expectation that Agribusiness, Food and Fibre workers will have the skills required to deal with the complexity of caring for living plant, soil, water-based and animal organisms and the products derived from them.

Ecosystem management, Continuing Climate Adaptation and Carbon Capture and Storage

Each sector across the Agribusiness, Food and Fibre Industries is responsible for the skills that are applied to manage the protection, utilisation, sustainability and health of Australia's ecosystem. This is an area of major and critical change given Australia's commitments to address climate change, the changing ownership and custodianship of Australian land and water masses, and the economic growth of the Asia Pacific region.

Digital and automation practices

The Agribusiness, Food and Fibre Industries are often early and enthusiastic adopters of technological advancement, especially where technology can be helpful in minimising the risk of operating in an environment with such extreme levels of uncertainty. However, the skills to take full advantage of digital practices are often not available to these industries, especially given the competitive and urban-based environment of the IT world. Recently the Rural Research and Development Corporations (RDCs) led the development of a Digital Capability Framework, supported by Skills Impact, which has the capacity to be useful for all industries. It is certainly important to all sectors within Agribusiness, Food and Fibre that digital and technological practices are incorporated wherever practicable and viable.

Food safety, quality assurance and regulatory compliance

While all industries face quality assurance (QA) and regulatory requirements, the Agribusiness, Food and Fibre Industries have common food safety and QA frameworks relating to the usage of products derived from biological entities. Access to international and national markets and competitive advantage are often dependent on strict standards, which can change rapidly.

Workplace and value chain risk management and safety culture

Risk management and safety culture is an aspiration shared by all industries, and Agribusiness, Food and Fibre work collaboratively across industries to maintain and further develop safety skills. The differentiating features for Agribusiness, Food and Fibre include:

- protecting the safety and wellbeing of multiple living entities, humans, animals and plants, as they interact
- dealing with global cultivation and production risks over the short-term, which may be highly unpredictable over the medium- and long-terms, such as weather conditions and diseases affecting animals and plants
- working in natural environments, with risks which cannot be engineered out
- working in remote situations, often alone or in small teams
- changing roles due to seasonal and lifecycle factors, and due to changing stock and crops
- dealing with natural disasters, such as drought, bushfires and floods, across all areas, from planning to recovery.

See the **Environmental Analysis** below for detailed discussion of the above characteristics.

Skills Domains in Agribusiness, Food and Fibre

The complexities of dealing with biological entities across a whole value chain means that different industries within Agribusiness, Food and Fibre must draw on unique skills. Nevertheless, these industries are inter-related, and each of the characteristics listed in the section above apply to distinct *skills domains* across the cluster.

Skills domains:

1. Working in Agribusiness
    a) Environment, farm, habitat, soils, water and land care, and fire management (ecosystem management)
    b) Agribusiness planning and trading
2. Working with Animals
    a) Animal breeding and growth
    b) Animal health, welfare and training
    c) Animal retraining, rehoming and end of life
3. Working with trees and plants
    a) Forest and plant cultivation and growth
    b) Forest and plant health and safety
    c) Cropping and harvesting
4. Working in processing
    a) Food and beverage
    b) Fibre (including pulp and paper)
    c) Timber and wood products
    d) Furniture and upholstery

Designing Industry Responses and Identifying Priorities

A major issue for the Australian Skills System has been its focus on national training packages and associated training products. Sectors across the Agribusiness, Food and Fibre Industries have reported that a weakness of the model currently guiding the Australian Industry and Skills Committee (AISC) is its narrow focus on training package silos, to the detriment of strategies that encompass all skills and educational pathways.

To operate effectively, a framework must be established to inform industry decision-making on the identification and prioritisation of work that needs to be undertaken. This will require detailed plans for meeting workforce and skills needs across industry sectors through different education and training pathways (i.e. nationally-recognised training, other forms of training and higher education) and any required training product development.

In aiming to ensure industries have access to a productive and safe workforce, the skills system in Australia is necessarily complex and dynamic. Recent reviews, including the Joyce Review, the Productivity Commission (National Agreement for Skills and Workforce Development Review) and other VET Reform initiatives, have recommended ways in which the VET system can be improved, including with the implementation of a priority framework which could be summarised as:

1. Learner/worker-centred
2. Industry-focussed
3. Competency-based
4. Government policy-aligned

New measures to support the system need to align with this framework by supporting the following aims:

1. **Learner/worker-centred:**
    a) Safe
    b) Employed or have the ability to compete for employment
    c) Accessible and understandable
2. **Industry-focused**
    a) Effective and efficient production and delivery of goods and services
    b) Meeting local and international market needs
    c) Enabling growth and Innovation
3. **Competency-based**
    a) Delivery of work-ready candidates
    b) Addresses Skills needs and gaps
    c) Changing skills
    d) Ongoing skills development
4. **Government policy-aligned**
    a) Regulatory requirements
    b) Supporting government policies for skills, training and education
    c) Supporting government policies for jobs, trade, markets and economic growth

In addition, the specific nature of work and of developing skills within these industries necessitates that there be a heightened focus on associated risks. Learners and educators need to understand and plan for:

5. **Risk**
    a) Nature of Risk
    b) Level of Risk
    c) Location of Risk
    d) Risk to self/others

Environmental Analysis

This environmental analysis is intended to provide value to employers and decision makers associated with the Agribusiness, Food and Fibre Industries. It provides analysis in the areas that are defining characteristics shared by these industries (described above) and, correspondingly, are of highest interest to stakeholders. The topics covered are:

- Whole of Value Chain Approach
- Biosecurity, Invasive Species and Pest Control
- Sustaining Plants and Animals
- Ecosystem management
- Digital & Automation practices
- Food Safety, QA and Regulatory Compliance
- Farm and Value Chain Risk, Safety Culture.

Whole of Value Chain Approach

The Agribusiness, Food and Fibre value chain encompasses all stakeholders (up- and down-stream suppliers, farmers, growers, traders, processors and retailers) who are often linked in cooperative and collaborative relationships to provide consumers with products and services. Value-adding across the Agribusiness, Food and Fibre Industries occurs when there is a change in the form of a product (e.g. changing grain into flour) or through the addition of an attribute to a product (e.g. registering the provenance of fish products). Equally, value-adding occurs both within the farm gate, such as through adopting organic, permaculture, chemical-free, or low-emissions farming systems, and further down the supply chain in food processing, packaging, and tracking and traceability. Many forestry and timber businesses are tightly linked through supply chains, and some are now vertically integrated with growing, processing and retailing of timber products.

The National Agriculture Workforce Strategy notes that a whole of value chain approach is essential not only for understanding the ways in which industries work together but also to implement robust and adaptable systems now and into the future:

> ‘the term 'agriculture' does not properly convey the true range of activities in the sector. These range from the pre-farm stage, where the main concern is the custodianship of the land and the sea; to the farm itself as it cultivates, treats, feeds and tends to its outputs; to the processing of those outputs, whether on or off the farm itself; to the transport of those products; through to the stage where the products are marketed, advertised, exported and in general reach the consumer; and ending up in a loop where consumer feedback reaches the farmer, and in turn suggests what to produce.’
> *J. Azarias, R. Nettle & J. Williams (2020); National Agricultural Workforce Strategy: Learning to excel; National Agricultural Labour Advisory Committee; Canberra, December; p.xiv*

This section covers issues relating to business sustainability; supply, value and distribution chains; provenance; traceability; blockchain; cultural and specialist approaches (e.g. permaculture, organic); and waste systems.

Value chain interdependencies a key focus of the National Agricultural Workforce Strategy

Agribusiness, Food and Fibre is more than just the farm, plantation or production hub. There are critical interdependencies and cooperation required across all stages of a variety of value chains as described above.

If Australian agribusiness is to become a $100 billion sector, as per the National Farmers' Federation's ambitious target, new approaches will be essential, including a fundamental reimagining of the role of agribusiness as a complex, modern, sophisticated sector that encompasses value-adding, supply chain considerations, consumer-driven approaches, sustainability issues, and adoption of field robotics and automation. As the National Agriculture Workforce Strategy contends:

> 'In the 21st century, which could be a century of pandemics, a wider and deeper vision is needed for Australian AgriFood, a recognition that all the actors in the AgriFood chain are bound together. In this more contemporary perspective, the AgriFood sector is thought of as an entire 'ecosystem', with a chain, or a web, of interdependencies, in which a weakening of one constituent element ultimately impairs the whole structure.'
> *Source: J. Azarias, R. Nettle & J. Williams (2020); National Agricultural Workforce Strategy: Learning to excel; National Agricultural Labour Advisory Committee; Canberra, December; p.6.*

Disruptions caused by COVID-19 have highlighted the need to streamline and increase the robustness of Australia's Agribusiness, Food and Fibre supply chains, inclusive of risk management strategies to locally produce more fresh food and process more food, forest, beverage, timber and medicinal products. Efforts in these areas include primary producers and processors creating economies of scale through improved logistics and aggregating production, processing, storage and distribution to ensure cohesive, agile and resilient supply chain systems.

COVID-19 built on issues arising from recent natural disasters, both prior to and during the pandemic. In particular, bushfires over the last five years have had an enormous impact on the forestry industry, limiting the number of trees available for harvesting, both as a result of destruction and the need for re-growth. At the same time, the pandemic has limited Australia's access to international product sources and led to an increase in demand for local timber, wood and fibre products. Increasing investment in infrastructure also results in increased product demand, as these products are fundamental to construction. It should be noted that international trade restrictions have created issues for the export sector.

All stages of the value chain are enabled by cross-sectoral skills and knowledge in biosecurity, infection control, traceability, sustainability and safety. Overlaying all of this is a further web of strategic planning, evaluation and learning that is delivered and updated continually.

The Agribusiness, Food and Fibre Industries have some of the most complex business planning, finance and investment, and workforce development challenges in Australia. More than in any other cluster (although shared by some regional, rural and remote businesses external to this cluster), businesses in these industries are subject to the vagaries of the natural environment, necessitating that they must respond to unpredictable weather, climate, water and natural disaster conditions.

Compounding these challenges, consumer demand, and so local and international markets, are largely beyond the control of producers and employers. As well as changes in consumer tastes, markets change over time in line with government planning and social licences relating to land and water quality and use, demand for ethical production, cultural promotion and protection, conservation, heritage, and recreational and tourism needs. Consumer choice and changing tastes are additionally shaped by the importance of food, animals and plants to cultural and religious traditions, celebrations and observations.

All these variables together create unique challenges across the value chain and have a major impact on access to staff, finance, insurance and many other business support mechanisms that are more readily available for and in other industries.

Major trends shaping value chains

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) describes the megatrends shaping agriculture and explores their implications for Australia's food and fibre industries up to, and beyond, 2040. Megatrends become apparent as multiple economic, political, environmental, social and technological trends intersect, creating both opportunities and challenges for the agricultural industries.

- Rapid growth of empowered consumers in emerging economies
    - The incomes, expectations and spending of people in emerging economies, especially in Asia, are rising. A more populous and empowered middle class are demanding higher volumes of quality food and fibre, including raised expectations around health value, provenance, sustainability and ethical production.
- Rivalries among superpowers
    - Economic, cultural and geopolitical power shifts are reshaping the world, creating greater competition and new global networks. International trade, comprising food and fibre markets, supply and value chains and trade relationships, are becoming increasingly complex as nations compete financially and ideologically.
- Establishing competitive advantage requires greater efficiency
    - Enhanced productivity, realised through a more efficient use of materials, energy, water, land and labour, is driven by innovation. However, the benefits of innovation and change will be unequal across different businesses, industries, states and nations. Rural industries and regional communities, already subject to population drift, will struggle to keep up without significant infrastructure investments. Hiring people with transferable, advanced skills is becoming more important as producers attempt to do 'more with less'.
- Volatile environments
    - Accelerating rates of change in ecosystems at all scales – from the microbial to the global – are giving rise to numerous challenges, and some opportunities. The agricultural industries are in the process of adapting to increasingly volatile climactic conditions and commodity price fluctuations. Emerging markets for carbon and ecosystem services could transform landscapes and business models.
- Disruptive technologies
    - Rapid advances in digital technology, automation, AI, genetics, and synthetics are disrupting and changing how Agribusiness, Food and Fibre products are made, marketed and delivered. Production systems, supply/value chains and customer demand-driven strategies are becoming more agile and interlinked, requiring new skills and cross-industry collaboration. These trends are creating greater risks and opportunities for agricultural producers and regional communities.
- Leading with a future focus
    - Australia boasts competitive industries, vibrant communities and unique natural assets. But, in a global marketplace, countries cannot rest on their laurels and so must drive progress rather than become defined as 'late adopters', a legacy that would burden future generations. Strong leadership is key.

ABARES comments that, overall, well-informed decision making and risk management strategies will become even more necessary for businesses. New business models and partnerships will emerge, and, in

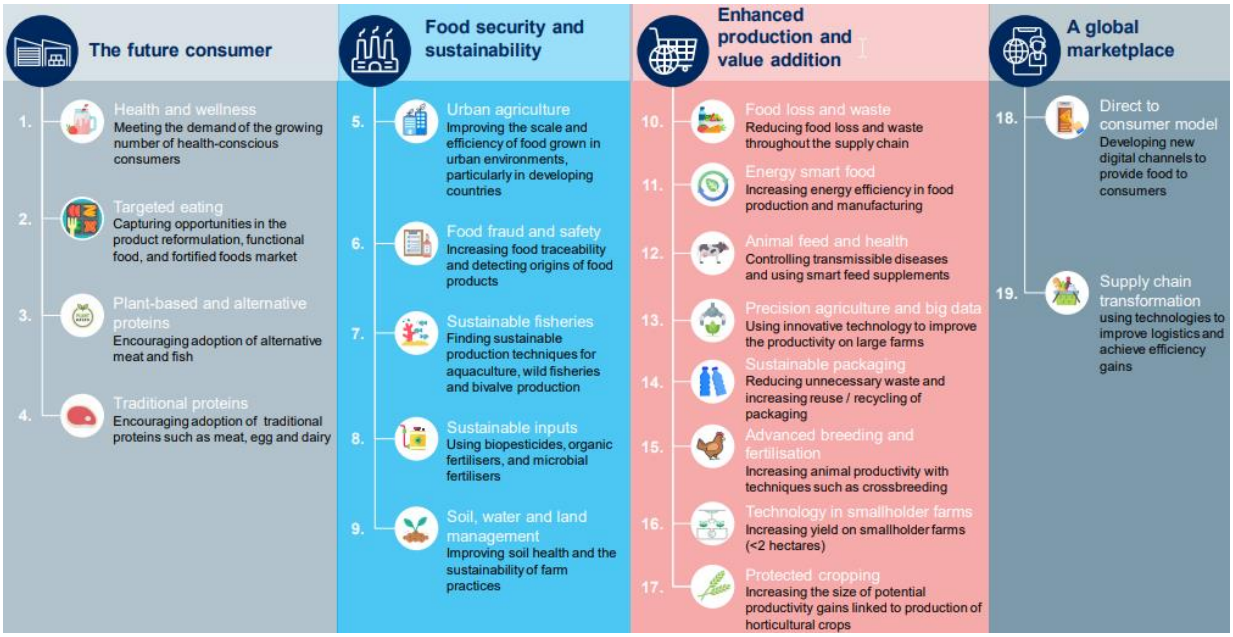
some cases, there will be opportunities to capture the value of as-yet unrealised income streams, which will require new skills in marketing, engagement and relationship management. Furthermore, harnessing the advantages facilitated by disruptive technologies will require new approaches to managing and sharing data and information. Success in these areas cannot be taken for granted and will require renewed commitment across value chain industries.

The Australian Food and Grocery Council (AFGC) report, *Sustaining Australia: Food and Grocery Manufacturing 2030*, presents in-depth analysis of the megatrends that are shaping the Australian food and grocery manufacturing sector. These include:

- Retail competition and concentration
    - Australia has one of the world's most concentrated supermarket sectors, with the two main retailers, Coles and Woolworths, having dominant buying power and stringent price control processes, which some research suggests raises costs but lowers revenue for food and grocery producers. The investment by these companies in block chain development is adding to the pressures on producers to work within systems controlled by the major retailers. According to the industry survey results informing the report, this is the single most important issue facing food and grocery production in Australia.
- Nutrition and health
    - Processors are focussing on responding to increased consumer awareness of good nutrition and its links to health. Demand for health, wellbeing, sustainable and premium foods will grow at 3.6%, which is above overall industry growth rate of 2.4%. This is a key driver for domestic and export markets.
- Circular economy
    - Processors are actively working to build a circular economy to reduce the environmental impact of packaging and food waste. The sector has set National Packaging Targets to improve packaging recyclability and recycling rates. This requires a transformation of resource recovery and recycling systems, and substantial research and development into more sustainable packaging, as well as investment in new packaging capital equipment. As recognised in the Australian Government's National Plastics Plan, this will require collaboration and effort across the entire packaging and resource recovery supply chain, consumers and local, state and federal governments. Circular economy principles are also being applied in processing practices to re-use waste that is generated during production processes.
- Climate change
    - The future of food and grocery production is intrinsically linked to the land, water and agriculture, which are in turn impacted by climate change. Addressing climate change extends to many industry challenges, such as sustainable sourcing (of energy supplies, ingredients and other inputs), production and consumption.
- Food security
    - The COVID-19 pandemic brought food security into the national conversation because of concurrent disruptions to international supply chains and surging demand for food and grocery products. While Australia's unique situation helped in navigating the pandemic, doubts have been raised over industries' ability to compensate for future potential disruptions to import markets.

Considering the trends impacting on the Agribusiness, Food and Fibre Industries, Food Innovation Australia Limited (FIAL) has highlighted 19 major opportunities for these industries that will impact on operations and the skills needed for working across the value chain:

Figure 1: 19 Major Opportunities in Agribusiness, Food and Fibre to 2030



Source: FIAL (2020); Capturing the prize: The A$200 billion opportunity in 2030 for the Australian food and agribusiness sector; p.4

Traceability, provenance and blockchain

Over the last five years, multiple Industry Skills Forecasts and Annual Updates prepared by Agribusiness, Food and Fibre Industry Reference Committees have emphasised the importance of traceability and provenance for national and international consumer markets, compliance, safety and welfare, licensing and prevention of fraud. There is an alignment with the chain of custody requirements established through formal standards in the forest and fibre sector.

A National Traceability Framework[2] was developed in 2019 as a tool to guide the Agribusiness, Food and Fibre Industries, governments and related businesses on traceability systems. The framework provides a common vision, principles for traceability systems, roles and responsibilities of stakeholders, and a guide for industry action plans with traceability objectives and measures of success.

[2] Australian Government (2019); *National Traceability Project*; https://www.awe.gov.au/biosecurity-trade/market-access-trade/traceability-project; viewed 22/02/2022.

Principles of the National Traceability Framework

- Industry-government partnerships:
    - assisting all industries to harness commercial opportunities and manage risks, and supporting government's role as a regulator and certifier, through a combination of voluntary and regulated approaches.
- Industry ownership:
    - developing approaches to tracing agricultural products and foods is the primary responsibility of industries, incorporating the associated accountability, supported by governments.
- Trust:
    - supporting existing industry systems and facilitating community, consumer and trading partner trust by enabling claims to be more accurately assessed and strongly verified and improving transparency along the entire supply chain.
- Information:
    - enabling data collection that is meaningful, timely, complete, accurate, and can be readily shared between all supply chain stakeholders and government for mutually agreed purposes, and when it is economically beneficial to do so. Where desired by all industry participants in a supply chain, this could include the use of standardised codes and attributes to facilitate interoperability and visibility through the entire supply chain.
- Visibility through the entire supply chain:
    - enabling tracing of foods and other agricultural products through the supply chain. Where required this covers activities from the point of origin, through all stages of production, processing, and distribution.
- Use of existing systems:
    - leveraging and building on existing systems, business processes and technologies where possible, to reduce cost and improve uptake.
- Harmonisation with standards:
    - implementing relevant international standards, to the extent desired, for both commercial and regulated traceability systems, that require each participant in the supply chain to be able to trace one-step forward and one-step back, as a minimum, and implementing domestic standards, as outlined in the Australia New Zealand Food Standards Code or other legislative instruments, and utilising these systems to facilitate domestic and international trade.
- Flexible and outcome-based solutions are 'fit for purpose':
    - accommodating a broad range of industry and government needs across agricultural products and foods, varying in their complexity and reasons for traceability.

Rapid improvements in technology, notably blockchain development, have improved the abilities of most sectors to trace and protect animals, plants and associated products.

Traceability is the ability to follow the movement of animal, plant, food, feed or other substances through relevant stages of production, processing and distribution. Traceability of animals, timber, plants, minerals, chemicals, agricultural products, food and feed, beverages and pharmaceuticals requires systems and arrangements that track how a product has been handled, processed, packaged and transported. This includes recording growth and production processes, complying with regulatory requirements, managing food, animal and worker safety, following prescribed packaging and handling practices, chain of custody compliance, and publicly sharing information about the management of waste and unwanted products. Traceability identifies potential risks of fraud, contamination or adulteration and provides evidence to support claims of socially and environmentally desirable processes and product provenance.

Traceability also relates to ensuring the welfare of animals, such as thoroughbred horses, in industries that depend on positive outcomes for sustaining 'social licence'.

Case Study: National Horse Traceability Register

The welfare of retired racehorses poses challenges for the racing industry. Horses leave the racing industry at various stages of their lives: as foals, during training, their racing career or at retirement age. Most racehorses will have a racing career of between two and three years and, given a life expectancy of 25 to 30 years, caring for them over the remainder of their lives is often complex and expensive. While many female racehorses begin a new career in breeding, geldings and slower runners are often not repurposed.

Following a 2019 ABC exposé of retired racehorse slaughter for pet food and human consumption in New South Wales and Queensland there has been increased public scrutiny of racehorse welfare. There is now greater public expectation that these horses will be appropriately cared-for in their post-racing life, which has also seen an increase in horse rescue centres, sanctuaries and charities.

In 2019, a Senate inquiry into the feasibility of a national horse register published 18 recommendations for better management and promotion of equine welfare, rider safety and biosecurity. Following this, the country's state agriculture ministers agreed to facilitate the creation of a National Horse Traceability Register to make horses easier to trace[3]. The inaugural meeting of the National Horse Traceability Working Group (NHTWG) was held on 30 October 2020 and has provided advice on matters relating to the design and introduction of a traceability system for horses, donkeys and mules in Australia. A major focus is on horse traceability in the context of the prevention and containment of disease, in particular economically important emergency animal diseases and zoonoses (diseases that can be transmitted from animals to humans). The working group is expected to deliver recommendations to the Agriculture Ministers Meeting in 2022[4].

Product provenance information is an important response to consumers' demand for transparency. Australian industries are frequently asked to provide evidence of the geographic origin and source of products to meet legal and cultural demands. It is important to consumers that they have confidence that products really are what they claim to be (e.g. Australian, kosher, farmed, sustainably caught, wagyu, plantation grown, vegan, cashmere). Consumers around the world are preferring to buy local, reduce

[3] ABC News (2020); *National Horse Traceability Register working group established after Senate inquiry*; https://www.abc.net.au/news/2020-02-28/national-horse-register-to-make-animals-more-traceable-planning/12011962; viewed February 2020.

[4] Agriculture Victoria (2022); *Horse traceability*; https://agriculture.vic.gov.au/livestock-and-animals/horses/horse-traceability; viewed 11/03/2022.

product transport costs, keep local producers and manufacturers in jobs and support local businesses. The high brand value of Australian products and services is sustained through accurate and trustworthy labelling, which informs consumers that products are harvested or processed within conditions that meet their cultural expectations, without using undesirable materials or processes, untrained or compromised labour, inaccurate species identification or fraudulent breeding records. This relies on transparent, reliable evidence of origin and quality, backed by scientific verification of authenticity, which then increases consumer trust, business profitability, the strength of the economy, and so the skills of the workforce.

Blockchain technology is rapidly becoming the option of choice for implementing traceability and provenance systems. During its establishment as a leading market technology, blockchain has been lauded for its perceived security; however, as with all such technologies, becoming a mainstream tool has led black market operators and others intent on undermining trade to attempt to expose any vulnerabilities.

A potentially bigger issue is the trend towards domination of blockchain technology by the major retailers in Australia. While these systems perform the functions of traceability and provenance, there is a perception among growers, producers and suppliers that major retailers are utilising blockchain to collect consumer data and so increase the market share of their 'own-brand' products at the expense of protecting the whole value chain.

Developing the skills and knowledge required to understand and operate blockchain technology may serve to ensure that the broad needs of industry are met.

Traceability in the marine environment

Since 2006 it has been a legal requirement that seafood sold in Australian retail must clearly display Country of Origin Labelling (CoOL). The Federal Government introduced these regulations to ensure consumers can make informed choices about the seafood they purchase[5]. This is a response to market research indicating:

- many Australian consumers incorrectly assume that most of the seafood sold in retail stores is Australian
- cheap imports are potentially damaging Australia's reputation for high quality seafood
- consumers are willing to pay more for quality Australian seafood
- Australian seafood is an important asset for the tourism industry
- CoOL helps the consumer identify seafood that is sustainably managed, from industries with well-regulated fish handling and hygiene standards, and whether it is from regulated wild harvest fisheries or aquaculture operations.

Australian seafood operators are implementing traceability systems to meet consumer demand for sustainably caught fish. In collaboration with the Boston Consulting Group and WWF, Austral Fisheries have developed traceability systems to connect with customers and reassure them that they are buying fish sourced from a legally managed fishery with optimised fishing operations, cold chain and logistics. This creates a unique opportunity for producers at the beginning of the value chain to connect all the way through to end consumers.

[5] Northern Territory Seafood Council (2022); *NTSC Policy Position Paper: Seafood Labelling*; https://www.ntsc.com.au/content/policy-position-7; viewed 15/03/2022.

Case Study: Austral Fisheries Traceability

Issue
Too much of the world's fish is caught illegally by unregistered vessels or in protected areas. Given recent controversies in the seafood industry that impact on its social license, consumers seek reassurance that they are buying sustainable, ethical products.

Solution
Austral Fisheries, in collaboration with the Boston Consulting Group and WWF, have developed a machine learning algorithm, 'OpenSC', that combines several data sources to prove that its vessels have only fished in legal areas. Austral then shares this information with consumers on a dedicated website.

Fish provenance traceability
OpenSC allows Austral to determine the exact origin of its fish. A radio-frequency identification (RFID) tag is attached to each fish immediately after it is caught, which records the exact GPS location of the vessel at that time. A management dashboard allows Austral staff to use the information to help optimise fishing operations.

Blockchain monitors product movement
Austral trace the journey of each fish caught in Antarctica all the way to filleting in Perth and distribution across Europe, Asia and the Americas. At the processing stage, data from the RFID tag on each fish is linked with a QR code and printed on the packaging. The RFID tags and QR codes are scanned at key stages throughout the supply chain. Austral can trace product temperature from catching to consumer, enabling efficiencies in cold storage and recalls. This blockchain tool provides a digital platform for Austral to share the provenance and journey of its products with seafood retailers, restaurant customers and online shoppers.

Source: J. Azarias, R. Nettle & J. Williams (2020); National Agricultural Workforce Strategy: Learning to excel; National Agricultural Labour Advisory Committee, Canberra, December; p.76

Capital investment and training provision

Capital investment in Agribusiness, Food and Fibre is essential for lifting productivity and is required across the value chain. Access to efficient capital is a key driver for strong, sustained sectoral growth over the short, medium and longer terms; however, the level of capital investment in agribusiness has not kept pace with the consumption of capital over the last decade.

AgriFutures Australia describes the daunting challenge of bridging the investment gap, which requires action from governments, industry and businesses to attract new capital, to reduce volatility and risk, and support growth.

The capital investment focus of AgriFutures does not directly include investment in *people*. There is a focus on investing in technology, better data provision, and market diversification, but far less is said about the people who would operate the technology, analyse the data, or pursue new market opportunities.

Investment in resources that deliver a more immediate financial return is understandable in industries that have large seasonal workforces, yet there is a rising shortage of people to fill technical and leadership roles and so make decisions on business strategies and the most effective use of technology across the value chain. The value of investing in the skills of the workforce, and ways in which the new industry engagement arrangements will encourage this, are discussed in greater detail in the **Business & Workforce Summary** and **Training Summary** below.

Current crossovers and divisions of the value chain in the VET system

The protection and support of the whole Agribusiness, Food and Fibre value chain is recognised as a critical element for these industries. It has not always been possible to include the whole value chain within associated ANZSCO or ANZSIC Codes, or training packages within the scope of a single Skills Service Organisation (SSO).

It is important to the Agribusiness, Food and Fibre Industries that crossovers and divisions in the value chain be identified because of the impact that issues in one area can have on other areas, or even across all areas of the value chain. This is a key principle underlying the National Agriculture Workforce Strategy, which notes that 'the AgriFood workforce extends from the farm through to contracting, professional services, processing, manufacturing, transport, freight, logistics and sales, and there are many interdependences with other sectors of the economy'. The importance of identifying and monitoring systems that cross over the value chain has been highlighted by recent concerns over food contamination (for example, strawberries contaminated by needles and toxic horse meat being traced in pet food) and social activism incidents. These disruptive events require prompt actions be taken and a clear understanding of which links in the value chain are affected so that producers, processors, wholesalers, retailers and consumers can adapt accordingly.

In the Australian skills and VET context, distinguishing affected parts of the value chain helps to identify priority work on cross-sector projects or where relationships need to be established with oversight bodies to ensure their involvement appropriate in skills and VET development.

Processing and manufacturing

There is crossover between the processing and manufacturing sectors of industries. Food and beverage processing and pharmaceutical manufacturing share requirements for Good Manufacturing Practice (GMP) but each industry has additional, sector-relevant requirements to incorporate food or therapeutic goods handling practices during processing activities.

While food and beverage processors have indicated that skills specific to the Agribusiness, Food and Fibre value chain are critical to their industry, pharmaceutical manufacturing is finding itself increasingly involved with industries outside of the Agribusiness, Food and Fibre value chain, including the advanced medical devices industry. Changes to technology and delivery systems means that there is an increasing need for connection to these industries and, consequently, pharmaceutical manufacturing stakeholders are currently considering their Industry Cluster alignment.

In food and beverage processing, the increasing move towards on-farm and on-site processing, and the growth of hospitality and tourism in regional areas, has seen a growing recognition of the importance of ensuring food safety and processing understanding is respected across the whole Agribusiness, Food and Fibre value chain.

Furniture, textiles and upholstery

Critical industry bodies in Agribusiness, including Australian Wool Innovation, Cotton Australia and Rural Research and Development Corporations, have important stakes in textile, leather, clothing footwear and furniture production.

IBISWorld's analysis of the furniture, textiles and upholstery industries' key buying and selling sectors shows that there is a high level of interdependence with the Agribusiness, Food and Fibre value chain. Sectors that have important up- and down-stream connections with Agribusiness, Food and Fibre include:

- wooden furniture and upholstered seats
- wicker and fibreglass furniture

- synthetic and natural textiles
- leather and leather substitute products
- clothing and footwear repair.

There are a number of peak and industry bodies that represent both employers across these sectors and in the fibre industry. Operationally, work functions are commonly applied across this value chain. Recognition of furniture, textiles and upholstery as part of the Agribusiness, Food and Fibre value chain provides a further opportunity for streamlining the VET system.

Tourism and hospitality

The tourism and hospitality industries currently sit within the *Tourism, Travel and Hospitality (SIT) Training Package* under the oversight of the Tourism, Travel and Hospitality Industry Reference Committee, with secretariat work undertaken by an external Skills Service Organisation. The *SIT Training Package* comprises four broad areas: tourism, hospitality, events and travel. Of these, tourism and hospitality have firm connections with the Agribusiness, Food and Fibre Industry Cluster.

Many businesses and operators in Agribusiness, Food and Fibre now undertake value-adding activities and services through tourism and hospitality functions, including:

- management of national and state parks, and Australia's natural wonders
- parks, gardens and walking trails
- Aboriginal and Torres Strait Islander-managed land and sites
- on-farm stays
- ecotourism
- on-site cellar door, café and catering operations
- local producer events, food and beverage expos
- exhibited animals
- sports turf
- racing and breeding events
- marine animal tourism
- agricultural, food and fibre show days and events.

Tourism and hospitality are national industries, but can be particularly critical to regional, rural and remote communities and economies. A significant proportion of the tourism sector involves activities that are focussed on recreation, the environment, history, culture, adventure, health, geography, and wildlife. Of these, environmental, adventure, geographic and wildlife tourism are all directly part of the Agribusiness, Food and Fibre value chain, and recreational and cultural tourism are often strongly associated with the value chain.

The hospitality industry is sustained by the food and beverage produced in Australia and is directly connected to the Agribusiness, Food and Fibre value chain. For example, baking qualifications in the *FBP Training Package* are closely connected with commercial cookery as well as food processing. Registered training organisations (RTOs) with the capacity and capability to deliver one is more likely to deliver the other due to the similar equipment and skills training required.

Tourism and hospitality have a need for customer service, guest service, finance and sales skills, which are additional to the skills in Agribusiness, Food and Fibre.

However, there are also many shared skills, including important regulatory and compliance skills, such as food safety, biosecurity, provenance, traceability and working in remote environments.

The regulatory requirements of tourism and hospitality are often based on food safety and ecosystem management legislation that is core to Agribusiness, Food and Fibre. On the tourism side, the Federal Government Business Support website[6] provides information on the types of permits and licences that may be required at federal, state or local government levels. The list is set out below, with those marked in bold having a direct connection to Agribusiness, Food and Fibre, while there may be indirect connections with the others listed:

- registration for travel agents
- **registration for tour operators**
- registration for accommodation providers
- registration of a caravan park
- **fishing and boating licensing**
- **permit for the use of national parks, forests or marine parks**
- permit to operate at an airport
- **permit to conduct whale or dolphin watching activities**
- **permit for Aboriginal land visits**
- **eco-tourism licensing**
- **permit to use public land**
- erecting/displaying signage
- playing video/sound recordings
- **preparing and/or selling food**
- selling and/or consumption of alcohol
- outdoor dining
- selling tobacco products
- gaming/lottery activities
- **disposal of waste**
- **importing goods**
- restricted trading days
- handling, storage and use of chemicals or dangerous substances.

Many workers in regional, rural and remote areas work seasonally or casually, and many are under-employed. Workers are across various regional and rural events, such as in the planning, preparation and delivery of show days and picnic race days. Recent discussions with industries in regional areas have indicated a desire to develop options that combine work experience and training across work functions to better reflect the ways that work is undertaken in these areas. This will need to be subject to further work as the current structure and funding of VET makes this difficult to achieve.

[6] Australian Government (2021); *Tourism industry*; https://business.gov.au/planning/industry-information/tourism-industry; viewed 22/02/2022.

As international borders re-open following COVID-19-related restrictions, the Federal Government's remodelled backpacker visa scheme is encouraging an influx of international visa workers, who are required to work in agribusiness, food, fibre, tourism or hospitality to fulfil the requirements for visa extensions.

Transport & logistics

The National Agriculture Workforce Strategy describes the significance of the Agribusiness, Food and Fibre value chain that exists *beyond* the farm gate, including critical work in transport and logistics, waste minimisation, traceability and provenance. While skills differ across industries depending on their approaches to work tasks, there are areas of commonality, particularly in service of supply chain tracking and food safety.

The National Agriculture Workforce Strategy finds that 'The performance of the freight, transport and logistics services sector is critical to the competitiveness of the sector and its ability to meet the needs of domestic and international customers'. It also identifies trends that will need to be considered in an integrated context:

> 'The demands being made on the freight, transport and logistics services sector are increasing in response to a suite of trends, including:
>
> 1) the increasing volume of freight carried – expected to grow by over 35% from 2018 to 2040, bringing the total volume to just over 1,000 billion tonne kilometres
> 2) the changing nature of the freight challenge in conjunction with growing population density pressures – urban freight is forecast to grow by nearly 60% over 20 years to 2040 (DITRDC 2019)
> 3) increasingly complex and dynamic supply chain structures arising from expanding business networks
> 4) the expanding nature of supply chain functions, for example traceability and tracking the identity of goods in transit to allow retailers to manage their inventory and meet customer demand
> 5) growing consumer expectations for timely delivery, through multiple channels, and consumers placing increasing importance on e-commerce and online purchases
> 6) greater importance of technology and big data, for example autonomous vehicles, digital monitoring and AI optimisation of delivery routes
> 7) the need to manage increased supply chain risk in line with increasingly complex customer requirements, multimodal connectivity, and high-quality protection of food travelling over great distances (Australian Industry Standards 2019; Rogers & Park 2018; Gunasekera & Parsons 2017; Deloitte 2018).'
>
> *Source: J. Azarias, R. Nettle & J. Williams (2020); National Agricultural Workforce Strategy: Learning to excel; National Agricultural Labour Advisory Committee, Canberra, December; p.84*

Research & Development, including Data Analysis

The importance of research and development, including the ability to analyse and apply results, is well-known throughout the agribusiness, food and fibre industries. Australia is globally recognised as a leader in research and development in these industries, and they are supported by Rural Research and Development Corporations funded through industry levies.

There has been increasing demand for assistance to be able to translate research and development into farm applications through occupations such as agronomy and data analysis. Much of the feedback indicates that assistance is needed from those with experience "on-farm" and within specific working environments

because of the extreme variability of the working environments, and to help make optimal decisions from the plethora of technological and data options that are available. An example of this was seen with industry support for the development of a Diploma of Agronomy designed (partially) to provide University qualified graduates with the needed on-farm experience required to guide business decision-making.

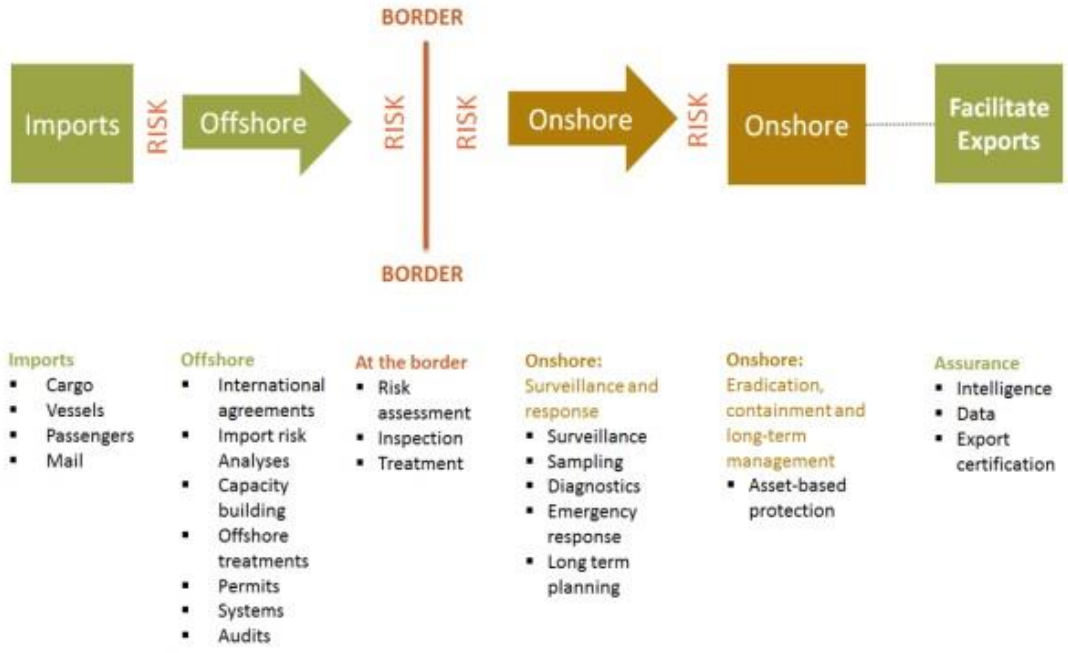
Biosecurity, Invasive Species and Pest Control

A key feature of the Agribusiness, Food and Fibre Industries, which distinguish them from other industries, is the critical importance of, and shared responsibility for, biosecurity. Biosecurity has been increasingly recognised in the 21st century, with outbreaks of avian and equine influenza, Ebola virus, bovine spongiform encephalopathy (BSE) and major changes in Australia's marine life, and well as the zoonotically transmitted COVID-19. This section covers issues relating to biosecurity processes and pest control, infection control, invasive and exotic species, and zoonotic disease prevention.

Approaches to biosecurity

Threats to Australia's biosecurity occur through the movement of goods and people, transmitting agents, especially insects, and environmental forces, including wind and water. Many of the potential transmission channels are uncontrollable, others are essential for human life, and others are directly connected to preferred human lifestyles. As many of these channels cannot simply be closed, skilled workers are required across the whole value chain to enact a continuum of biosecurity practices associated with 'prevention, detection, eradication and ongoing management (containment and impact mitigation)'[7], as highlighted by the Government of South Australia:

Figure 2: The Biosecurity Continuum



Source: Government of South Australia (2020); Technical Directions Paper - Supporting information for public consultation: Developing a new Biosecurity Act for South Australia; p.15

[7] Government of South Australia (2020); *Technical Directions Paper - Supporting information for public consultation: Developing a new Biosecurity Act for South Australia*; p.20

A review of this continuum demonstrates that biosecurity controls are complex and often outside of the control of nations. Across the Agribusiness, Food and Fibre Industries, some biosecurity threats relate to known issues, such as Pacific oyster mortality syndrome and the potential importation of invasive species, including stink bugs, fruit flies, fire ants and cane toads, that impact on plant and animal health. For example, Plant Health Australia has identified 408 high priority pests that threaten plants in Australia[8]. Constant management and enhanced surveillance are required to prevent new incursions of invasive species. Considering both revenue loss and expenditure, the total cost of weeds to the Australian grain, beef and wool industries is estimated to be $5 billion annually.[9]

Other threats are known only conceptually, such as the risk of infectious diseases spreading from animals to humans, as with COVID-19 (see the discussion of **Zoonotic transmission** below); however, these can emerge without known causes and cannot ultimately be prevented. This emphasises the need for enhanced biosecurity systems, including workers with skills in traceability and provenance operations that can assist in identifying the origin of any new pest or disease outbreaks.

COVID-19 has catalysed urgent reviews of current biosecurity legislation at federal, state and territory level. The purposes and coverage of legislation is expanding as Australia gains deeper understanding of the multiplicity of potential biosecurity threats, from destruction of natural environments and habitats to major pandemics and epidemics.

At a state level, for example, the Government of South Australia has been consulting the public over a new Biosecurity Act, with the objective of protecting the state 'from pests and diseases that are economically significant, threaten our terrestrial and aquatic environments, or that may affect public amenities, community activities and infrastructure'[10]. It also identified six key priorities:

1. Securing primary production and food safety
2. Detection and response to new pests and diseases
3. Minimising the economic, social and environmental impacts of pests and diseases
4. Government, industry, and the community working collaboratively to enhance biosecurity
5. Biosecurity technical expertise
6. Modern fit for purpose infrastructure

Source: Government of South Australia (2020); Technical Directions Paper - Supporting information for public consultation: Developing a new Biosecurity Act for South Australia; p.16

On a national level, prior to the outbreak of COVID-19 Australia was undertaking major work to improve its biosecurity performance, based in part on an Intergovernmental Agreement on Biosecurity Review conducted in 2017. The resulting report, *Priorities for Australia's biosecurity system*, recommended greater unity in approaches to biosecurity, with additional focus on community and environmental biosecurity to equal that of human health and primary production. The Review provided a summary of Australia's biosecurity environment:

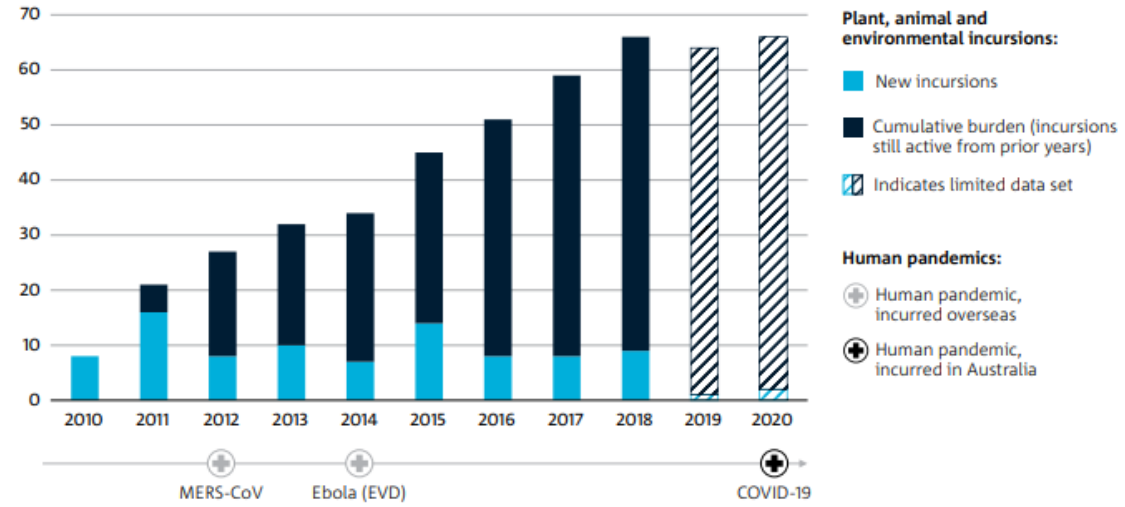
> 'Biosecurity risks are increasing due to increased global trade and travel, increased agricultural expansion and intensification, increased urbanisation close to farmlands, and other factors such as climate change. A tight fiscal environment for governments has placed significant pressure on biosecurity budgets and the ongoing capacity of jurisdictions to meet their biosecurity commitments. Biosecurity stakeholders, especially those bearing an increasing share of the costs, want a greater say in decision making about the national system, greater alignment of biosecurity and market

[8] Plant Health Australia (2021); *The 2020 National Plant Biosecurity Status Report*; p.13.
[9] R. McLeod (2018); *Annual costs of weeds in Australia*; eSYS Development & Centre for Invasive Species Solutions, Canberra.
[10] Government of South Australia (2020); *Building a new Biosecurity Act for South Australia*; p.8.

access efforts, more efficient delivery of government biosecurity services, and stronger arrangements for environmental biosecurity, among other things. In addition, major biosecurity incidents continue to test public confidence in the national biosecurity arrangements.'
Source: W. Craik, D. Palmer & R. Sheldrake (2017); Priorities for Australia's biosecurity system: An independent review of the capacity of the national biosecurity system and its underpinning Intergovernmental Agreement; Canberra; p.1

Building on this work, CSIRO's Report on Australia's Biosecurity Future (2020) illustrated the increasing number and severity of risks, including data showing that biosecurity interception incidences rose by almost 50% between 2012 and 2017.

Figure 3: Indicative Biosecurity Incursions and Cumulative Burden in Australia



Source: CSIRO (2020); Australia's Biosecurity Future; p.ii

CSIRO's report supports nationally coordinated strategies being implemented across the One Health spectrum, which comprises the interconnected and interdependent human, environmental, agricultural and marine sectors. CSIRO supports a re-think of the current biosecurity system, and makes recommendations for greater collaboration among governments, industry, research and the community:

'Recommendations fall under three themes:

- System connectivity: Digitising processes, enhancing partnerships and greater data sharing across supply chains and the One Health sectors to facilitate market access and ensure the system is capable of understanding and managing emerging risks and established pests and diseases.
- Shared responsibility: Harnessing the collective knowledge and capability of citizens, communities and industries to ensure national biosecurity efforts are optimised; and that all Australians are aware of, and value, their role in managing biosecurity risks.
- Innovation in science and technology (S&T): Creating national innovation platforms for developing and commercialising next-generation technologies and services that target priority biosecurity risks and can be sold globally.'

Source: CSIRO (2020); Australia's Biosecurity Future; p.iii

Working with key partners and informed by the 2017 Intergovernmental Agreement on Biosecurity Review[11], the Australian Government Department of Agriculture, Water and the Environment (DAWE) commenced development of a national biosecurity strategy in 2021 to define strategic objectives for the Australian biosecurity system up to 2030[12]. At the time of writing, DAWE is seeking feedback on a consultation draft of the National Biosecurity Strategy.

The draft acknowledges that, while Australia's biosecurity system has served us well, there are growing and more complex biosecurity risks emerging from phenomena such as climate change, shifting and unpredictable trade and travel patterns, and land use changes. The number of risks *and* sources of risk are increasing simultaneously, requiring that Australia develops and sustains 'a highly skilled workforce to ensure we have the right capability, in the right place, at the right time'[13].

Case Study: The Importance of Skills to Identify Invasive Species

Ros Cridland, Senior Project Officer at Tallebudgera Outdoor & Environmental Education Centre, an RTO in Queensland, has described the importance of students learning to identify the taxonomy of animals and plants. Developing the skills and knowledge to recognise different species and classify genus is crucial knowledge for professionals, such as Indigenous Rangers, when reintroducing or managing species in a natural environment, and differentiating between exotic and native species when they are very similar.

In 2019, Tallebudgera Outdoor & Environmental Education Centre worked with Indigenous Rangers, scientists and school students on Muralag (Prince of Wales Island) in the Torres Strait to undertake animal and plant surveys. The importance of the identification process was exemplified when a rat was caught as part of the biodiversity survey process. At first sight, the rat appeared to be a native species; however, on closer inspection, the length of its tail revealed it to be a black rat, *Rattus rattus*. This identification was crucial because, up to that point, the presence of black rats on the island was unknown. This instigated plans to redesign Muralag's biodiversity management strategy because, without the inclusion of a feral animal trapping plan, the black rat could be catastrophic to the survival of native species.

[11] W. Craik, D. Palmer & R. Sheldrake (2017); *Priorities for Australia's biosecurity system, An independent review of the capacity of the national biosecurity system and its underpinning Intergovernmental Agreement*; Canberra.
[12] Department of Agriculture, Water and the Environment (2022); *National biosecurity strategy*; https://haveyoursay.awe.gov.au/national-biosecurity-strategy; viewed 09/03/2022.
[13] Department of Agriculture, Water and the Environment (2022); *National Biosecurity Strategy – Consultation draft*; Canberra, February. CC BY 4.0; p.10.

These photographs show the Torres Strait Regional Authority Ranger and Indigenous Ranger/Traditional Custodian of the Kaurareg Peoples and students from Tagai State College in the delivery of the *Certificate II in Conservation and Land Management*. It captures the moments when it was identified that a rat, initially thought to be a native *Melomys* (mosaic-tailed rat, whose tail is shorter than its body), was in fact a *Rattus rattus*.

Reproduced by kind permission of Tallebudgera Outdoor & Environmental Education Centre

So far, state and federal reports on biosecurity have not suggested the need for additional VET training package products. Current training products have proved fit for purpose in responding to a multitude of challenges, including during extreme climate conditions, floods, bushfires and the COVID-19 pandemic between 2019 and 2021. Industry Reference Committees have been seeking constant feedback on potential changes to training package products; however, skills gaps have not been identified in the area of biosecurity.

The National Biosecurity Strategy consultation draft does, however, note that there are recruitment challenges and capacity constraints in developing the specialist capabilities of relevant workers, including for enabling digital transformation. This emphasises the need for a national strategy that supports workforce planning for the skilled workforce needed now and into the future. The consultation draft describes where there are current opportunities to support and enhance existing biosecurity efforts, including in key primary production areas in northern Australia. It states:

> ‘The Northern Australia Biosecurity Strategy provides a platform for us to focus our efforts on high priority activities, which include expanding our Indigenous Ranger programs and capacity, increasing surveillance and diagnostic capabilities, addressing regional skills needs in key areas and improved data collection for wider use.’
> *Source: Department of Agriculture, Water and the Environment (2022); National Biosecurity Strategy – Consultation draft; Canberra, February. CC BY 4.0; p.26.*

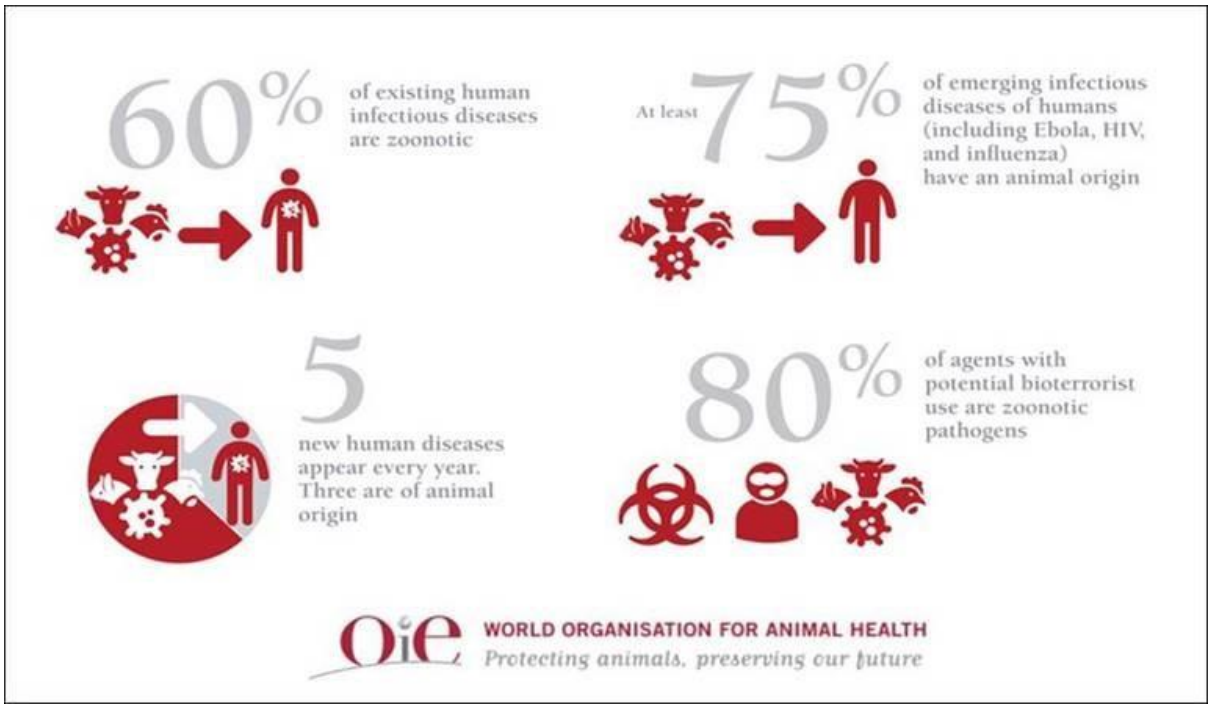
Zoonotic transmission

The risk of zoonosis, when a virus is passed from a non-human animal to humans, as with COVID-19, has heightened awareness of the need for effective infection control. There are numerous examples of zoonosis occurring in Australia; for example, people catching toxoplasmosis through contact with infected cat faeces, and an outbreak of ‘parrot fever’ in the Blue Mountains, NSW, in 2005. Recent biosecurity concerns in Australia, including Japanese encephalitis and Ehrlichia canis, have highlighted the need for cohesive strategies across Agribusiness, Food and Fibre to ensure the welfare of humans, animals and industries

generally. These events have significant implications for worker safety, biosecurity surveillance systems and response mechanisms, pest animal management, and skills training[14].

The importance of biosecurity to address zoonosis is reflected in statistics provided by World Organisation for Animal Health:

Figure 4: Zoonotic Diseases



Source: OIE World Organisation for Animal Health

Animal Health Australia[15] emphasises approaches to animal transmission risk management that will be familiar to many Australians after COVID-19 pandemic experiences, including:

- vaccination of staff and stock
- use of Personal Protection Equipment
- infection Control procedures and hand washing.

In a special publication of Microbiology Australia[16] in March 2020, microbiologists identified lessons in risk management that have not been fully addressed. Among these were the need to incorporate surveillance of wildlife disease outbreaks at national and global levels and improve understanding of the drivers of human behaviours that lead to the emergence or re-emergence of zoonotic diseases.

The growing rate of companion animals being re-homed during COVID-19 restrictions has highlighted that strict biosecurity measures must be followed to ensure the detection, containment and future prevention of disease. Dogs in northern Western Australia and the Northern Territory, for example, have been contracting

[14] QFF (2022); *Jev raises biosecurity and pest management concerns*; https://www.qff.org.au/presidents-column/jev-raises-biosecurity-pest-management-concerns/; viewed 15/03/2022.
[15] Animal Health Australia (2021); *Zoonotic Disease*; https://animalhealthaustralia.com.au/zoonotic-disease/; viewed 22/02/2022.
[16] The Australian Society for Microbiology Inc (2020); Microbiology Australia: Zoonoses; *Official Journal of The Australian Society for Microbiology Inc, Volume 41 Number 1 March 2020*

ehrlichiosis, which is spread by ticks infected with the bacteria, Ehrlichia canis[17]. State and territory governments have put in place conditions for dogs being moved out of northern Australia to reduce the spread of the disease. Ehrlichiosis is zoonotic but it is relatively rare for ticks to transmit the disease to humans (contact with infected dogs cannot pass the disease to humans)[18]; however, it is serious and often fatal for dogs and so requires that animal care and management workers are skilled in diagnosing, treating and supporting containment of the disease, as well as informing the public on prevention strategies, notably controlling ticks on dogs[19].

From February 2022, Japanese encephalitis has been detected and confirmed in piggeries in Victoria, Queensland, New South Wales and South Australia. Japanese encephalitis is a viral zoonotic disease spread by mosquitoes. Contracting the virus causes pigs and horses to suffer reproductive losses and encephalitis (swelling of the brain that can lead to ill-health and seizures)[20]. Other animals, such as sheep, cattle, goats, dogs and cats, may become infected but do not typically show signs of illness. While relatively rare, people may become infected by Japanese encephalitis, which can also be a cause of death. Transmission to humans is also through mosquitos and there are no food safety concerns associated with commercial pork products.

While humans do not play a role in transmitting the virus, pigs and some wild birds are 'amplifying hosts'. The Australian, state and territory governments are currently working with the pig and equine industries in response to this outbreak. Government advice is that workforce needs to continue skilling in biosecurity practices and management across piggeries and paddocks. This is so that workers are aware of signs of Japanese encephalitis, where to report suspected incidences, and how to take steps in controlling mosquitoes and protecting animals (e.g. rugging and hooding horses to reduce mosquito bites)[21]. To ensure the safety of workers, meanwhile, businesses such as SunPork are providing mosquito repellents and facilitating vaccinations for staff in their piggeries[22].

Sustaining Plants and Animals

The Agribusiness, Food and Fibre Industries are founded upon cultivating, growing and utilising biological substances and entities. In common with the human health and services industries, there is an expectation that Agribusiness, Food and Fibre workers will have the skills required to deal with the complexity of caring for living bodies.

This section will cover issues relating to biological wellbeing; caring for biological substances and entities (trees, plants and animals); cultivation; and breeding.

Complexity of care

Looking after plants and animals, like caring for humans, is fundamentally different from looking after machinery, equipment and infrastructure, and requires skills that take into account the biological complexities and differences of living forms.

The sheer variety of standards and knowledge required to work with individual plant and animal species

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[17] Government of Western Australia (2020); *Ehrlichiosis in dogs (Ehrlichia canis)*; https://www.agric.wa.gov.au/ehrlichiosis; viewed 09/11/2021.
[18] Wildlife Health Australia (2020); *Canine ehrlichiosis in Australia Fact sheet*
[19] NSW Department of Primary Industries (2022); *Ehrlichiosis in dogs (Ehrlichia canis) - Primefact*
[20] Commonwealth of Australia (2022); *Japanese encephalitis*; https://www.outbreak.gov.au/current-responses-to-outbreaks/japanese-encephalitis; viewed 11/03/2022.
[21] Commonwealth of Australia (2022); *Japanese encephalitis*; https://www.outbreak.gov.au/current-responses-to-outbreaks/japanese-encephalitis; viewed 11/03/2022.
[22] ABC News (2022); *Japanese encephalitis virus detected in Qld, NSW and Vic piggeries*; https://www.abc.net.au/news/rural/2022-03-03/japanese-encephalitis-detected-in-eastern-australia/100877778; viewed 11/03/2022.

makes it difficult to simplify and streamline training products – despite the skills often being similar. Industry stakeholders have emphasised the importance of training package content being designed to enable contextualisation to address this issue.

An example of this complexity was in the recent development of training package products for medicinal cannabis, an emerging market in Australia. While it was expected that the training package products would be able to take advantage of existing horticulture products with minimal additional requirements, consultation demonstrated that the additional requirements related to growing this product for human therapeutic purposes had substantial impacts on both knowledge requirements and methods of work. An additional consideration was the need to meet complex licensing requirements and to address high-level security issues. This resulted in the Australian Industry and Skills Committee (AISC) endorsing the release of two qualifications and additional skill sets to meet the needs of industry.

As reported in Animal Care and Management Skills Forecasts and Annual Updates over the last three years, allied health services for animals, such as massage, nutrition and alternative therapies, is a growing market, as are care, grooming and accessory services and products for companion animals. These markets are no longer niche markets, however as emerging markets, there is limited data available on the size and growth of these markets. The establishment of major competitive chains in these industries is an indicator that large corporations and franchise operations are very aware of the economic opportunities available.

There may be a need to develop training and assessment in these areas to ensure there are appropriate levels of animal welfare standards applied. There is considerable support for the increased regulation of these markets, as reported to the Animal Care and Management Industry Reference Committee (IRC) to the AISC. While training cannot be used as a proxy for regulation, it is essential that training is available to meet any future regulatory needs. In any event, the growth of these markets are very strong indicators of consumer support for high standards of care.

Animal welfare standards

The animal care and management and racing and breeding industries are leading proponents of animal welfare standards. The Greyhound Adoption Program (GAP), which runs in several states, has received widespread praise for finding new homes for greyhounds that are no longer suitable for racing. In Queensland, for example, the GAP is part of the Queensland Racing Integrity Commission, which is tasked with overseeing integrity and animal welfare in the three codes of racing: greyhound, harness and thoroughbred. The GAP is funded by the Queensland Government and works with the racing industry to prepare retiring greyhounds for life as a pet, including to ensure good health and behavioural suitability. Such programs are complemented by occupational skill standards in the *RGR Training Package* so that racing integrity and animal welfare skills and knowledge are reflected in training[23].

The animal care and management industry works across several related industries to safeguard and improve animal welfare standards in Australia. In 2021, the RSPCA released a report highlighting the positive impact the RSPCA Approved Farming Scheme is having on the lives of farm animals. The Scheme, established in 1996, continues to play a key role in the RSPCA's efforts to drive continuous improvements for the welfare of Australia's most intensively farmed animals, including egg-laying hens, meat chickens, turkeys, pigs and farmed Atlantic salmon.

More than 585 million animals were raised under the Scheme's detailed Animal Welfare Standards in 2020. This embeds, and reflects, animal welfare concerns across the food supply and value chain, from agriculture and aquaculture to food (especially meat and seafood) processing, all the way to the consumer, whose demands for high-welfare products (that are subject to provenance and traceability tests) in turn shape the sustainable and ethical practices of producers.

[23] Skills Impact (2017); *Greyhounds Project (animal welfare and racing integrity)*; https://www.skillsimpact.com.au/racing/training-package-projects/greyhound/; viewed 15/03/2022.

Moves towards better animal welfare have improved value-adding and various industry practices across the value chain. Examples include:

- *Animalplan 2022 to 2027* will be Australia's first national action plan for agricultural animal health. The plan consolidates topics from numerous current frameworks, strategies and plans, and proposes priority animal health activities that were determined through engagement with governments, industry organisations and animal health experts[24]. The *Animalplan* is also intended to support the National Farmers' Federation's '$100 billion by 2030' goal.
- export animal traceability systems
- the use of new technologies, such as intelligent automation, in the meat processing sector is being applied to areas such as animal welfare monitoring
- livestock health data is monitored in real-time using agricultural robotics and sensor-based technologies in the paddock
- Sheep: following the introduction of animal welfare regulatory changes to manage heat stress in live sheep exports to the Middle East, there was an almost 80% reduction in sheep mortality in 2019 compared to the average for the previous six years[25]
- Goats: in collaboration with Animal Health Australia, the Goat Industry Council of Australia, reviewed and developed the Australian Industry Welfare Standards and Guidelines for Goats in 2019-2020 and released a tool to enable industry uptake of best-practice animal welfare, improve production and maintain market access[26]
- the Model Code of Practice for the Welfare of Pigs, legally enforceable by each state, requires all stockpersons working with pigs to be competent in maintaining the health and welfare of the animals under their care or be supervised by a competent stockperson
- Tasmanian aquaculture businesses, such as Huon and Tassal, are employing an increasingly specialised workforce with remote or off-site control to monitor fish health and ensure environmental conditions are stable and optimal
- with high animal welfare standards in place, the producers can qualify for certification, such as 'RSPCA Approved' logos on their products, thereby maintaining 'social license' and meeting consumer demand.

Changes to animal welfare standards and practices being applied to live exports have received widespread attention over the past few years and have contributed to the minimisation of major incidents more recently. Improvements in traceability have assisted in efforts to improve animal welfare in these markets.

Ecosystem Management, Continuing Climate Adaptation and Carbon Capture and Storage

The Agribusiness, Food and Fibre Industries are responsible for the skills that are applied to manage the protection, utilisation, sustainability and health of Australia's ecosystem. This is an area of major and critical change given Australia's commitments to address climate change, the changing ownership and custodianship of Australian land and water masses, and the growth of the Asia Pacific region. Industries within Agribusiness, Food and Fibre are among the most substantial contributors to carbon capture and storage in Australia, and have been leading the way on climate adaptation which is essential to industry survival.

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[24] Australian Government (2022); *Animalplan 2022 to 2027: Australia's National Action Plan for Terrestrial Agricultural Animal Health*; www.awe.gov.au/animal-plan; viewed 22/05/2022.
[25] Australian Government (2022); *Live animal export trade*; https://www.awe.gov.au/agriculture-land/animal/welfare/export-trade; viewed 22/05/2022.
[26] Animal Health Australia (2020); *Australian Industry Welfare Standards and Guidelines - Goats*

This section will cover issues relating to conservation, land and sea management; climate change; drought, bushfire, floods and other natural disasters; biodiversity; environmental sustainability; and carbon management.

Sustaining biodiversity

Biodiversity is fundamental to environmental sustainability as it helps to regulate climate, water quality, pollination, animal health and habitats, flooding and storm surges. It plays an essential role in sustaining and enriching food, fibre, medicines and other genetic materials. In addition, it has socio-cultural value because it enhances wellbeing as people walk through forests, along rivers, or spend time in green spaces it the city[27]. All these factors show the importance of biodiversity to the Agribusiness, Food and Fibre Industries.

In Australia, the importance and complexity of caring for biodiversity is made more challenging by the percentage of native and unique plants and animals. Known as endemism, Australia has very high levels of species found only in Australia: 46% of our birds, 69% of mammals (including marine mammals), 94% of amphibians, 93% of flowering plants and 93% of reptiles. Other groups, such as the eucalypts, are mostly found in Australia or nearby[28].

The CSIRO[29] has identified five core, interdependent benefits brought by sustaining plant and animal life biodiversity:

- Economic: biodiversity provides humans with raw materials for consumption and production. Many livelihoods, such as those of farmers, fishers and timber workers, are dependent on biodiversity.
- Ecological life support: biodiversity provides functioning ecosystems that supply oxygen, clean air and water, pollination of plants, pest control, wastewater treatment and many ecosystem services.
- Recreation: many recreational pursuits rely on our unique biodiversity, such as birdwatching, hiking, camping and fishing. Our tourism industry also depends on biodiversity.
- Cultural: the Australian culture is closely connected to biodiversity through the expression of identity, through spirituality and through aesthetic appreciation. Indigenous Australians have strong connections and obligations to biodiversity arising from spiritual beliefs about animals and plants.
- Scientific: biodiversity represents a wealth of systematic ecological data that help us to understand the natural world and its origins.

Any loss or deterioration in the condition of biodiversity can have severe impacts on societies because it is intrinsic to material welfare, the security of communities, the resilience of local economies, relations among groups in communities, and human health.

The leading driver of biodiversity loss in recent decades has been population growth, which requires greater areas of land to be farmed and expanded fishing operations to provide food. The challenge for industries is to use increasingly sustainable practices to produce the food, beverage and fibre products we need while conserving and managing biodiversity.

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[27] The Guardian (2019); *Biodiversity touches every aspect of our lives – so why has its loss been ignored?*; https://www.theguardian.com/environment/2019/sep/19/biodiversity-touches-every-aspect-of-our-lives-so-why-has-its-loss-been-ignored; viewed 17/02/2022.
[28] Australia State of the Environment (2016); *Importance of biodiversity*; https://soe.environment.gov.au/theme/biodiversity/topic/2016/importance-biodiversity; viewed 22/02/2022.
[29] S.R. Morton & R. Hill (2014); What is biodiversity, and why is it important?; in: S.R. Morton, A.W. Sheppard & W.M. Lonsdale (eds), *Biodiversity: science and solutions for Australia;* CSIRO Publishing, Collingwood, Melbourne, pp. 5–7.

The *Australia State of the Environment 2021* report[30] states that while 'Australia currently lacks a framework that delivers holistic environmental management', developing the correct skills and resources can help implement innovative and whole-of-system ecosystem management strategies. It also emphasises that 'Indigenous knowledge and connections to Country are vital for sustainability and healing Australia', which can also be achieved through Indigenous and non-Indigenous knowledge systems working together to lead positive change.

The *Australia State of the Environment 2021* report provides examples of biodiversity conservation practices, including through landscape-scale conservation planning, which aims to support biodiversity alongside agricultural and other land uses[31]. The main objective of landscape-scale conservation is to establish the right balance of land uses and species' habitats through careful land management. This requires conservation skills including for ecological restoration, revegetation and agroforestry. While these practices are still emerging, there is now eight million hectares of agricultural land reserved for biodiversity protection and conservation purposes.

Ecosystem management, social licence and consumer markets

Australian consumers are demanding high quality products from industries that have a social licence to operate across the value chain. Social licence corresponds with public perceptions, which, in the case of the Agribusiness, Food and Fibre Industries, rely principally on operators' sustainable practices and environmental conservation. Drilling down further, these are implicated with responses to climate change, production practices, cultural and traditional production methods, impacts on natural habitats, protection of rare and endangered species, animal welfare, water and chemical use, waste disposal and recycling, and a variety of other factors.

Australian businesses are increasingly collaborating with experts in culturally sustainable practices and conservation and ecosystem management to deliver a greater balance between production, protection and regeneration. Enabling digital technologies, including traceability and provenance systems, are improving access to, and the transparency of, accurate information about products and production processes. This is proving to be highly beneficial to Agribusiness, Food and Fibre businesses, who are enabled to demonstrate their prowess at addressing issues that engender social licence.

Despite many positive developments in sustainability, social media misinformation and activist groups are threatening the social licence of Agribusiness, Food and Fibre businesses. At times, this is even threatening the livelihoods and, occasionally, safety of businesses and employees working in these industries. Stakeholders are increasingly requesting the delivery of skills to deal with social media misinformation and activist groups, especially as these sources are receiving greater attention from the mainstream media, which can disproportionately expose the public to distorted, minority views which misrepresent entire sectors and jeopardise businesses' continuing and hard-fought social licence.

Ecosystem management transformation in Agribusiness, Food and Fibre

Throughout history, the Agribusiness, Food and Fibre Industries have continually evolved to meet the needs of villages, local communities, regional centres, nations and global markets. Techniques and methods established in one area have been shared and subsequently augmented or transformed to implement appropriate practices in other areas and sectors. These industries are always in flux and adaptable to new innovations and research developments. A key area of transition currently is a result of improved knowledge and techniques in ecosystem management.

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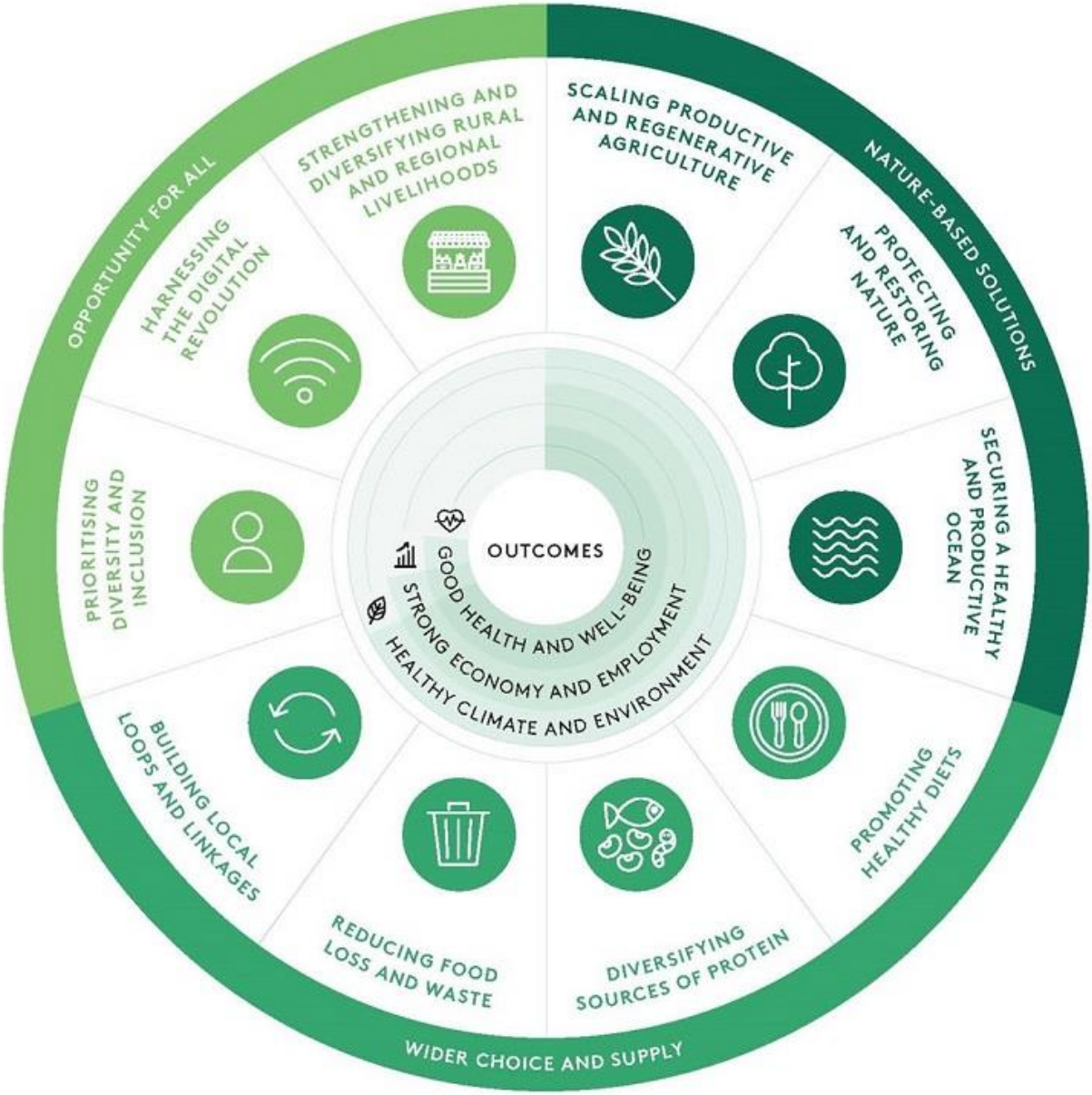
[30] Australia State of the Environment 2021 (2022); *Key Findings*; https://soe.dcceew.gov.au/overview/key-findings; viewed 22/08/2022.
[31] Australia State of the Environment 2021 (2022); *Production systems*; https://soe.dcceew.gov.au/biodiversity/pressures/industry#production-systems; viewed 22/08/2022.

ClimateWorks Australia has identified ten key transformation areas, and the associated transitions required, for the Australian and South Pacific regional economies to meet current ecosystem challenges (see **Figure 5**).

Figure 5: Ten Critical Transitions for a Sustainable and Resilient Food and Land Use System



Transition	Summary
Strengthening and diversifying rural and regional livelihoods	Each transition must support stronger, more diverse and more resilient rural and regional livelihoods.
Scaling productive and regenerative agriculture	Changing farming practices and technologies can improve profitability and resilience while reducing and reversing climate, environmental and other impacts.
Protecting and restoring nature	It is possible to both produce affordable, nutritious food and fibre while protecting and rehabilitating the ecosystems that underpin human health, livelihoods, food security and wellbeing.
Reducing food loss and waste	Efficiency and optimisation, redistribution of excess food and repurposing of unavoidable food waste can reduce pressure on the climate, water and land resources, while delivering economic benefits.
Harnessing the digital revolution	Digital technologies and big data can support each of the other transitions through improved supply chain transparency and alignment to economic, social and environmental objectives.
Building local loops and linkages	Circular local food economies can reduce environmental impacts, build resilience and improve security of fresh food by shortening supply chains and repurposing urban waste streams.
Diversifying sources of protein	Expanding the range of protein sources could provide health benefits, free up land and water for other uses, and cut methane and greenhouse gas emissions, while opening up new economic opportunities.
Promoting healthy diets	A shift towards more plant-rich diets could meet human health and nutritional needs while minimising environmental impacts.
Prioritising diversity and inclusion	Meaningfully contributing to overcoming systemic diversity and inclusion challenges in food and land use should be prioritised within each transition.
Securing a healthy and productive ocean	Producing more ocean-based protein from sustainable fishing and aquaculture, is possible but depends upon protection and restoration of marine and estuarine ecosystems.

Source: ClimateWorks Australia (2020); Challenges and opportunities for Australia; https://www.climateworksaustralia.org/wp-content/uploads/2020/07/CWA_LUF_Transitions_Overview_July-2020-1.pdf; viewed 22/02/2022.

While each of these transitions are critical, there is a particular concern in Agribusiness, Food and Fibre for strengthening and diversifying regional and rural livelihoods and creating circular local food economies.

Australia's food and land use systems have the capacity for adopting these transformational practices; however, for this potential to be realised, specific barriers must be addressed simultaneously. For example, opportunities may be undermined if major retailers continue to dominate the market (including with the use of blockchain) and drive down prices, leaving primary producers with smaller returns with which to transition their practices and support the development of local communities.

While COVID-19 has sparked a welcome increase in people moving to regional, rural and remote Australia, the incapacity of local services, rising property prices and rental shortages have intensified and so exacerbated the liveability issues that must be improved if people are to *stay* in the regions (for further discussion, see the **Regional, Rural & Remote Summary**).

Given such challenges, most businesses are continuing to locate in urban areas, where there is greater access to labour, and where employees have broader options associated with work and social lifestyles, education and training, and housing and schools.

Endeavours to diversify and so strengthen regional rural and remote economies must be encouraged in order for regional industries to develop the capacity to support sustainable transformation. Due to the interdependencies that underpin the Agribusiness, Food and Fibre Industries, enduring ecosystem management transformation must be supported by holistic strategies that recognise how actions in one sector can have knock-on effects throughout the value chain. Crucially, success is dependent on the buy-in of industry leaders across the cluster.

Initiatives to support ecosystem management leadership across regional industries include the Australian Agricultural Sustainability Framework[32], due for release in 2022. The Federal Government Department of Agriculture, Water and Environment (DAWE) has provided $4m in funding to the National Farmers' Federation to develop and trial the Framework, which is being designed with respect to three interrelated themes to support regional businesses of all sizes in their roles as stewards of the environment and contributors to regional economies and communities:

Figure 6: Australian Agricultural Sustainability Framework themes

Source: Australian Farm Institute (2022); Australian Agricultural Sustainability Framework; https://www.farminstitute.org.au/product/aasf-australian-agricultural-sustainability-framework/; viewed 09/03/2022.

The objectives for the Framework include:

- to integrate productivity, sustainability and biodiversity in regional industries to provide lasting benefits for businesses and the community
- to ensure primary producers can demonstrate best practice sustainability/biodiversity management of natural resources – and ensure these actions are identifiable by supply chains, markets, investors, the community and other regional operators and collaborators.

Articulating national standards through such initiatives is intended to facilitate a new sustainability paradigm, which, with common acceptance, will encourage and empower more businesses to transform their practices. In doing so, they are likely to share in the benefits of meeting environmental, social and governance principles, as being able to show evidence of sustainability will enable greater opportunities for trading in new, emerging, premium and environmental markets.

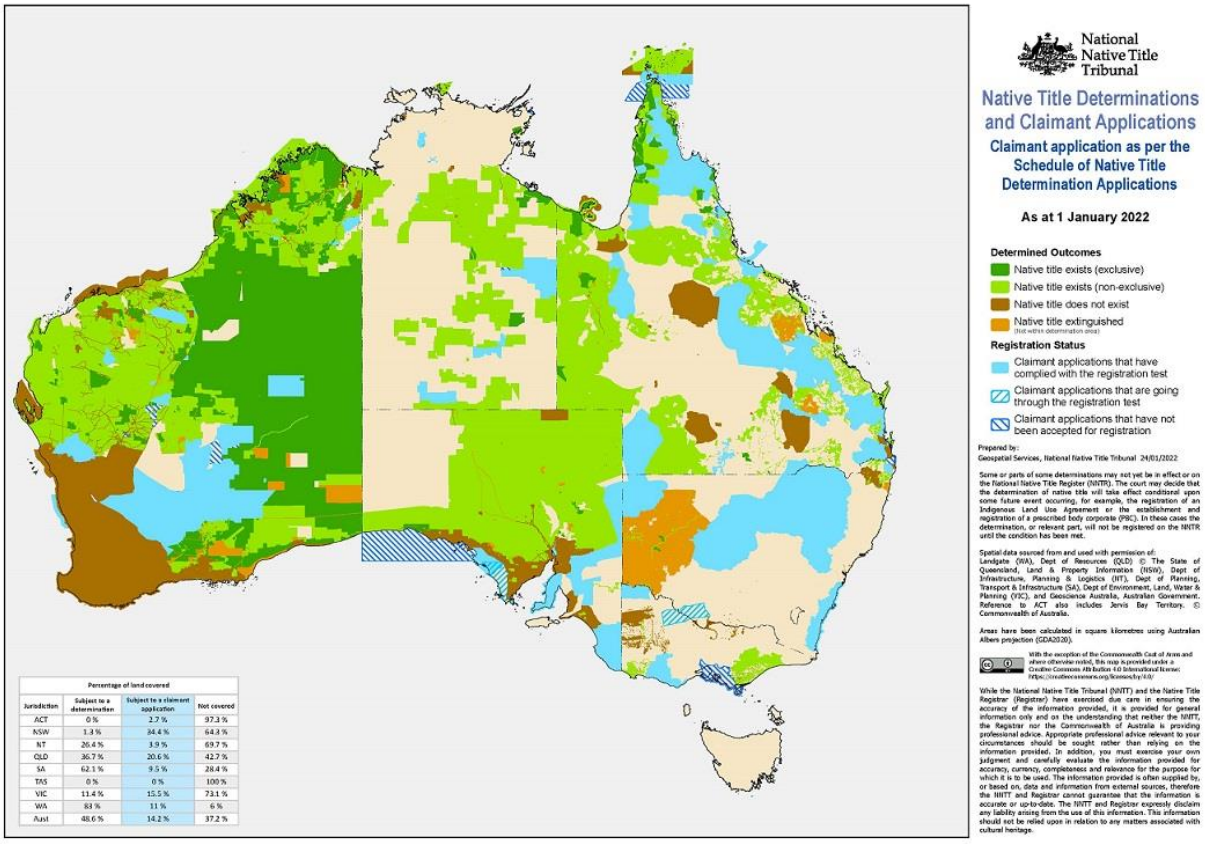
[32] National Farmers' Federation (2022); *Australian Agricultural Sustainability Framework*; https://nff.org.au/programs/australian-agricultural-sustainability-framework/; viewed 09/03/2022.

Aboriginal and Torres Strait Islander Custodianship

With the finalisation of many claims relating to Aboriginal and Torres Strait Islander custodianship of and rights to Australia's land and water has come a change in the way that work is being undertaken to protect and conserve the ecosystem.

The National Native Title Tribunal publishes updates which outline the scope of the return of land and waters to Aboriginal and Torres Strait Islander ownership and custodianship. The map below shows coverage across Australia of determinations and applications, currently covering more than 60% of Australia's land mass, along with some areas of Australian-claimed seas.

Figure 7: Native Title Determinations and Claimant Applications



Percentage of land covered

Jurisdiction	Subject to a determination	Subject to a claimant application	Not covered
ACT	0 %	2.7 %	97.3 %
NSW	1.3 %	34.4 %	64.3 %
NT	26.4 %	3.9 %	69.7 %
QLD	36.7 %	20.6 %	42.7 %
SA	62.1 %	9.5 %	28.4 %
TAS	0 %	0 %	100 %
VIC	11.4 %	15.5 %	73.1 %
WA	83 %	11 %	6 %
Aust	48.6 %	14.2 %	37.2 %

Source: Map reproduced with the kind permission of the National Native Title Tribunal

Aboriginal and Torres Strait Islander communities, business enterprises and individuals are now major employers of workers or service providers in ecosystem management. This has not only increased employment opportunities for Aboriginal and Torres Strait Islander peoples but has also led to changes in the ways in which work is undertaken. This is often met with resistance from established bodies (notably government-based parks operators) who have previously been responsible for this work and utilised western approaches to land care. The more encompassing approach of cultural ecosystem care that forms part of Aboriginal and Torres Strait Islander tradition has led to the need to incorporate new approaches or to reinstate long-term practices that were in remission before the restoration of custodianship.

An example of this is noted in the Royal Commission into National Natural Disaster Arrangements:

> 'There is a growing recognition of the value of Indigenous land and fire management practices as a way to mitigate the effects of bushfires and improve disaster resilience. Governments should continue to engage with Traditional Owners to explore the relationship between Indigenous land management and disaster resilience.'
> *Source: Royal Commission into National Natural Disaster Arrangements (2020); Report; p.21*

Various industry stakeholders are now recognising the importance of developing closer working relationships with Aboriginal and Torres Strait Islander communities and business enterprises. This is likely to be an on-going priority for the Agribusiness, Food and Fibre Industries because many potential opportunities, including for ecosystem management and accounts of provenance, can be unlocked with traditional cultural knowledge and practices. Skills standards relating to savanna burning carbon farming projects, including projects carried out on Aboriginal land, have already been developed under the guidance the Amenity Horticulture, Landscaping, Conservation and Land Management Industry Reference Committee (IRC).

Climate and carbon

The Agribusiness, Food and Fibre Industries are constantly having to meet the planning and operational challenges of climate, natural disasters and ecosystem management. Business operators have been dealing for many years with the practical impacts of policy uncertainty in the context of changing climate and carbon conditions.

While climate change is impacting on some industries incrementally over time, certain industries are substantially and rapidly affected; for example, the increasing prevalence and intensity of bushfires over the last five years has had an enormous impact on resource availability in forestry, which has seen a substantial reduction in the number of trees available for harvesting. With fewer natural resources, the forestry industry has been forced to value-add through the creation of new and revised products, such as glue laminated timber (GLT) and cross laminated timber (CLT). While such developments offer evidence of forestry industry innovation, ongoing workforce shortages continue to threaten the sustainability of operations.

According to the National Farmers Federation (NFF), farmers and society alike will benefit from actions that reduce carbon emissions and limit climate change. The NFF and its constituent organisations have called for strong leadership and clear pathways to create opportunities for positive environmental outcomes for the whole sector[33].

The NFF's president, Fiona Simson, has emphasised that supporting a target of net zero emissions by 2050 'creates certainty in an industry where much is uncertain'[34]. This is because Australian Agribusiness, Food and Fibre stands to retain and develop international trading networks by aligning itself with shifts in other countries' climate-related policies and consumer expectations for sustainability. With climate change such a prominent global issue, inaction could potentially see Australian products subject to reputational damage and additional tariffs internationally, which may destabilise the partnerships and revenues businesses have worked hard to establish.

The Intergovernmental Panel and Climate Change report states, 'In the long term, a sustainable forest management strategy aimed at maintaining or increasing forest carbon stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation

[33] QLD Farmers' Federation (2021); *Agriculture needed to achieve net zero*; https://www.qff.org.au/presidents-column/agriculture-needed-achieve-net-zero/; viewed 11/10/2021.
[34] The Guardian (2021); *Lack of support for emissions reduction target will 'punish farmers', NFF tells Nationals*; https://www.theguardian.com/environment/2021/oct/20/lack-of-support-for-emissions-reduction-target-will-punish-farmers-nff-tells-nationals; viewed 27/10/2021.

benefit.'

Climate change is driving a push for planting more trees, as well as less carbon intensive construction methods, and novel uses of biomass for energy and other purposes. All Regional Forestry Hubs, as well as a range of businesses, bodies and groups are working to develop and implement responses to climate change challenges. Changes to the Federal Government's Emissions Reduction Fund (ERF) have opened opportunities for an increase in investment in the forest industry and its products.

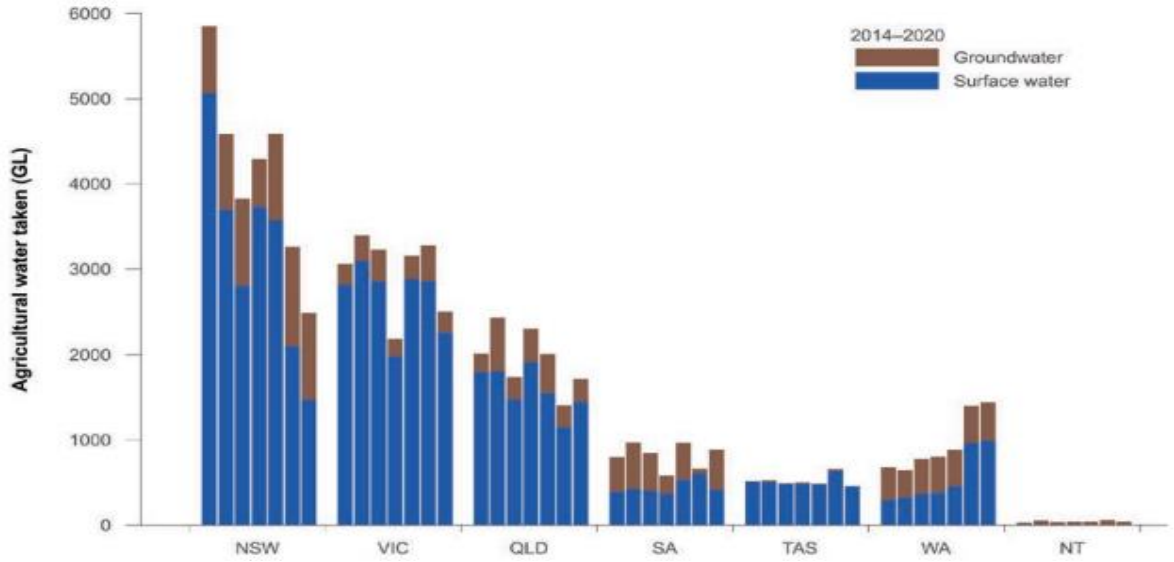
Water and soil

Water and soil issues remain at the forefront of Agribusiness, Food and Fibre planning. Water is a crucial but scarce resource, exemplified by Australia's status as the driest inhabited continent on earth.

Dry conditions across the country, including low rainfall and stream flow, are impacting on access to water[35]. To meet urban demand and compensate for widespread shortfalls, desalination plants were used to provide almost 4% of Australia's water in 2019-2020 compared with 1% the previous year. During that same period, water taken for agricultural use dropped by about 11%.

Of the total volume of water accessed by Australians in 2019-2020, water for agricultural use accounted for 67%. Twenty-two per cent of water was for urban use and 11% was for industrial use. While 75% of the water sourced was from surface water, approximately 20% was taken from groundwater – an increase on the previous year because of the lack of surface water available for agricultural use.

Figure 8: Volume of Agricultural Water Taken from Surface Water and Groundwater in Each State and Territory, 2013-14 to 2019-20



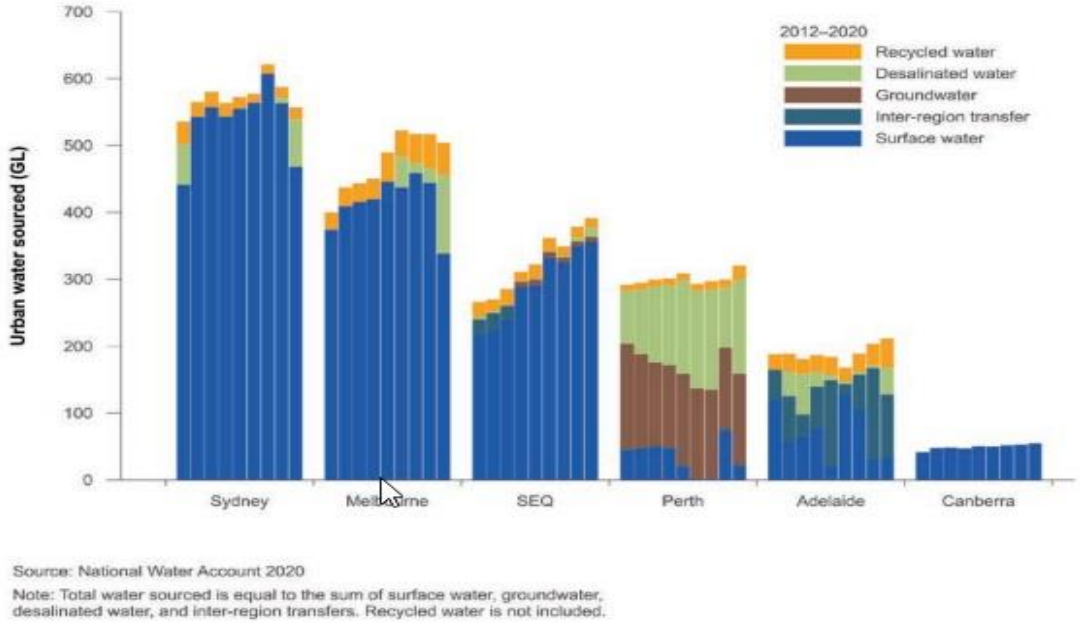
Source: Bureau of Meteorology (2021); Water in Australia 2019-20; p.46

Apart from in Western Australia, agricultural water use has been on a downward curve or remained steady in the states and territories over the seven years to 2020. This demonstrates that Agribusiness, Food and Fibre efforts to conserve water have been largely successful. This contrasts with urban water use over the

[35] Bureau of Meteorology (2021); *Water in Australia 2019-20*

same period, which has generally risen.

Figure 9: Volumes and Sources of Urban Water Used Annually in Australia's Major Urban Centres, 2011–12 to 2019–20



Source: Bureau of Meteorology (2021); Water in Australia 2019-20; p.50

Water trading and regulation is a growing sector in Australia. The Bureau of Meteorology notes that, 'Water markets facilitate the buying and selling of water entitlements and allocations to allow water to move between various rural, agricultural and environmental uses. However, in Australia, water trading occurs mainly between agricultural users'[36]. A project is underway to develop training products that will deliver skills to understand and work within the complex regulatory environment, as well as negotiate and trade water for all purposes across Australia[37].

It is important to note that government agencies have not tracked water used for environmental or Aboriginal and Torres Strait Islander cultural purposes in a similar manner to the Bureau of Meteorology's data on agricultural and urban water use (displayed in the figures above). There may be a need for projects to be developed for additional water trading skills, including negotiating access to water under Aboriginal and Torres Strait Islander custodianship.

Alongside water, soil is a fundamental terrestrial asset that provides the basis for all life and biodiversity. It is essential for the crops that are harvested for food and fibre, and for the livestock that is farmed for animal products (wool, eggs, milk, meat). As summarised by Agriculture Victoria:

> 'Soil provides ecosystem services, enables plant growth, resists erosion, stores water, retains nutrients, and is an environmental buffer in the landscape. Soil supplies nutrients, water and oxygen to plants, and is populated by soil biota essential for decomposing and recycling. Soil health is the condition of the soil in relation to its inherent (or potential) capability, to sustain biological

[36] Bureau of Meteorology (2021); *Water in Australia 2019-20*; p.43.
[37] Skills Impact (2021); *Water Allocation & Entitlement Skills Project*; https://www.skillsimpact.com.au/agriculture/training-package-projects/water-allocation-entitlement-skills-project/; viewed 17/02/2022.

productivity, maintain environmental quality, and promote plant and animal health. A healthy soil is productive, sustainable and profitable.'
Source: Agriculture Victoria (2022); What is Soil Health?; http://vro.agriculture.vic.gov.au/dpi/vro/vrosite.nsf/pages/soilhealth_what_is

Land managers need skills and knowledge concerning different soil properties, including its depth, texture, clay type, stoniness, biology, mineral nutrients (e.g. phosphate and nitrogen), organic matter, biological activity, and bulk density[38]. This is because different soil properties influence the appearance, productivity and health of the soil, and may require interventions such as applying additional inputs (e.g. irrigation, fertiliser) or adopting sustainable management practices to reduce degradation (e.g. tillage).

Research commissioned by the Soil Cooperative Research Centre[39] found that 43% of farmers in the Eyre Peninsula experience soil problems, including erosion and low biological activity, that lead to production losses. While a majority of farmers feel responsible for maintaining the productive capacity of their soil, knowledge of best-practice is low, with less than half of the farmers surveyed possessing sufficient knowledge to act on or implement most of these practices. The report suggests that there is a gap in education and knowledge translation, though considers there to be opportunities in this area given that farmers report a high degree of theoretical openness to learning new farming techniques. The report finds that a major challenge is to convince farmers of the mounting evidence that developing business management skills enables effective land management decisions and holistic farm planning to secure long-term viability and resilience.

Digital & Automation Practices

Agribusiness, Food and Fibre Industries are often early and enthusiastic adopters of technological advancement, especially where technology can be helpful in minimising the risk of operating in an environment with such extreme levels of uncertainty. However, the skills to take full advantage of digital practices are often not available to these industries, especially given the competitive and urban-based environment of the IT world.

This section will cover issues relating to the digital capability framework; data and analysis; automation and robotics; and digital agribusiness.

Adoption

While often early and enthusiastic adopters of technology, industries in regional, rural and remote areas often experience connectivity issues that can prevent the rollout of digital technologies. The Agribusiness, Food and Fibre Industries are also reporting shortages of the skilled workers that would help them take full advantage of digital practices, automation and robotics. This is for various reasons, including competition with other regional industries, such as mining, for workers with digital skills, as well as with urban-based industries that undertake remote operations. Various government, industry and research agencies are responding to these challenges and highlighting potential solutions for raising workers' digital capabilities and technological advancement across sectors.

It must nevertheless be noted that, while technological change is accelerating, the competitive market for Agribusiness, Food and Fibre products still demands a mixture of advanced, standard, artisanal and traditional methods to meet the vast array of consumer tastes.

This means that there is still a need to retain skills for current practices (including those undertaken

[38] Australia State of the Environment (2021); *Soil*; https://soe.dcceew.gov.au/land/environment/soil; accessed 25/08/2022.
[39] H. Luke, C. Baker, C. Allan & S. McDonald (2020); *Agriculture on the Eyre Peninsula: Rural Landholder Social Benchmarking Report 2020*; Southern Cross University, NSW, 2480.

manually, often by small businesses), even while nationally recognised training products are introduced to meet new and emerging industry practices.

National Digital Foundations for Agriculture Strategy

In April 2022, the federal government released the *Digital Foundations for Agriculture Strategy*[40], which outlines five foundational focus areas, one of which is skills, for delivering the capabilities and expertise needed by both the current and future workforce to modernise the sector. Strategic actions include:

- developing digital agriculture skills and capabilities to meet the needs of the future workforce
- working with governments and educational institutions at all levels to implement and deliver the *National Agricultural Workforce Strategy*
- promoting an agriculture industry that attracts and invests in skilled workers
- enhancing understandings of changing digital workforce needs and our ability to respond in an agile way.

The report highlights that establishing greater collaboration between educational institutions, farmers and industry stakeholders will drive opportunities.

VET Digital Capability Framework

The Australian Industry and Skills Committee (AISC) has identified the development of a Digital Capability Framework as priority work for 2022, with the intention of it being applied across the entire VET system[41]. At the time of writing, a draft framework and associated tools have been prepared and are being piloted with select stakeholders, including the Agriculture and Production Horticulture Industry Reference Committee.

The objectives of the project are:

- Development of a VET specific Digital Capability Framework to establish a common language between the range of stakeholders, to inform training product design and support a systematic approach to skills supply and demand.
- Identification of the new and emerging skills required in response to new technologies; where future-focussed upskilling and reskilling pathways need to be established; where human-centric 'soft skills' need to be strengthened; and how to fully optimise the recognition of portable skills.
- Evolution of the companion volume concept into an online 'living' document which captures technologies in detail and in their industry context and helps VET practitioners increase the currency and relevancy of training and assessment.

Development of a common language for use across the VET system will facilitate determinations of peoples' skills gaps, more effective training delivery, and clearer identification of opportunities to streamline training package products. It will also act as an important resource for grasping the ways in which occupations may be transforming from being roles exclusive to an industry sector to being defined by skills, including technology use and maintenance, that are transferable across industries and occupations.

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[40] DAWE (2022); *Digital Foundations for Agriculture Strategy: Driving the development and uptake of digital technologies in the Australian agriculture, fisheries and forestry industry*; Department of Agriculture, Water and the Environment, Canberra, March. CC BY 4.0.

[41] Digital Transformation Expert Panel (2021); *Digital Transformation Skills Strategy*; https://www.digitalskillsformation.org.au/; viewed 04/05/2022.

Industry stakeholders involved in the pilot have identified challenges that may persist for training providers, whose delivery of training package products associated with digital practices hinges upon their identification of appropriate units. To maintain flexibility and adaptability, training packages are generally designed to describe the skills and knowledge needed to apply technologies but do prescribe *which* technologies should be used and *how*. Training providers hence find it difficult to identify which units can be contextualised for delivery with specific technologies and equipment (e.g. drones and automated vehicles) while maintaining compliance with the Standards for Training Packages and Standards for RTOs.

Stakeholders have also suggested there will be challenges for tracking the ways in which jobs transform and augment. As businesses become increasingly digitally-enabled and automated, job roles within an industry may completely change despite facilitating similar outcomes. As an example, aquaculture divers, who previously untangled nets and cleared debris manually are being retrained as underwater drone operators to fulfil the same tasks. Similarly, Meat and Livestock Australia has identified the potential for some meat processing roles to be fully automated, meaning that previous requirements for skills in meat-handling are being replaced by machinery maintenance skills (although this particular transformation is unlikely to occur in the near future due to prohibitive machinery costs and the technology for automated meat processing still being developed).

Agricultural Workforce Digital Capability Framework

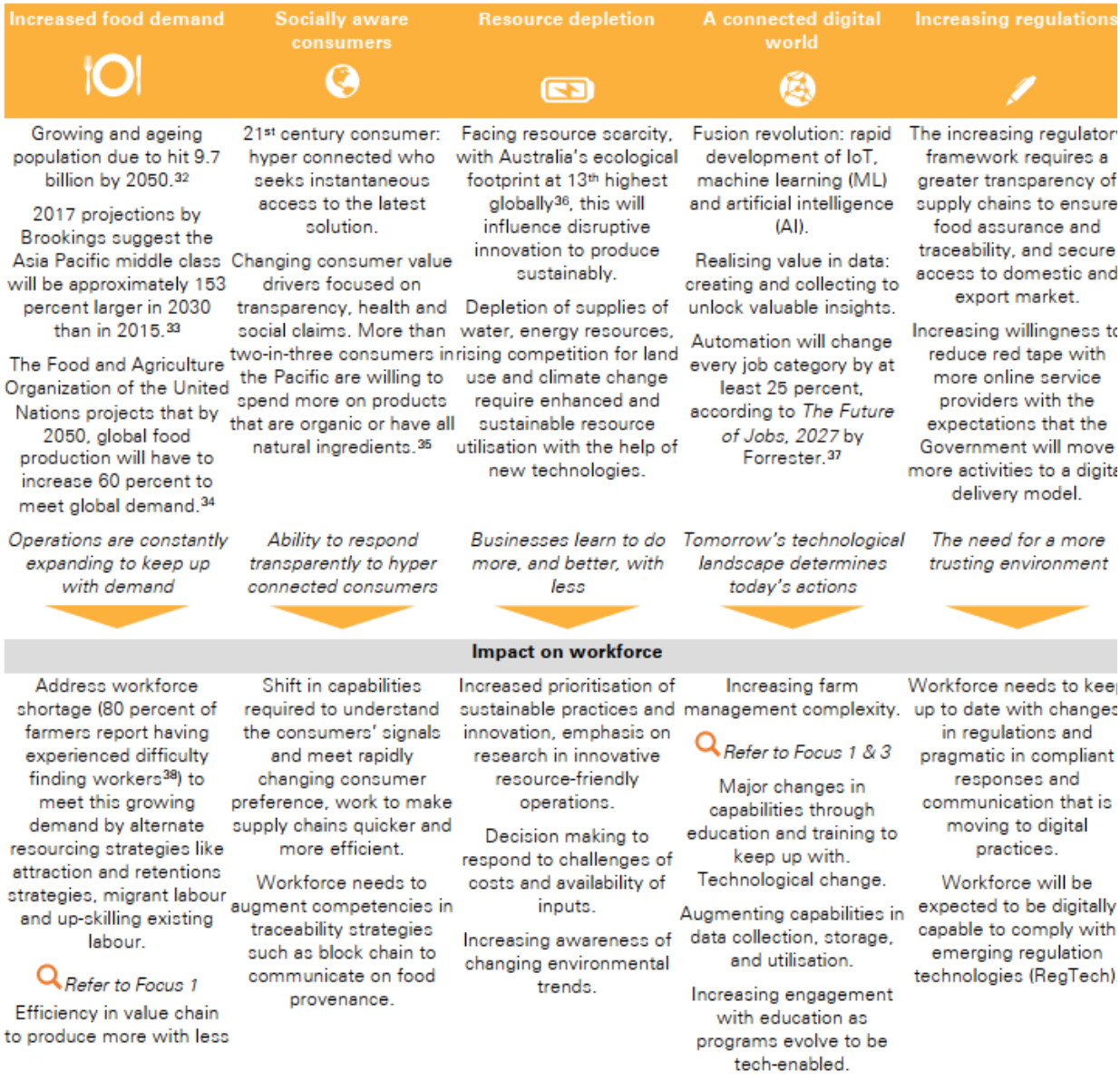
In 2019, the Cotton Research and Development Corporation (RDC) and a group of Rural RDC's, supported by KPMG and Skills Impact (with contributions from Faethm and The University of Queensland), led the development of an *Agricultural Workforce Digital Capability Framework*[42]. The project was to assist in understanding the digital capabilities required by Agribusiness, Food and Fibre workers and address any gaps in the abilities of the workforce to meet future demand. It was also intended to provide education providers with a framework for developing education pathways to upskill the workforce and aid decision-making on the adoption of new technology. Due to the breadth of this study and its outputs, it has the capacity to inform digital skills development across all industries.

The *Agricultural Workforce Digital Capability Framework* was developed in recognition that 'in the next ten years one in three new jobs created in Agriculture, Forestry and Fishing will be tech related'[43], as well as the following megatrends:

[42] KPMG and Skills Impact (2019); *Agriculture Workforce Digital Capability Framework*
[43] KPMG and Skills Impact (2019); *Agriculture Workforce Digital Capability Framework*; p.48

Figure 10: Megatrends in the Agricultural Sector and Key Impacts on the Workforce

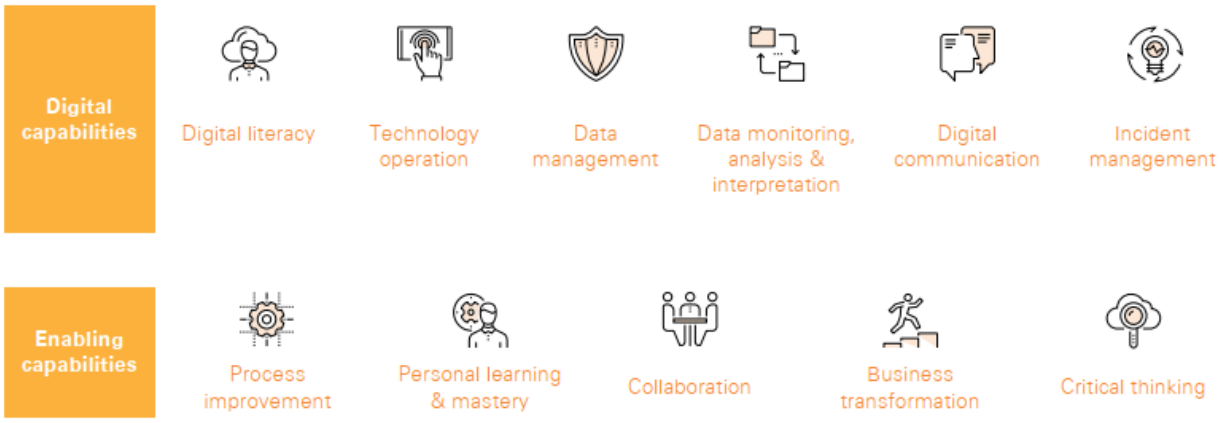
The pressure of global megatrends will reshape the market in which organisations in the agricultural industry compete for skills. The agricultural industry will keep competing with other industries to attract trained and digitally capable workforce. With rapidly changing global consumer demand, adoption of digital innovation will be a key aspect for Australian agriculture to remain competitive on a global scale.



Source: KPMG and Skills Impact (2019); Agriculture Workforce Digital Capability Framework; p.16

Since its publication, Skills Impact has been utilising the *Agricultural Workforce Digital Capability Framework* during training package product development. This framework appears to be compatible with the current working draft of the VET Digital Capability Framework (detailed above). *The Agricultural Workforce Digital Capability Framework* additionally provides a series of enabling capabilities to demonstrate the soft skills and experience individuals need to be capable of progressing in different contexts and roles across the value chain.

Figure 11: Digital Capability Framework for the Agriculture Industry



Source: KPMG and Skills Impact (2019); Agriculture Workforce Digital Capability Framework; p.7

Despite these positive developments, there is presently a low level of digital maturity across the Agribusiness, Food and Fibre Industries. The *National Agriculture Workforce Strategy* reports:

> 'A number of factors are thought to contribute to the relatively low digital maturity of the Australian AgriFood sector, including:
>
> 1) a lack of leadership and strategic direction
> 2) low levels of awareness of available technologies and the benefits they could deliver
> 3) low levels of digital literacy and a lack of specialist agricultural data scientists
> 4) perceived low value from the technology or the provider
> 5) lower payoffs for smaller businesses, which are predominant in the industry
> 6) a lack of necessary infrastructure or connectivity in regional areas (KPMG & Skills Impact 2019; Zhang et al. 2019; Nolet & Mao 2018; Leonard 2017).'
>
> *Source: J. Azarias, R. Nettle & J. Williams (2020); National Agricultural Workforce Strategy: Learning to excel; National Agricultural Labour Advisory Committee; Canberra, December; p.102*

In 2021, AISC approval and Australian Skills Ministers' endorsement was confirmed for a new nationally recognised qualification, *AHC51920 Diploma of Agronomy*, partially as a result of feedback on the lack of specialist agricultural advisers with digital capabilities and the need to assist farmers and business operators to identify and source technology to meet their needs.

Local digital ecosystems

A report prepared on behalf of the Australian Broadband Advisory Council (ABAC) by the Agri-tech Expert Working Group (AEWG)[44] discusses that solving 'salt and pepper connectivity' (localised connectivity gaps on, across and between farms) will not be enough to stimulate the widespread adoption of digital agriculture.

The AEWG's research concludes that 'local ecosystems of digital skills across a stack of technical capabilities' are needed, including:

[44] Agri-Tech Expert Working Group (2021); *Agri-Tech Expert Working Group June 2021*

- Selection and installation of agri-tech solutions: certain apps, e.g. soil sensors, can operate with narrowband intermittent coverage, such as from Low Earth Orbit (LEO) satellites, terrestrial LoRaWAN or mobile carrier's IoT networks; however, others, e.g. in-cab harvester monitors, require high quality, real-time connectivity provided by mobile networks and private WIFI. Advanced apps that use imaging, such as automated weed sprayers, require mobile networks providing high bandwidth.
- Data aggregation and integration: the real value in farm data collected by agri-tech apps is when it is integrated with other data, such as soil moisture data overlaid with harvest yield data, local area weather data, etc. This will often require data correlation and integration skills to represent the integrated picture back to the farmer.
- Digital agronomy/farm management decisions: the digital output needs to be translated into changed farming practices. Farmers already draw on the advice of local agronomists, and increasingly they need to become 'digital agronomists'.
- Advice on connectivity options: farmers may not have knowledge of, nor a way of accessing information on viable connectivity alternatives to mobile coverage (which is often poor).

These skills are currently difficult to access in regional businesses and there is a need to overcome the 'tyranny of distance': crop or livestock value can be affected if an operator is required to wait for a technician to drive hundreds of kilometres to fix a critical agtech application. Improving the digital ecosystem will require efforts at the state, territory and national level, as well as VET and university courses to be delivered to develop and attract digital capability in and to regional, rural and remote areas.

Stakeholders in regional, rural and remote areas have queried the identification of 'advice on connectivity options' as a needed capability, suggesting that there are limited integrated solutions available to meet industry needs according to the AEWG report. Available solutions tend to be supply focused, rather than demand focused. The purpose of the NBN network rollout included maximising 'the economic and social benefits of the NBN' and to help 'foster productivity and innovation and support our goal for Australia to be a leading digital economy and society by 2030' according to the report. Among the statement of expectations is that 'it maintains flexibility to adopt future innovations and advancements' and 'position effectively for and utilise as appropriate emerging and future technologies where this can improve service in an effective or cost-efficient manner'.

These are laudable goals that should be applied beyond the NBN and considered as applying to local ecosystems of digital skills. The question being asked by industry stakeholders is whether the issue lies with advice or access and there are a multitude of experiences being shared that suggest access is at least as big an issue as advice.

Drone usage

Many job tasks that were previously undertaken manually can now be performed remotely with the use of technology. One of the most common enquiries raised with Skills Impact by industry stakeholders is over appropriate training for skills relating to drones. The use of air- and water-based drones (or uncrewed vessels) is increasing at a rapid rate throughout industries, and a wide variety of work is undertaken utilising them, from monitoring plant and animal health to examining soil and growth conditions.

In the aquaculture industry, underwater drones and other remotely operated vehicles (ROVs) are helping businesses to monitor fish health and environmental conditions and inspect and repair nets. It is expected that these developments will affect most job roles as uptake of these new technologies becomes widespread, requiring updated skills in digital literacy, data and automation[45].

[45] Skills Impact (2019); *Fishtech and Aquabotics Project*; https://www.skillsimpact.com.au/aquaculture-and-wild-catch/training-package-projects/fishtech-and-aquabotics-project/; viewed 15/03/2022.

The AgSkilled 2.0 Program in NSW (see a description of **AgSkilled** below) offers funded accredited training in courses across four key pillars: Production, Technology, Business and Safety. The Drones in Agriculture course attracts more than double the enrolments of the next most popular course (Agriculture Chemical Skill Set). Drones in Agriculture teaches learners how to use drones for farm data collection, including to inform decisions on 'refined fertiliser, sowing, crop and weed management plans, as well as monitoring and maximising the efficiency of farm water systems'[46].

Skills standards and capabilities development is crucial in these areas because some businesses and training providers are experiencing difficulties ensuring the safe and efficient operation of drones, in addition to navigating complex regulatory environments, including Australian laws relating to the use of Remote Pilot Aircraft's (RPA) for private use. The increasing use of this technology is also leading to increased demand for maintenance and repair skills and services, which are rarely available in a timely manner in regional, rural and remote Australia.

Digital and automation skills delivery

The delivery of training, reskilling and upskilling to meet the needs of regional, rural and remote businesses remains a major barrier to effective business operation. As well as the usual issues related to thin markets (discussed in greater detail below), the delivery of digital skills poses an additional challenge through the demand for qualified trainers and assessors. To be qualified, the VET system requires trainers and assessors to be knowledgeable on, and maintain industry currency relating to, the skills they are delivering. Digital and automation skills delivery requires trainers who understand the technology in the context of the industry in which they are delivering training. However, it remains a challenge for RTOs to find suitable candidates with industry, VET and pedagogical proficiency when the broader market has needs for:

- developers looking to continue improving the technology and to expand range of use and access to markets
- sales and marketing workforces to demonstrate and persuade businesses to invest in the technology
- on-site trainers for specific brand products to provide immediate training to incorporate the technology on-site
- maintenance, repair and improvement staff to address issues and meet purchaser requirements.

All these requirements are seen by digital and automation creators, wholesalers and retailers as essential to sales and further product development, leading to strong competition for an expert workforce. In this highly competitive market, RTOs struggle to compete for workers.

Food Safety QA & Regulatory Compliance

While all industries are governed by regulations and standards of practice, the Agribusiness, Food and Fibre Industries has common frameworks relating to food safety and quality assurance (QA) that regulates processes for handling and adding value to products from biological entities.

Australia is internationally renowned for producing food, beverage and fibre products with high levels of safety and freedom from disease. Food processors, for example, can source quality produce at competitive prices from the agricultural sector because of high food security and safety standards that are supported by a strong and stable regulatory system, which oversees aspects of production such as food labelling. This requires high levels of skill, knowledge and collaboration across different sectors.

[46] AgSkilled (2022); *Drones in Agriculture*; https://www.agskilled.org.au/courses/drones-in-agriculture; viewed 15/03/2022.

It is important that the Agribusiness, Food and Fibre Industries work with other industries on issues of mutual responsibility as products travel along the value chain towards the consumer. This is because there are numerous intersecting interests and areas of legislation: for example, between the maritime and seafood industries, the animal care and livestock industries, the food processing and hospitality industries, and the forestry and furniture industries.

This section will cover themes relating to operational requirements, food safety, hygiene, national and international regulatory controls, chemical handling, and licensing requirements.

Food safety regulations, codes of practice and guidelines

Strict food safety standards apply across food and beverage processing, meat processing, agriculture products, and aquaculture and wild-caught products. These industries are all part of the same value chains; the regulations, codes of practice and guidelines that determine practices in one sector also have an impact on others.

All food and beverage manufacturing operations are subject to national standards and safety assurance systems enforced by Food Standards Australia New Zealand (FSANZ). The Food Standards Code (The Code) represents the uniform law governing Australian food and beverage production. The Code describes appropriate labelling requirements, provides specific definitions of products, details the composition of products and permitted ingredients, and outlines approved processing methods. All genetically modified (GM) foods intended for sale in Australia and New Zealand must also undergo a safety assessment by FSANZ. FSANZ will not approve a GM food unless it is deemed safe to eat.

The food and beverage manufacturing sector is also subject to many customer food standard requirements, including the Woolworths Quality Assurance (WQA) Standard, and international food safety standards, including the BRC Global Standard for Food Safety and the IFS International Food Safety Standard. Furthermore, all nutrition content and health claims of functional food and drink products must be factually correct and substantiated through scientific research papers or clinical trials to avoid misleading consumers and breaching Australian Consumer Law.

Requirements that apply to seafood products include:

- labelling of ingredients
- country of origin
- nutrition
- directions for use
- best before date
- supplier name and details
- maximum residue limits for agricultural chemicals
- contaminants and natural toxins
- maximum levels of foodborne micro-organisms.

FSANZ also monitors standards in agriculture, particularly for poultry, meat, dairy, eggs and egg products, and seed sprout. FSANZ has recently strengthened food safety regulations to reduce the incidence of foodborne illnesses associated with seed sprouts and eggs or egg products. In addition, dairy standards outline the implementation of documented food safety programs for primary dairy production and for the collection, transportation and processing of raw milk. The industry has also developed and implemented certification programs and integrity systems to verify and assure food safety and other quality attributes of livestock. Examples include:

- National Feedlot Accreditation Scheme – encompassing animal health and welfare, environmental conservation, food safety and product integrity.
- Australian Dairy Food Safety Scheme – monitoring compliance with food standards to ensure the integrity of the dairy value chain, including the collection, transportation and processing of raw milk.
- B-QUAL – a voluntary program for apiarists and honey-processing businesses that ensures honey bee industry standards meet best practice, and domestic and international market demands.
- Freshcare – providing internationally recognised assurance standards for the fresh produce and wine grape industries.

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

In the meat processing industry, all processing plants must be licensed with the relevant state/territory authorities before supplying meat to domestic markets. Most authorities have different classes of licence, depending on the type of animal/meat being processed. Since the early 1990s, regulation of the domestic meat industry has been conducted by state-based Meat Hygiene Authorities. The Australian Department of Agriculture, Water and the Environment also supplies a meat inspection service (including veterinarians and meat inspectors) and regulatory oversight by area technical managers.

The AUS-MEAT National Accreditation Standards ensure that processors' quality systems are independently audited and cover quality assurance procedures throughout every step of the process, from handling, storage, processing and packaging through to labelling and description of meat products. This ensures meat products are produced by trained staff and monitored throughout production by accredited personnel. The standards are essential to the international reputation and integrity of Australia's red meat export market. To further strengthen the meat export regulatory system, a $328 million package was announced by the Australian Government as part of the 2020-21 Budget. The four-year package is intended to reinforce Australia's reputation as a producer of high-quality and safe meat, underpinned by a robust regulatory system. The measures in place are reputed to be the most comprehensive reforms undertaken since the 2011 Australian Export Meat Inspection System was implemented and include key proposals such as post-mortem inspection and disposition modernisation activities to align modern food safety science with meat processing standards.

All state and territory-based meat hygiene authorities base their legislation on the Australian Standards; in particular, *AS4696:2007 Hygienic production and transportation of meat and meat products for human consumption*. The Australian Standards also apply to wholesale businesses handling raw meat. Once a product is processed through cooking, drying or fermentation, food authorities apply both the FSANZ code and *AS4696:2007*. Most retail activity is controlled by state and territory food authorities and by local councils.

Further state/territory government regulations, codes of practice and guidelines that apply across the Agribusiness, Food and Fibre Industries include:

- Hazard Analysis and Critical Control Points (HACCP) is an internationally recognised systematic approach to identifying and controlling food and related safety hazards.
- Freshcare Food Safety & Quality Standards define the necessary practices for providing assurance that fresh produce is safe to eat, meets customer and legislative requirements, and has been produced through environmentally sustainable practices.
- Harmonised Australian Retailer Produce Scheme (HARPS) is an initiative to integrate food safety certification requirements such that Australian fresh produce businesses need only complete a single audit rather than multiple audits against multiple programs

- GlobalG.A.P. is a farm and aquaculture assurance program that provides global benchmarks to enable supply chain stakeholders to adopt safe, socially and environmentally responsible farming practices
- Food Act 2003 is to ensure food is safe and suitable for human consumption, and does not mislead the consumer
- The Food (Plant Products Food Safety Scheme) Regulation (2005) (NSW) provides specific control measures to manage the safe production and supply of seed sprouts, fresh-cut fruit and vegetables, and juices
- The Food Production (Safety) Regulation (2014) (QLD) sets out requirements for the transport and processing of fresh primary produce
- The NSW Food Authority's Industry Guide for the Development of a Food Safety Program (High Priority Plant Products Industry) (2005) covers seed sprouts, fresh-cut fruits and vegetables, unpasteurised juice, and vegetables in oil
- Guidelines for On-Farm Food Safety for Fresh Produce (2004) was published by the Australian Government Department of Agriculture, Fisheries and Forestry, now the Australian Department of Agriculture, Water and the Environment
- PrimeSafe-Victoria – regulates meat hygiene
- Primary Industries and Regions South Australia (PIRSA) – regulates the meat industry
- NSW Department of Primary Industries, Biosecurity and Food Safety (formerly the Meat Branch of NSW Food Authority) – responsible for meat hygiene regulation
- Safe Food Production Queensland (SafeFood Qld) – incorporates all aspects of food safety in all food products, including meat
- The Tasmanian Government Department of Primary Industries, Parks, Water and Environment – regulates the meat industry
- In Western Australia, meat hygiene is controlled by the Department of Health with input from the Western Australian Meat Industry Authority
- In the Northern Territory, the Department of Primary Industries and Resources regulates the meat industry
- AS 5812-2017 Manufacturing and marketing of pet food – This standard provides requirements for the manufacture and marketing of pet food intended for consumption by domesticated cats and dogs
- AS 4464-2007 Hygienic production of game meat for human consumption – This standard applies to game animals shot in the field and processed at game processing plants
- AS 4466-1998 Hygienic production of rabbit meat for human consumption – This standard applies to rabbits and hares, both those shot in the field and raised commercially
- AS 5010-2001 Hygienic production of ratite (emu/ostrich) meat for human consumption – This standard applies to emus and ostriches processed at specialist abattoirs with full ante-mortem and post-mortem inspection
- AS 4465-2006 Construction of premises and hygienic production of poultry meat for human consumption – This standard applies to all poultry processing including further processing such as boning and packing
- AS 4467-1998 Hygienic production of crocodile meat for human consumption – This standard applies to all crocodile processing including further processing such as boning and packing

- AS 5011-2001 Hygienic production of natural casings for human consumption – This standard applies only to casing manufacture from animal intestines, not artificial casings
- AS 5008-2007 Hygienic rendering of animal products – This standard applies to rendering of meat by-products from slaughtering and processing for the production of inedible tallow and meat meal.

With the number and complexity of food safety regulations, codes of practice and guidelines, it is extremely difficult for new sectors to become established quickly. The emerging Native Food sector is an example of where upskilling workers to adhere to strict food safety guidelines is crucial to industry growth. New job roles are emerging in this sector, requiring specific skills for working in Aboriginal communities and remote locations, harvesting and processing wild food, and exporting products according to international regulations. There are only around 18 native foods currently in commercial production (from roughly 6,400 varieties) and, in the context of growing international demand, the industry is lacking support in expanding its markets. According to Australian Native Food and Botanicals (ANFAB) deputy chair, Russell Glover, there are skills shortages in working with the strict food safety regulations in order to commercialise bush food products[47]. To address such concerns, nationally recognised training products are being developed[48].

Environmental regulations, codes of practice and guidelines

Sectors within Agribusiness, Food and Fibre face specific environmental regulations, codes of practice and guidelines which need to be addressed through skills development.

Aquaculture and fishing in Australia are managed under strict environmental guidelines. Federal and state governments have shared responsibility for the management of Australia's fisheries resources. The Offshore Constitutional Settlement (OCS) is a formal agreement that deals with Commonwealth and individual state fisheries jurisdictions that manage arrangements for specific fisheries within a single jurisdiction or a joint authority (Commonwealth or state). There are presently three joint authorities, involving the Commonwealth and the Northern Territory, Queensland and Western Australia.

The Australian Government has no direct management responsibility for aquaculture. However, multiple national programs for research, quarantine, aquatic animal health, food safety, environmental management, and market access and trade are available for the aquaculture industry. The state governments regulate domestic fisheries and aquaculture production in their jurisdiction through the issuing of licences, permits, leases and quotas; and through regulations, which cover the environment, animal welfare, water supply and wastewater, monitoring and compliance. Aquaculture occurs almost exclusively in state/territory waters, although there is likely to be increasing interest in undertaking aquaculture in Commonwealth offshore waters as technology allows aquaculture operations in further offshore areas.

The Code of Conduct for Responsible Fisheries (the Code), initiated by the United Nations Food and Agriculture Organization Committee on Fisheries, is adopted by over 170 countries, including Australia. The Code is voluntary and provides operators with principles and standards applicable to the conservation, management and development of all fisheries. It also covers the capture, processing and trade of fish and fishery products, fishing operations, aquaculture, fisheries research and integration of fisheries into coastal area management.

The Australian Aquaculture Code of Conduct, initiated by the Australian Aquaculture Forum, provides principles aimed at maintaining ecological and economic sustainability for the aquaculture industry. The code of conduct requires compliance with regulations, respect for the rights and safety of others, humane treatment of aquatic animals, and promotion of the safety of seafood for human consumption.

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[47] ABC News (2019); *Australian bush tucker industry push to transform native foods for international consumption*; https://www.abc.net.au/news/2019-11-17/native-bush-foods-australian-bush-tucker-going-global/11658008; viewed 18/02/2022.
[48] Skills Impact (2022); *Australian Native and Bush Food Project*; https://www.skillsimpact.com.au/food-beverage-and-pharmaceutical/training-package-projects/australian-native-and-bush-food-project/; viewed 18/02/2022.

The regulations, codes of practice and guidelines that guide the seafood industry intersect with maritime laws. The way that industry is shaped by these legislative requirements impacts on the ways in which seafood is processed and labelled along the value chain, and to whom it is marketed, especially in light of consumer demand for environmental and fish stock sustainability.

In the forestry and wood products industry, public native forests, including those held in conservation reserves and those available for wood production, are governed and managed under national and state/territory regulatory frameworks and management plans (many of which are prescribed in legislation) relating to the conservation and sustainable management of forests. There are three significant pieces of legislation at the federal level that support the conservation and sustainable management of public native forests:

- Environmental Protection and Biodiversity Conservation Act 1999
- Regional Forest Agreement Act 2002
- Illegal Logging Prohibition Act 2012.

There are also over 30 pieces of legislation at the state and territory level, including:

- Forestry Act 2012 (NSW)
- Forestry Act 1959 (QLD)
- Forest Act 1950 (SA)
- Forest Management Act 2013 (TAS)
- Forest Act 1958 (VIC)
- Forests Act 1918 (WA).

Federal and state/territory government environmental and heritage protection legislation includes:

- Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
- The Aboriginal and Torres Strait Islander Heritage Protection Act 1984 (Commonwealth)
- Environmental Protection Act 1994 (QLD)
- Protection of the Environment Operations Act 1997 (NSW)
- Environment Protection Act 1993 (SA) Natural Resources Management Act 2004 (SA)
- Environmental Management and Pollution Control Act 1994 (TAS)
- Environmental Protection Act 1970 (VIC)
- Environmental Protection Act 1986 (WA)

There are also a multitude of major non-legislative policies and strategies that guide the sustainable forest management of Australia's forests, including the Commonwealth's National Forest Industries Plan launched in 2018 to support forest industries to:

- meet the challenges of the future
- underpin growth in the renewable timber and wood-fibre industries
- innovate and use our forest resources smarter
- assist industry to realise its ambition to plant a billion new plantation trees during the decade to 2030.

The Australian Government National Forestry Policy Statement 1992 sets out a vision and goals, objectives

and policies for Australia's forests. It also commits Australia's governments to prepare a national 'state of the forests' review every five years. The next report in this series is due to be released in 2023.

Regional Forest Agreements (RFAs) are long-term plans for the conservation and sustainable management of native forests. Commercial native forestry regions are covered by ten RFAs (five in Victoria, three in New South Wales, one in Tasmania, and one in Western Australia), which define forest management commitments, especially the obligation to balance economic, social and environmental demands on forests.

The regulations, codes of practice and guidelines that determine governance of the forestry and wood products industry not only impact on the practices of this industry but also shape key industries along the value chain, such pulp and paper, textiles and furnishings.

In production horticulture and other production sector systems, there is a high reliance on irrigation, fertilisers and pesticides. Laws governing environmental protection and management by horticultural producers include numerous federal, state and local Acts and Regulations. Generally, these Regulations relate to fertiliser and pesticide supply, handling, usage and storage; disposal of empty chemical containers and contaminated wastes; water usage; wastewater generation and the treatment of waste arising from production; biodiversity; and land and soil management. National environmental legislation and Regulations relevant to the industry include:

- Hazardous Waste (Regulation of Exports and Imports) Act 1989
- Ozone Protection and Synthetic Greenhouse Gas Management Act 1989
- Water Act 2007
- National Water Quality Management Strategy
- National Environment Protection (Assessment of Site Contamination) Measure 1999
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- Australian Drinking Water Guidelines (2011)
- National Residue Survey
- National Environment Protection (Air Toxics) Measure.

In late 2019, the then-Minister for Agriculture announced a comprehensive review of the regulatory framework for agricultural and veterinary (agvet) chemicals. The review was to analyse the agvet chemicals regulatory framework's aims, structure and operation, and make recommendations to ensure its fitness for purpose and reduce any unnecessary red tape. In 2021, the independent panel established to conduct the review concluded that 'the status quo is untenable' due to issues such as:

- growing community concern about the use of pesticides and veterinary medicines and the risk of losing the social licence to continue their use
- a lack of clarity about the purpose and objectives of the regulatory system as a whole
- reluctance by regulators to give credit to industry's own QA and stewardship programs as a means to strengthen safe chemical use

The panel has made recommendations that it considers will enhance existing protections for the health and safety of humans, animals and the environment, while improving access to new and established chemical products. The most significant recommendation by the panel is for the introduction of a single national law to control the use of pesticides and veterinary medicines in all jurisdictions of Australia. The panel also recognise that education and training plays a key role in ensuring that pesticides and veterinary medicines are handled and deployed safely and effectively. Recommendation 20 states:

> 'The Panel recommends that all businesses who apply pesticides commercially (be it agricultural

or domestic) are responsible for ensuring operators complete accredited education, training, competencies or other relevant qualifications in chemical use and application techniques, including handling, storage, risk assessment and management, end-of-life cycle disposal and recycling, regardless of whether the activity is subject to licensing.'

Source: DAWE (2021); Final Report of the Independent Review of the Pesticides and Veterinary Medicines Regulatory System in Australia; Department of Agriculture, Water and the Environment, Canberra, April. CC BY 4.0; p.120

Such recommendations will have impacts along the value chain associated with such industries as agriculture and production horticulture, animal care and management, and amenity horticulture, landscaping, conservation and land management.

Animal health, welfare and export regulations, codes of practice and guidelines

Responsibility for legislation on animal welfare, wildlife protection, and vertebrate pests lies with each state and territory government. Relevant legislation includes:

- Animal Welfare Act 1992 (ACT)
- Prevention of Cruelty to Animals Act 1979 (NSW)
- Animal Welfare Act (NT)
- Animal Care and Protection Act 2001 (QLD)
- Animal Welfare Act 1985 (SA)
- Animal Welfare Act 1993 (TAS)
- Prevention of Cruelty to Animals Act 1986 (VIC)
- Animal Welfare Act 2002 (WA).

State and territory governments also oversee the maintenance of veterinary standards through registration boards and veterinary services legislation. Local governments coordinate regulations relating to the management of companion animals, including registration, limiting the number of cats and dogs per household, compulsory sterilisation and microchipping. Legislation, such as the Stock Medicines Act, the Stock Foods Act, the Poisons Act, and various other food and drug Acts, control the use of poisons and specify maximum residue limits for agricultural and veterinary chemicals in human food.

Hunting in Australia is regulated separately by each state and territory government. This has led to a variety of different Regulations and laws, as well as different fees, charges and licence requirements. For instance, game and feral animal hunting in New South Wales is subject to Regulations set out in the Game and Feral Animal Control Act 2002 and the Game and Feral Animal Control Regulation 2012. The NSW Department of Primary Industries is responsible for enforcement of and compliance with these Regulations. The legislation relating to wildlife in Queensland includes the Nature Conservation Act 1992 and related Regulations. The Department of Environment and Heritage Protection (EHP) and the Department of National Parks, Sport and Racing (NPSR) oversee the regulations and issue licences for hunting of native animals.

At federal level, the Australian Government oversees critical legislation, such as the Biosecurity Act 2015 and the Environment Protection and Biodiversity Conservation (EPBC) Act 1999. The Australian Department of Agriculture, Water and the Environment (DAWE) oversees policies and legislation concerning aspects of livestock management and biosecurity, including live exports. 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 livestock for slaughter on or after 1 July 2017, and to compel export licence holders to ensure all livestock

are treated satisfactorily prior to slaughter. DAWE 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. DAWE also manages quarantine controls at borders and provides import and export inspection and certification.

State and territory governments also have responsibility for livestock management, disease response and welfare arrangements within their jurisdictions, requiring both the enforcement of national and state/territory legislation.

Australia has an inclusive ban on the feeding of restricted animal material (RAM), including meat and bone meal 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 bovine spongiform encephalopathy (BSE, also sometimes colloquially known as 'mad cow disease'), in the unlikely event that it is introduced to Australia. The ruminant feed ban is nationally coordinated by Animal Health Australia, and is part of a comprehensive national TSE (transmissible spongiform encephalopathy) Freedom Assurance Project. The prohibition and program targets livestock producers and other end users of manufactured stockfeed, retailers of manufactured stockfeed, and stockfeed manufacturers. Each Australian state/territory adopted the ruminant feed ban in legislation, indicating feeding prohibition and requirements for labelling and RAM content. In addition, the industry implements the FeedSafe accreditation program through the Stock Feed Manufacturers' Council of Australia. To achieve FeedSafe accreditation, feed manufacturing sites are required to address the elements of the Code of Good Manufacturing Practice for the Feed Milling Industry, particularly methods to ensure effective cleaning, flushing and sequencing between different types of stockfeeds, to minimise the possibility of cross-contamination.

Other industry regulation, standards and licensing requirements impacting on value chain operations

- The alcoholic beverage sector is subject to excise Regulations that require producers to measure and sample the alcohol content of the product they produce to calculate the excise that is payable. A licence from the Australian Taxation Office (ATO) is required to distil alcoholic spirits in Australia. This licence imposes several obligations to ensure spirit products are kept secure, production accounts are maintained, and excise duty is paid when due. The ATO requires significant and adequate records for all excisable products to show these obligations have been met.
- The wine industry has stand-alone Regulations in relation to geographical terms, labels and exports under the Australian Grape and Wine Authority Act 2013 and Australian Grape and Wine Authority Regulations 1981. Wine producers and exporters must obtain an export licence from the Australian Grape and Wine Authority (AGWA). The regulation of wine exports is primarily to ensure the quality of Australian products marketed overseas. AGWA also oversees labelling requirements for wine producers to ensure labels include the variety of grapes used and regional zones of production.
- The Australian viticulture sector is subject to a number of federal and state/territory laws and regulations, 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.
- Businesses signatory to the Australian Packaging Covenant, an agreement between government, industry and community groups, are obliged to find and fund solutions to address packaging sustainability issues.
- The forestry industry implements two voluntary forest certification schemes, the Responsible Wood Certification Scheme and the Forest Stewardship Council Scheme (FSC), which typically require more stringent forest management practices than the legislation alone. Forest management standards and chain-of-custody standards frame both schemes.
- Genetically modified (GM) crops in Australia, including seeds, are regulated under the Gene Technology Act 2000 through the Office of the Gene Technology Regulator. The regulatory policy

seeks to protect the health and safety of both people and the environment. The regulator identifies risks posed by, or as a result of, gene technology, and manages these risks. This Act regulates all dealings with live and viable genetically modified organisms (GMOs) in Australia, including research, manufacture, import, production, propagation, transport and disposal of GMOs. There is also corresponding legislation in each state and territory.

- Good manufacturing practice (GMP) systems are used by the pharmaceutical manufacturing industry to ensure that products are consistently produced and controlled according to quality standards. Australian pharmaceutical manufacturers are required to hold a licence to manufacture, which can only be obtained with evidence of maintaining compliance with relevant GMP codes. Other regulatory requirements include Therapeutic Goods Regulations, the Therapeutic Goods Act, National Medicines Policy, Manufacturing Principles and Therapeutic Goods Orders.
- The Fisheries Management Act 1991 sets out the legislative parts of the Commonwealth's fisheries management framework, including the regulation of fisheries, preparation of fisheries management plans, allocation and management of statutory fishing rights and other concessions, determination of allowable catch, fish receival, compliance and foreign fishing controls, cooperation with the states and the Northern Territory, and satisfying international obligations.
- 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.

Regulated occupations in the Agribusiness, Food and Fibre Industries

Regulated occupations have legal (or industry) requirements or restrictions that must be adhered to so to perform the work. Regulated occupations require a licence from, or registration by, a professional association or occupational licensing authority. The National Training Register (training.gov.au) identifies which occupations require that a formal qualification, skill set or unit of competency be held for specific licensing, legislative or certification requirements. Please see **Appendix: Qualifications and Licensing, Legislative or Certification requirements** for details. Relevant examples are provided below.

Australia is a signatory to the International Maritime Organization (IMO), which governs maritime safety and standards for credentials. Domestic commercial vessel (DCV) safety legislation applies to the fishing and aquaculture fleet to ensure safety measures and consistency in the application of standards to underpin safety at sea and on-board commercial vessels. The sector also has a number of other activities for which high-risk licences are required, particularly in the processing/filleting area, for which operators must have licences to perform those work functions. The seafood industry employs a range of other regulated occupations, including those associated with diving, chemical handling, and vehicle, mobile equipment, crane and forklift operators.

The only meat industry-specific occupation that requires a licence is that of meat inspector. Registration can be with a federal or state authority, depending on the nature of the enterprise. Other professionals who work with meat processors, as well as a range of other industries, who require formal licensing or qualifications include veterinarians, animal welfare officers, electricians, plumbers, and forklift operators.

While the amenity horticulture, landscaping, conservation and land management industries do not have any specific trade-licensed occupations, different professional accreditation structures are overseen by industry bodies. For example, in Victoria, landscapers are required by the Domestic Building Contracts Act 1995 (Vic) to be registered with the state Building Practitioners Board in order to carry out large-scale structural landscaping. Similarly, arborists do not need a licence to practise arboriculture in Australia, yet WorkCover, the Tree Contractors Association of Australia, Arboriculture Australia and the Local Government Tree Resources Association recommend that professional arborists meet several requirements. Arborists practising in Australia should represent a professional business, hold proper

worker's compensation insurance, and have minimum qualifications of *Certificate II in Arboriculture* for carrying out ground and climbing work, and *Certificate III in Arboriculture* for supervising climbing work.

Workplace and Value Chain Risk Management and Safety Culture

All industries share the aspiration of achieving risk management and safety cultures. To develop safety skills, the Agribusiness, Food and Fibre Industries will need to work collaboratively, while attending to the differentiating features of this cluster, which include:

- protecting the safety and wellbeing of multiple living entities – humans, animals and plants – as they interact
- dealing with global cultivation and production risks that can be difficult to manage over the short-term and unpredictable over the medium- and long-terms, such as weather conditions and diseases affecting animals and plants
- working in natural environments, with risks which cannot be engineered out
- working in remote situations, often alone or in small teams
- changing roles due to seasonal and lifecycle factors, and due to changing stock and crops
- dealing with natural disasters, such as drought and floods, across all areas, from planning to recovery.

This section will cover issues relating to human and animal safety, including mental and physical wellbeing.

Workplace safety

Across the Agribusiness, Food and Fibre Industries, numerous strategies are being implemented to support and improve workplace safety outcomes. Workplace safety is of particular concern in this cluster due to the specific environments, tools and animals that people work with. Examples of situations requiring heightened safety precautions include:

- arborists working at height
- the use of chainsaws for, or as part of, arboriculture, forestry, horticulture, agriculture, conservation and land management, local government, emergency services and other government agency operations
- deckhands working on fishing vessels
- zookeepers managing facilities with exhibited animals
- workers caring for companion animals
- jockeys, trackwork riders, trainers and stablehands working with thoroughbred horses
- agriculture employees working with livestock or chemicals
- forestry workers operating machinery and falling trees in harvesting operations
- pulp and paper workers working with chemicals, large equipment, steam and power generation
- timber processing workers operating cutting equipment and machinery
- meat and seafood processors working with knives
- people using quad bikes and tractors on farms

Workplace safety is crucial for employee cohorts who are most at risk. Among workers, people 50 years of

age and over accounted for almost 50% of all on-farm non-intentional injury deaths between 2001 and 2015. The farming industry has an ageing workforce, with many farmers continuing to work well beyond what is considered 'normal' retirement age in other sectors. Consequently, there is a need to identify improved ways of balancing the extensive benefits of older farmers' continuing participation with their personal safety.

Injury is the second leading cause of death among Aboriginal people working in agriculture, especially in grain, sheep and beef cattle farming. Death caused by injury occurs at three times the rate of non-Aboriginal farm workers. The three main categories of non-intentional injury deaths are transport deaths, drowning and poisoning. Acknowledging the high rates of injury in indigenous workers requires that employees are engaged in safety programs with appropriately targeted and culturally relevant and effective injury prevention resources and strategies.

It is imperative that education and training be available to all farmers, service providers, land managers and food and fibre producers to mitigate the risks of working on farms, forestry blocks, native bush and animal facilities, including for the protection of others, such as children, who account for almost 15% of farm injury deaths[49]. While the Agribusiness, Food and Fibre Industries are highly aware of, and responsive to, safety issues, there are still areas requiring improvement, especially in emerging industries that may not have developed a workplace health and safety culture. Risky behaviours can become normalised because 'Habit, lack of time, stress, fatigue, and even the absence of regular adverse consequences all conspired to cause farmers to become complacent even when the risk is clear'[50]. Farmsafe Australia contend that coordinated action, including investing in industry-endorsed training and continued learning, is needed to engender leadership and cultural change for the next generation of Agribusiness, Food and Fibre workers.

In recent years, there have been various high-profile farm safety awareness and education initiatives to help prevent accidents. The National Farmers' Federation[51] has set a goal for 90% of Australian farms to be employing risk management tools by 2030, including through education and training. Farmsafe Australia, meanwhile, has released its National Farm Safety Education Fund Strategy, aimed at significantly reducing injuries and fatalities in agriculture by 2030. The strategy calls for collaborative industry action across a range of work, health and safety impact opportunities.

In the forest industry, the Australian Forest Products Association (AFPA) and the Australian Forest Contractors Association (AFCA) signed up to a charter of essential training standards for the workforce and life-saving commitments to guide behaviour.

Similar initiatives are being implemented across the Agribusiness, Food and Fibre Industries, including SeSAFE:

[49] AgHealth Australia (2021); *Projects – populations at risk*; The University of Sydney; https://aghealth.sydney.edu.au/projects-and-reports/projects-populations-at-risk/; viewed 01/09/2021.
[50] Farmsafe Australia (2021); *National Farm Safety – Educational Fund Strategy 2020-2021*; p.3
[51] National Farmers' Federation (2021); *NFF completes farm risk management study*; https://nff.org.au/media-release/nff-completes-farm-risk-management-study/; viewed 01/09/2021.

Case Study: SeSAFE

The SeSAFE project commenced in 2018, funded by the Fisheries Research and Development Corporation and the Australian fishing and aquaculture industry. Australian fishing and aquaculture occupations are some of the most hazardous in Australia, with statistics indicating that it is 25 times more likely that a fatality will occur on a commercial fishing boat than in mining operations[52]. The goal of SeSAFE is to raise awareness and improve safety performance in the fishing and aquaculture industry.

Through SeSAFE, an online safety learning management system (LMS) has been produced, and consists of numerous brief modules designed to deliver essential Workplace, Health and Safety (WHS) training to fishers and aquaculture workers prior to working on the water. This LMS provides companies and boat owners with a simple way to induct individuals in relevant WHS in a user-friendly online format, including general workplace safety requirements under WHS legislation and specific requirements under Australian Maritime Safety Authority legislation. Learners' comprehension of training material is evaluated by means of simple questions, and they can answer questions multiple times or repeat a module until they attain a desired level of performance. Importantly, the online LMS offers a solution to many of the traditional barriers to safety training for fishers and aquaculture workers, including perceptions about cost, access and timing.

The Australian Veterinary Association has been raising awareness of the challenges faced by people working in veterinary services and the adverse effects that these can have on mental health. Stakeholder research, including over 2,500 participants, was conducted in 2021 to construct a contemporary image of the mental health and wellness of veterinary professionals in Australia[53]. As many Agribusiness workers have animal welfare responsibilities, it is likely that some of the findings of this work will apply across multiple industries.

The research confirmed that prevalent stress factors include high workload, long hours, poor remuneration, abuse by clients, staff shortages and financial stress. Results also indicate that the challenges faced by veterinary services workers are two-fold: those inherent to the job, such as exposure to death; and typical workplace challenges, for example interpersonal conflict and inadequate leadership support. While these challenges can never be fully eliminated, it is concluded that workplace conditions, environment and culture can be improved with greater attention to the mental health and wellbeing risks that the research identifies.

Natural disaster planning, response and recovery

All sectors of the Agribusiness, Food and Fibre Industries experience the devastating and unpredictable damage of natural disasters, in particular bushfires, flood and drought. The Bushfire and Natural Hazards Cooperative Research Centre has reported that Australia has conducted more than 50 full inquiries, coronial inquests and Royal Commissions into bushfires and natural hazards over the 75 years up to 2015. The first national Royal Commission was conducted in 2020.

Agribusiness, Food and Fibre stakeholders have a deep desire to be able to participate in response and recovery efforts, especially as many have experienced the devastating effects of natural disasters on their local communities. Stakeholders have been extremely interested in the implementation of recommendations from the 2020 *Royal Commission into National Natural Disaster Arrangements*, which was a response to the devastating bushfires across several states in 2019 and early 2020.

[52] SeSAFE (2021); *SeSAFE*; http://www.sesafe.com.au/; viewed 15/03/2022.
[53] SuperFriend (2021); *Australian Veterinary Association Veterinary Wellness Strategy: Final report*; Australian Veterinary Association

The report emphasises that 'The importance of local knowledge to disaster management, and particularly to disaster response, was emphasised by many people we heard from, including firefighters and the public'.

The Royal Commission, however, relays firsthand accounts of locals' inability to interact with emergency services (including armed forces) personnel, even though their extensive knowledge of local conditions, including access tracks and areas of potential danger, would have benefitted firefighting endeavours. Accordingly, stakeholders in Agribusiness, Food and Fibre would like mechanisms for interacting more effectively with emergency services in planning, preparation and the development of training products.

Several sectors within the Agribusiness, Food and Fibre Industries are already participating in the preparation of plans, strategies and training product development to manage risks during natural disasters: the Forestry sector currently aims to undertake training product work relating to bushfire response; the National Agriculture Workforce Strategy addresses the need to establish resilient supply chains to deal with the impacts of bushfires, floods, drought and other natural disasters; the animal care and management industry is working to establish additional skills in managing animals during disasters because of past shortcomings:

- The *Royal Commission into National Natural Disaster Arrangements*[54] describes how evacuation centres were overwhelmed and unable to accommodate all the domestic animals needing care and management. Some people put their lives at risk to evacuate those domestic animals that could not be transported to, or accommodated by, welfare facilities, with many unwilling to be separated from their pet or leave them in potentially smoke-affected areas outdoors.
- In their submission to the *Royal Commission into National Natural Disaster Arrangements*, World Animal Protection[55] report on a lack of coordinated bushfire response mechanisms to help save domestic animals. They argue that cross-border organisations and agencies lacked clear planning and often had to rely upon in-kind support from animal care professionals and volunteers. They also describe insufficiently trained response workers and reports of untrained individuals mounting their own animal rescue efforts. World Animal Protection conclude that bushfire response animal care and management was 'not of an appropriate standard'.

Responses to these situations requires a well-trained workforce and public awareness. Improving risk management strategies and enhancing the overall safety cultures across industries, especially in regional, rural and remote Australia, is likely to mitigate some of the devastating effects of natural disasters on both populations and industries.

[54] Royal Commission into National Natural Disaster Arrangements (2020); *Royal Commission into National Natural Disaster Arrangements Report*; p.280

[55] World Animal Protection (2020); *Submission to the Productivity Commission into National Natural Disaster Arrangements*; https://naturaldisaster.royalcommission.gov.au/system/files/2020-07/NND.600.00255.pdf

Industry Summary and Trends

Market Summary

Agribusiness, Food and Fibre businesses are mainly market driven, but some are based on delivery of social amenity. Even in those sectors, competitive market processes are often used for service provision.

The Agribusiness, Food and Fibre Industries contribute to Australia's food security, our homes, health and wellbeing. They produce essential food, drink, medicine, fibre and textile products. They also work with and protect Australia's environmental assets, now valued at more than $6.5 trillion according to the ABS[56] and CSIRO[57].

Overall, the Agribusiness, Food and Fibre Industries have a total revenue of almost $432 billion and contribute over $96 billion to overall GDP ('industry value added').

Table 1: Industry Financial Activity

Training Package-Related Industries	Revenue ($billion)	Industry Value Added ($billion)
Animal Care and Management (ACM)	$3.82	$2.33
Agriculture, Horticulture and Conservation and Land Management (AHC)	$171.18	$42.78
Australian Meat Processing (AMP)	$52.22	$7.94
Food, Beverage and Pharmaceutical (FBP)	$157.89	$31.80
Forest and Wood Products (FWP)	$23.12	$6.36
Pulp & Paper Manufacturing Industry (PPM)	$10.75	$2.51
Racing & Breeding (RGR)	$4.45	$0.97
Seafood Industry (SFI)	$8.57	$1.63
Total	**$431.99**	**$96.33**

Source: IBISWorld Industry Wizard, 2022

The significance of these industries has been highlighted by the COVID-19 pandemic. The increased demand for products like paper, packaging, meat, timber, pharmaceuticals, and services in the animal care industry meant most of the sectors in the Agribusiness, Food and Fibre Industries were classified as 'essential industries' and remained in operation throughout the pandemic.

As with all industries since the start of 2020, Agribusiness, Food and Fibre have experienced disrupted supply chains and labour supplies; however, the robust adaptations, innovations and evolution of these critical industries mean that, in spite of on-going challenges, they are thriving[58].

Some drivers and examples include:

- A record boom in pet ownership during the COVID-19 pandemic, with 69% of Australian households now having one or more companion animals (compared with 61% only two years ago). There are

[56] ABS (2019); *4655.0 - Australian Environmental-Economic Accounts, 2019*; https://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/4655.0Main%20Features22019?opendocument&tabname=Summary&prodno=4655.0&issue=2019&num=&view=; viewed 22/02/2022.
[57] CSIRO (2020); *Australia's Biosecurity Future*
[58] R. Heath (2021); Editorial: Ag thriving in disruption; *Farm Policy Journal Vol.18, No.2, Winter Quarter 2021*

now 30.4 million pets (compared with 28.5 million in 2019) that require breeding, training, grooming, shelter and health-related services[59].

- Unprecedented demand in nursery, landscaping and gardening businesses as a result of both new and experienced customers renovating their gardens and veggie patches while spending greater amounts of time at home[60].
- Local food consumption, with over 90% of daily food consumed in Australia provided by Australian farmers, fishers, aquaculture workers, seafood processors, meat processors, and food and beverage processors[61], seeing the gross value of production reach an all-time high[62].
    - Over 71% of 'agriculture, forestry and fisheries' products are exported, meaning that Australia produces substantially more food than it consumes and is one of the most food secure nations in the world[63].

Such trends ensure the products, services and economic contributions of Agribusiness, Food and Fibre continue to grow in productivity and profitability. Agriculture, for example, is highlighted as having the highest rate of growth of *all* industry divisions over the 12 months to March 2021 (based on ABS data): see Figure 12. Its increasing value is partly due to favourable domestic growing conditions concurring with poor seasonal conditions experienced by grain supply competitors, including Brazil, Canada, Russia, Ukraine, Argentina and the USA, which is driving up prices to the benefit of Australian producers. The value of agricultural exports is now forecast to reach a record $61 billion in 2021-2022[64].

Figure 12: Australian Industries Growth

Source: IBISWorld (2021); Australia's Top 500 Private Companies for 2020-21; https://www.ibisworld.com/blog/top-500-companies-2021/61/1133/; viewed 13/10/2021

[59] Animal Medicines Australia (2021); *Pets and the Pandemic*
[60] IBISWorld (2021); *Nursery Production in Australia*; AU Industry (ANZSIC) Report A0111
[61] Department of Agriculture, Water and the Environment (2021); *Delivering Ag2030*; Canberra, May. CC BY 4.0.
[62] ABARES (2021); *Agricultural Commodities: December quarter 2021*; Canberra. CC BY 4.0
[63] ABARES (2020); *Australian food security and the Covid-19 pandemic*; Canberra. CC BY 4.0.
[64] ABARES (2021); *Agricultural Commodities: December quarter 2021*; Canberra. CC BY 4.0

The Agribusiness, Food and Fibre Industries are critical for rebuilding Australia's economy and creating jobs in regional, rural and remote areas, and this rebuilding relies on developing the skilled workers that can sustain them. The *National Agricultural Workforce Strategy* notes that the best way of future-proofing the Agribusiness, Food and Fibre industries is by preparing all levels of the workforce through 'learning in all its forms, at all levels, in all the relevant parts of the nation'[65]. Such capabilities development will unlock opportunities, including through the improved use of knowledge, practices and technologies, for realising the National Farmers' Federation's plan for agriculture becoming a $100 billion industry by 2030.

Australian producers expanding into new export markets

Agribusiness, Food and Fibre businesses operate in highly competitive national and international markets. Businesses need to continue to innovate to produce goods and services that are viable and profitable into the future. Asia has been the fastest growing export destination for Australian produce, though this has been disrupted by on-going trade disputes and tariffs imposed by China on products such as wine, beef, cotton, lobster and barley.

Case Study: Australian Wine and the Impact of China's Anti-dumping Duties

Changing international trade conditions have necessitated that businesses rapidly alter their strategies to maintain operations and viability. In response to recent trade disputes with China, Australia's main destination for exports, many organisations have had to seek alternative markets, which has required advanced skills and knowledge to access these markets, comply with relevant legislation and create new partnerships. The experiences of Australian wine exporters are illustrative of the challenges multiple industries have faced.

Under the China-Australia Free Trade Agreement, from 2019 there was zero tariff on bottled Australian wine entering China. Many Australian exporters began focusing heavily on this market[66] and, by 2020, China became Australian wine's largest market in value terms, accounting for 33% of wine export revenue.

Due to alleged 'dumping', in March 2021 China announced duties on Australian wine, which were between 116% and 218% depending on the supplier. This immediately restricted wine exports to China, rendering the market unviable for many. With the loss of such a significant market, producers have both reduced production and received lower average prices for wine.

To overcome export volume, revenue and production shortfalls, Australian wine producers promptly enacted plans for diversifying their business operations, including direct-to-consumer sales and expanding into new markets. The UK is now Australia's largest market by volume and value[67]. There are also examples of producers establishing or expanding in markets such as India[68] and the USA[69].

In support of the industry, the Australian Government has invested $50 million in the Export and Regional Wine Support Package, which includes funding for targeted marketing campaigns in overseas markets

[65] J. Azarias, R. Nettle & J. Williams (2020); *National Agricultural Workforce Strategy: Learning to excel*; National Agricultural Labour Advisory Committee; Canberra, December. CC BY 4.0; p.xiii.
[66] T. Gleeson, D. Addai & L. Cao (2021); *Australian wine in China: impact of China's anti-dumping duties*; ABARES research report 21.10, Canberra, July. CC BY 4.0.
[67] Wine Australia (2021); *Australian wine exports reflect challenging year*; https://www.wineaustralia.com/news/media-releases/australian-wine-exports-reflect-challenging-year; viewed 31/01/2022.
[68] Food & Beverage Industry News (2021); *Australian wines establish a growing presence in India*; https://www.foodmag.com.au/australian-wines-establish-growing-presence-india/; viewed 31/01/2022.
[69] Premier of South Australia (2021); *Cheers to Wine Australia's US Market Entry Program*; https://www.premier.sa.gov.au/news/media-releases/news/cheers-to-wine-australias-us-market-entry-program; viewed 31/01/2022.

and capability development programs[70], which will further assist producers in developing the skills and knowledge to respond to the rapidly changing trade environment.

The Agricultural Trade and Market Access Cooperation (ATMAC) program[71], which is part of the Agri-Business Expansion Initiative (ABEI), has been extended to help Australian producers reach new export markets. Seven new ATMAC projects were announced in July 2021, accounting for $5.9 million out of a $19 million budget for grant funding over the 2020–21 and 2021–22 financial years. Successful projects already funded include:

- Australian red meat export market diversification: Saudi Arabia, Thailand, Vietnam program[72]
    - This program has added three new business development specialists with skills for promoting trade flows and to capitalise on recent market access gains.
- Cotton Export Market Diversification Strategy: 'Taking Australian Cotton to the World'[73]
    - This program will assist exporters in increasing Australian cotton's market share in traditional export destinations and expanding into new and emerging markets. This will include a coordinated marketing and education effort along the supply chain.
- Nut Industry Trade and Market Access Expansion Program[74]
    - This program is to develop market access intelligence to expand trade, include marketing of Nuts for Life research, as well as establish a sustainability framework.
- Program to reduce Technical Barriers to Trade (TBTs) for Australian Dairy in South-East Asia[75]
    - This program will consult industry to identify and address current TBTs, including product testing and food labelling.
- Market Diversification Framework for the grains industry value chain[76]
    - This framework is to help grains industry market diversification and to enhance competitiveness, including by developing a collaborative grain partnership with India.
- Exploration of new seafood export opportunities in high-value overseas markets[77]
    - Seafood Industry Australia (SIA) have been awarded an $888,0000 grant to explore new export opportunities in overseas markets, especially for rock lobster and abalone in Asia, the Americas and Europe, and a one-stop-shop digital platform created for seafood exporters to simplify their access to information and resources, and so lift barriers to market participation.

[70] Wine Australia (2021); *$50m Package Highlights*; https://www.wineaustralia.com/whats-happening/highlights-of-the-$50m-package; viewed 31/01/2022.
[71] Australian Government (2021); *Agricultural Trade and Market Access Cooperation (ATMAC) Program*; https://www.agriculture.gov.au/market-access-trade/atmac; viewed 29/09/2021.
[72] Australian Government (2021); *Money on the table for Meat Exporters*; The Hon. David Littleproud MP; https://minister.awe.gov.au/littleproud/media-releases/money-table-meat-exporters; viewed 29/09/2021.
[73] Australian Government (2021); *Cotton looks further afield for markets*; The Hon. David Littleproud MP; https://minister.awe.gov.au/littleproud/media-releases/atmac-grant-australian-cotton-shippers-association; viewed 29/09/2021.
[74] Australian Government (2021); *Nuts about market expansion*; The Hon. David Littleproud MP; https://minister.awe.gov.au/littleproud/media-releases/atmac-grant-australian-nut-industry-council; viewed 29/09/2021.
[75] Australian Government (2021); *Milking opportunities for dairy markets*; The Hon. David Littleproud MP; https://minister.awe.gov.au/littleproud/media-releases/atmac-grant-australian-nut-industry-council; viewed 29/09/2021.
[76] Australian Government (2021); *Going against the grain to find new markets*; The Hon. David Littleproud MP; https://minister.awe.gov.au/littleproud/media-releases/atmac-grant-grains-australia; viewed 29/09/2021.
[77] Australian Government (2021); *Joint media release: Seafood exports to scale up*; The Hon. David Littleproud MP; https://minister.awe.gov.au/littleproud/media-releases/atmac-grant-seafood-industry-australia; viewed 29/09/2021.

Markets solutions for environmental and resource protection challenges

In recent years, there has been a growing trend of seeking market solutions to challenges with environmental and resource management and protection.

The Australian Water Trading market is beginning to evolve beyond its earlier focus on accessing water from the Murray Darling Basin for agriculture and irrigation-reliant areas, to now cover water accessed across the continent, including cultural allocations for traditional custodians. Water trading has evolved into a multifaceted market with an annual value estimated at more than $1.5 billion. The Australian Competition & Consumer Commission (ACCC)[78] reports that the fragmented understanding of agribusiness about changing water markets is undermining their efficiency and regulatory compliance.

Trading in carbon credits and hydrogen investments represent other rapidly expanding markets being driven by the need to encourage investment in climate protection and energy efficiency. Carbon credit units increased by 5% in the first half of 2021, meaning supply was on track to reach 17 million by the end of the year (an increase of one million compared with 2020)[79].

The Australian Government Clean Energy Regulator has recently conducted a tender process for a program to accelerate the emergence of an Australian carbon exchange, which is intended to make the trading of carbon credit units simpler[80].

Being visibly active in climate protection and sustainable production is becoming more powerful as a marketing tool for reaching consumers and increasing return on investment in these activities. It is also important for maintaining international trade relationships as various jurisdictions are introducing market barriers for countries and exporting businesses who underperform in environmental matters.

Hidden Markets

There are a growing number of markets that continue to be hidden from standard market analyses. This occurs for reasons such as emergent markets not yet being formally recognised, or niche markets being misrepresented simply as *contributors* to larger markets.

The companion animal and pet market is a good illustration of this issue. Research by Animal Medicines Australia[81] shows that around 69% of households across the country now have at least one pet, while the number of individual pets has risen to 30 million. In line with changing social attitudes towards pet treatment, there has been an explosion in new animal services and goods on offer. The true value of this market, however, is generally underappreciated, especially as it is not classified in the Australian and New Zealand Standard Industrial Classification (ANZSIC). This means workforce numbers in this emergent sector are not quantified and the opportunities associated with having an ANZSIC (being included on skilled visa lists, training funding) remain locked.

Not being included in the ANZSIC means industries or sectors are overlooked and seldom the subject of analysis or research. Industry sectors such as arboriculture and permaculture contribute millions of dollars in value-add to broader industries, such as energy, agriculture and conservation, yet baseline data representing these sectors is rarely captured. Likewise, the value of work completed by the landscaping, turf and sports turf businesses is often counted under the market value of other industries, such as construction, energy, sport and recreation. This is also true of Aboriginal and Torres Strait Islander business enterprises, in particular the work being undertaken in conservation, ecosystem management, Australian

[78] Australian Competition and Consumer Commission (2020); *Murray–Darling Basin water markets inquiry - Interim report*
[79] Australian Government (2021); *Quarterly Carbon Market*
[80] Australian Government Clean Energy Regulator (2021); *Calling for expressions of interest to develop a carbon exchange*; http://www.cleanenergyregulator.gov.au/ERF/Pages/News%20and%20updates/News-item.aspx?ListId=19b4efbb-6f5d-4637-94c4-121c1f96fcfe&ItemId=921; viewed 22/02/2022.
[81] Animal Medicines Australia (2021); *Pets and the Pandemic: A social research snapshot of pets and people in the COVID-19 era.*

native foods, water allocation and cultural trading.

While it would be difficult to disentangle the results of work in these sectors from the industries that they support, not doing so sustains the comparative disadvantages that they face. Stakeholders note that attracting new entrants, the design of training opportunities and their promotion, government funding and initiatives, and overall industry growth can usually only be achieved with the visibility that being included in official statistical sources enables.

Business & Workforce Summary

Workforce overview

The Agribusiness, Food and Fibre Industries account for more than one million employees and around 8% of total employment in Australia. Almost 244,000 individual businesses operate and trade in locations spanning all states and territories, and comprise a variety of small, medium and large enterprises. The sectors across these industries are extremely varied, with large agribusinesses, as well as niche, specialist and regional operators.

As such, these industries form a sophisticated and complex web cross the value chain, and comprise many influential stakeholders, whose leadership is a key driver for defining and facilitating the many different forms of workforce capabilities development required for on-going productivity.

Table 2: Industry Businesses and Employment

Training Package-Related Industries	Businesses	Employment
Animal Care and Management (ACM)	3,439	25,746
Agriculture, Horticulture and Conservation and Land Management (AHC)	184,186	499,054
Australian Meat Processing (AMP)	6,409	98,343
Food, Beverage and Pharmaceutical (FBP)	27,072	285,939
Forest and Wood Products (FWP)	10,926	62,821
Pulp & Paper Manufacturing Industry (PPM)	619	15,291
Racing & Breeding (RGR)	5,001	26,658
Seafood Industry (SFI)	6,304	18,069
Total	**243,956**	**1,031,921**

Source: IBISWorld Industry Wizard

Skilled labour is a key input in the Agribusiness, Food and Fibre Industries. However, average employment figures do not accurately capture the complexity and variability of sectors' workforces across the value chain.

Workforces are shaped, in different places at different times, by multiple factors:

- **Industry maturity**: some industries are experiencing workforce contraction or expansion in line with their relative maturity (denoted by longevity, markets and technological evolution)[82].
- **Seasonality**: employment figures are, for some industry sectors, highly variable throughout the year because of the timing of labour-intensive operations, such as planting and harvest.
- **Business structure**: the operations undertaken also determine the types of employment people

[82] IBISWorld (2021); *Agribusiness in Australia: AU industry (ANZSIC) Report X0005*; p.18

are offered; for instance, horticulture farms hire large proportions of casual and contract labour at specific times of the year, while dairy and broadacre farms tend to use this kind of labour consistently throughout the year and retain a higher proportion of full-time employees[83].

- **Regional, rural and remote locations**: many businesses are located in regional areas, which impacts on the availability, attraction and retention of skilled workers, especially as they may be competing with the mining industry for skilled workers[84].
- **Risk and volatility**: Agribusiness, Food and Fibre employers must frequently adapt to and manage significant risk and volatility, including with the impacts of the COVID-19 pandemic, climate change, natural disasters and unstable commodity prices and markets. Such variables impact on businesses' capacity to hire and retain staff (especially if productivity and, therefore, profitability is affected)[85], and can reduce potential labour pools (e.g. overseas workers not being allowed to cross international borders during the pandemic).
- **Changing industry roles**: perceptions of the nature of skills and employment in the Agribusiness, Food and Fibre Industries are often outdated and not cognisant of rapid digitalisation and task automation. Updating the contemporary image of these industries is an on-going task, so far with variable success across Australia.

These complexities make it imperative for workforce challenges and opportunities to be more clearly articulated through ongoing, extensive consultation and engagement across the Agribusiness, Food and Fibre Industries (and other Industry Clusters). Such intelligence-gathering and insights would inform decision-making by employers, unions, the National Skills Commission (NSC) and Skills Ministers, and help to drive change and improvements across systems, including industry and education.

Stakeholders have noted that approaches by policymakers and regulators towards casualisation of the workforce and a larger gig economy are being driven by urban considerations. In remote areas, being able to undertake multiple types of work as they become available provides income opportunities for local residents. An example of this, presented by Robert Dalton (then Program Leader – Aboriginal Policy, NT Government) at the 2019 National Indigenous Empowerment Forum, is of coastal Aboriginal and Torres Strait Islander communities in the NT arranging for Indigenous Rangers to also undertake fisheries compliance activities (in addition to other responsibilities). Communities were able to coordinate the variety of work undertaken by rangers independently, with strategies to share workloads among the available qualified community members. This allowed communities to meet their targets while maintaining the ability to schedule their work and cultural lives appropriately. Such examples suggest that, while concerns about access to entitlements under current Australian labour systems remain, greater consideration needs to be afforded to the division and timing of work in regional, rural and remote Australia.

Policies that understand and reflect the structure of the workforce across Agribusiness, Food and Fibre will assist in making timely interventions for the benefit of these industries. The Food and Agribusiness Growth Centre, FIAL, contends that better industry policies and structures will facilitate greater value-adding, which will in turn create more jobs. They estimate that there could be around 300,000 more jobs by 2030 if these industries pursue major growth opportunities (detailed in Figure 1)[86].

Workforce demographics

The National Skills Commission (NSC) report that most workers in agriculture, forestry and fishing are employed in agribusinesses in regional Australia[87]. This workforce is notable because, compared with all

[83] ABARES (2021); *Snapshot of Australian Agriculture 2021*; Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. CC BY 4.0.
[84] KPMG (2020); *A Refreshing Recovery - A Post-Coronavirus Recovery Blueprint for the Australian Drinks Industry*; p.11.
[85] Cotton Research and Development Corporation (2020); *CRDC Grower Survey*; p.51
[86] FIAL (2020); *Capturing the prize: The A$200 billion opportunity in 2030 for the Australian food and agribusiness sector*; p.30
[87] National Skills Commission (2021); *Australian Jobs 2021*; p.19

Australian industries, it has the highest proportion of:

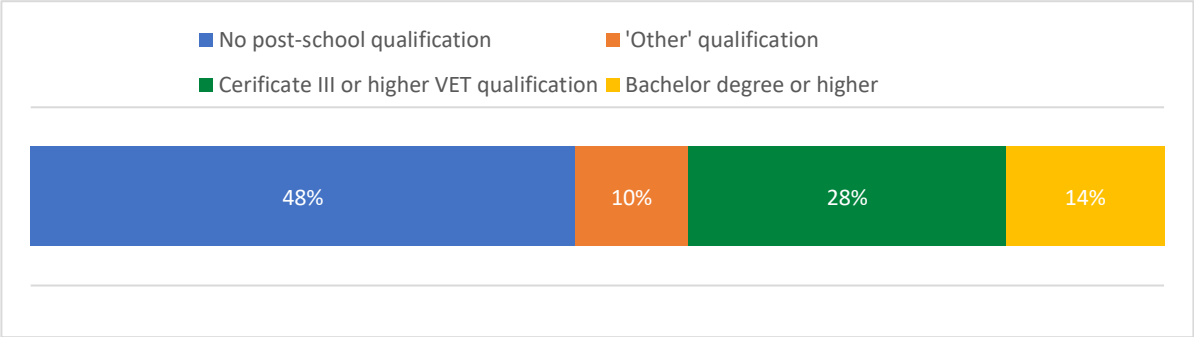
- Participants who are self-employed and managing their own properties (around one in two workers); and
- Workers aged 55 years or older (43% of workers).

The data has been shaped by various historical and cultural trends. The profile of an ageing, predominately male workforce, which resides on family farms, informally educates the next generation and hires labourers without qualifications is undoubtedly an on-going legacy; however, it is important to note that digital technology adoption and greater recognition of diversity (including women and Aboriginal and Torres Strait Islander peoples) within the Agribusiness, Food and Fibre Industries are contributing to the evolving image of roles and value assigned to skilled workers, which is having a positive impact on attracting new entrants.

Workforce educational attainment profile

The National Skills Commission (NSC)[88] detail that the need for *formal* qualifications to obtain employment is less common in agriculture, forestry and fishing than in most industries, with around half of this workforce possessing no post-school qualifications (see Figure 13). Practical skills and experience are highly valued although there are also some jobs for which employers are more likely to consider applicants without previous experience, notably 'crop farm workers' (72% of employers will consider inexperienced people: the fourth highest proportion of all Australian jobs)[89]. For such workers, most capabilities development takes place on the job, including on-farm inductions for seasonal and short-term employees, such as fruit pickers (informal learning is unpacked in greater detail below).

Figure 13: Educational Profile of the Agriculture, Forestry and Fishing Workforce



Source: National Skills Commission (2021); Australian Jobs 2021; p.19

The NSC's analysis aligns with research by Howe *et al*[90], who highlight that the skills requirements of different sectors are shaped by the nature of the work and financial capacity of employers. They determine that lower-skilled jobs in the horticultural industry, such as packing, 'do not require formal qualifications or certifications,' and 'would generally be paid at Level 1 (the lowest level) under the Horticulture Award, with induction training the only training required to perform the job'. Most employers, they conclude, require a higher proportion of lower-skilled workers, with some businesses operating on the basis that 20% of their employees/jobs should be higher-skilled and 80% should be lower-skilled.

Industry stakeholders assert that there are additional factors that explain the agriculture, forestry and fishing

[88] National Skills Commission (2021); *Australian Jobs 2021*; p.19
[89] National Skills Commission (2021); *Australian Jobs 2021*; p.34
[90] J. Howe, S. Clibborn, A. Reilly, D. van den Broek & C.F. Wright (2019); *Towards a durable future: tackling labour challenges in the Australian horticulture industry*; Adelaide University & University of Sydney; p.61

educational profile. These industries have workplace safety incidence rates at concerning levels, which reflects on the often-dangerous nature and remote locations of the work, but also the lack of access to training delivery or a skilled workforce. It is clear that legacies of unequal access to education and training, as well as cultural barriers within the primary industries (discussed in greater detail below), have played some role in the current educational profile.

Moving forward, the NSC expect that the contribution of VET to the agriculture, forestry and fishing industries' skills profile is likely to grow. This is because technologically advanced production systems will become more common (e.g. with automation and A.I.) and the employers who use such systems will require more highly skilled workers. Rapid technological change, furthermore, is occurring at the same time as workforce contraction.

As a result, employers are seeking highly trained people who can help achieve economies of scale and, essentially, 'do more with less'[91] (opportunities and barriers to this are discussed below). Meanwhile, the recent consolidation and corporatisation of many regional businesses has seen increased recruitment of external labour with qualifications and middle-management skills[92].

Gender diversity across the Agribusiness, Food and Fibre Industries

The Agribusiness, Food and Fibre Industries are promoting the greater inclusion of women in the workforce. Recent publications have indicated that less than 30% of this workforce are female[93]. This analysis is open to question and criticism as it fails to include work carried out by women on behalf of family businesses that is not being counted[94], such as generation of off-farm income which can be a critical risk mitigation strategy for agribusiness enterprises.

Owner-managers and corporate enterprises are driving an increase towards the transfer of responsibilities to hired managers. The employment of hired managers trends towards those recognised as having significant experience and this contributes to maintaining the predominance of a male workforce'.

The relatively low visibility of women in the Agribusiness, Food and Fibre Industries sustains the perception of them being male dominated, which further discourages women from seeking opportunities and so hinders industry growth potential. To promote the breadth of jobs, careers and education and training opportunities available, the National Agricultural Workforce Strategy (NAWS) recommends a comprehensive interactive digitised map of the agricultural workforce, including case studies of female (and Aboriginal and Torres Strait Islander peoples' – see below) participation[95]. They furthermore highlight stakeholder submissions calling for greater flexibility in industry working conditions as a strategy for attracting and retaining more women. Given on-going issues relating to parental leave and career progression and continuance, they discuss the potential for additional support to be in place for women who take career breaks, including formal training support to bridge knowledge gaps that appear.

The NAWS reinforces the importance of women as cultural and business leaders in agriculture:

> 'Women spearhead many entrepreneurial initiatives in regional Australia. Most of these are sophisticated value-adding enterprises that require a range of skill levels. The industry leaders putting capability development at the core of their business could do a lot worse than to tap into the

[91] Skills Impact (2020); *Australian Agriculture, Horticulture, Conservation and Land Management Industry Sector: Annual Update 2020 - IRC Skills Forecast and Proposed Schedule of Work*

[92] ABARES (2021); *Snapshot of Australian Agriculture 2021*; Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra. CC BY 4.0.

[93] J. Azarias, R. Nettle & J. Williams (2020); *National Agricultural Workforce Strategy: Learning to excel*; National Agricultural Labour Advisory Committee; Canberra, December; p.15.

[94] B. Binks, N. Stenekes, H. Kruger & R. Kancans (2018); *Snapshot of Australia's agricultural workforce;* ABARES Insights, issue 3, Canberra.

[95] J. Azarias, R. Nettle & J. Williams (2020); *National Agricultural Workforce Strategy: Learning to excel*; National Agricultural Labour Advisory Committee; Canberra, December; p.115.

successes achieved by women in AgriFood.'
Source: J. Azarias, R. Nettle & J. Williams (2020); National Agricultural Workforce Strategy: Learning to excel; National Agricultural Labour Advisory Committee; Canberra, December; pp. xxi-xxii.

Such contributions are already being evidenced across Australia, which suggests growing inclusiveness; for example:

- The first female President of the National Farmers' Federation (NFF), Fiona Simson, is promoting female participation across many events and programs.
- Women now make up 50% of the NFF Board.
- In 2020, the Victorian Farmers' Federation appointed President, Emma Germano, and Vice President, Danyel Cucinotta, marking the first time the two most senior offices were held by women.
- COVID-19 restrictions have increased the prevalence of working from home arrangements, enabling more flexibility and opportunities for women in 'white-collar' agriculture roles[96].
- To mark International Women's Day 2021, applications opened for the NFF's fourth annual Diversity in Agriculture Leadership Program, a mentoring opportunity for women who aspire to take a leading role in shaping the future of agriculture and regional Australia[97].
- Emma Ayliffe was named the 2021 Young Farmer of the Year. As a successful farm business owner, Emma advocates for future generations to consider a career in agriculture[98].
- The AgriFutures Rural Women's Award is a leading award for empowering and celebrating the inclusive and active leadership of women involved in Australia's rural and emerging industries, businesses and communities. Winners have emerged from diverse industries, including agriculture, forestry, seafood and wine production[99].
- There are a number of active national and state-based women's networks across the Agribusiness, Food and Fibre Industries, including:
    - Women in Seafood Australasia
    - Women in Forests and Timber Network
    - Australian Women in Agriculture

The breadth and availability of Agribusiness, Food and Fibre jobs

The many and varied roles in contemporary Agribusiness, Food and Fibre

The sophistication of contemporary Agribusiness, Food and Fibre Industries mean that Australia needs the contributions of many skilled occupations such as:

[96] ABC News (2021); *Call for action to raise gender diversity in agriculture to 50 per cent*; https://www.abc.net.au/news/rural/2021-09-14/diversity-in-agriculture-needs-improving/100457778; viewed 27/09/2021.
[97] National Farmers' Federation (2021); *Applications open for Diversity in Agriculture Leadership Program*; https://nff.org.au/media-release/applications-open-for-diversity-in-agriculture-leadership-program/; viewed 27/09/2021.
[98] The Farmer (2021); *Emma Ayliffe named 2021 Young Farmer of the Year*; https://thefarmermagazine.com.au/emma-ayliffe-named-2021-young-farmer-of-the-year/; viewed 27/09/2021.
[99] AgriFutures Australia (2022); *Rural Women's Award*; https://www.agrifutures.com.au/people-leadership/rural-womens-award/; viewed 15/03/2022.

• Agricultural consultants, engineers, scientists and technicians • Agronomists • Animal attendants, trainers and therapists • Apiarists • Aquaculture farmers and workers • Arborists • Bakers and baking factory workers • Butchers and smallgoods makers • Carpenters and joiners • Chemical plant operators • Chemical production machine operators • Crop, dairy cattle and livestock farmers • Deck hands • Dog handlers and trainers • Dog and horse racing officials • Environmental scientists • Farm managers • Farriers • Fisheries officers • Food and drink factory workers	• Food technologists • Food trades workers • Foresters • Gardeners and garden labourers • Grain mill workers • Greenkeepers • Horse breeders and trainers • Horticultural nursery assistants • Inspectors and regulatory officers • Jockeys • Lab animal technicians • Landscape gardeners • Life science technicians • Logging assistants and logging plant operators • Meat boner and slicers • Meat inspectors • Meat process workers • Mobile plant operators • Nurserypersons • Paper and pulp mill workers • Paper products machine operators • Park rangers • Pastrycooks • Pest controllers	• Poultry farm workers • Pet groomers • Product graders • Production managers (Manufacturing) • Retail managers (General) • Retail supervisors • Sales assistants (General) • Sales representatives (Building and plumbing supplies) • Saw technicians Sawmill and timber yard workers • Sawmilling operators • Science technicians • Seafood process workers • Shearers • Slaughterers • Stablehands • Stock and station agents • Technicians and trades workers • Veterinary nurses • Winery cellar hands • Wood and wood products factory workers • Wood machinists • Wool classers and handlers

These occupations further support, and are supported by, a myriad of others including statisticians, administrators and freight workers across the value chain. Agriculture, forestry and fishing employs the second highest number of people in manager positions of all Australian industries (11%)[100]. Such positions are in diverse sectors, requiring a multitude of transferable skills.

Promoting the NFF's AgDay 2021 campaign, CEO Tony Mahar highlighted how contemporary Australian agriculture requires a spectrum of occupations from the traditional, on-farm role to business and technology-focused jobs across the supply chain:

[100] National Skills Commission (2021); *Australian Jobs 2021*; p.25

There is a job for everyone in agriculture – whether it's riding the boundary fences of a Top End cattle station or breeding the next breakthrough wheat variety in an inner-city laboratory […] The quintessential farm jobs that have in many ways defined agriculture are still there and new entrants are desperately needed. Jobs like shearers, roustabouts, station hands, header operators and stock truck drivers. And there are many other jobs, lots of which can be city- or country-based, that aren't on-farm but which are vital in the farm supply chain. Careers in fields as diverse as finance, digital technology, science, marketing, trade and policy development. No matter what your interest, where you live (or want to live) there are rewarding, fulfilling, and diverse jobs.
Source: National Farmers' Federation (2021); AgDay 2021 challenges Australians to choose an #AgVenture; https://nff.org.au/media-release/agday-2021-challenges-australians-to-choose-an-agventure/; viewed 06/08/2021.

Review of occupations in the ANZSCO

Agribusiness, Food and Fibre Industries have been providing constructive feedback on the Australian and New Zealand Standard Classification of Occupations (ANZSCO) for some time. The classifications were based on the 2001 labour market and over the years, many of its classifications became outdated due to new, emerging and augmented occupations[101]. Following formal public consultation, the Australian Government Department of Agriculture, Water and the Environment, in partnership with the Australian Bureau of Statistics, released an update to the ANZSCO in November 2021. The update covered occupations spanning industries including agriculture, horticulture, animal care and management, racing and breeding, aquaculture, forestry and wood processing.

The ANZSCO update is intended to benefit industries by improving the data that informs government decision-making. This includes various services and programs for workforce planning, identifying skills shortages, allocating VET funding and designating skilled migration occupations. The update has been met with positive feedback from industry[102] as demonstrated by the following quotes:

- Australian Dairy Farmers CEO David Inall:

  'Dairy is a skilled industry and we welcome recognition of modern dairy farm roles. Taking into account the hierarchy of skill levels in dairy farm occupations will enable better recognition of a wide range of dairy occupations and assist in training and recruitment.'

- Australian Pork Limited Chief Executive Officer Margo Andrae:

  'We know the diversity of employment opportunities for skilled and semi-skilled workers in the industry. But communicating this to people who are hesitant about relocating to rural and regional areas, and gaining access to skilled migrant workers, is a challenge.

  This update ensures ANZSCO is fit for purpose and accurately reflects the pork industry and the increasingly technical and integrated nature of the pork supply chain.

  This will help us work with government to better describe our industry and its people and build greater capability as a result.'

- Australian Fresh Produce Alliance Chief Executive Officer Michael Rogers:

  'Industry growth is creating a big increase in middle management roles in horticulture, which had not been appropriately reflected in ANZSCO classifications. These supervisory roles are vital to ongoing industry growth, and we welcome their inclusion within ANZSCO, which will assist with support for and attraction of talented workers to these key roles.'

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[101] Australian Bureau of Statistics (2021); *Updating the Australian and New Zealand Standard Classification of Occupations*; https://www.abs.gov.au/articles/updating-australian-and-new-zealand-standard-classification-occupations; viewed 31/01/2022.
[102] The Hon David Littleproud MP (2021); *ANZSCO update to Agricultural occupation groups*; https://minister.awe.gov.au/littleproud/media-releases/anzsco-update; viewed 31/01/2022.

Better reflection of the breadth of careers and skills will benefit government and industry programs that aim to reframe misconceptions about industry jobs being unskilled and, ultimately, help attract new workers. It will also help industries address critical shortages that have inadvertently been sustained through occupations being mis-classified in the ANZSCO (see **Case Study: ANZSCO and Track Riders in the Racing Industry**).

Case Study: ANZSCO and Track Riders in the Racing Industry

The racing and breeding industry has strenuously been advocating for track riders to be reclassified to help address shortages in key states. Track riders provide crucial services by preparing racehorses for races under the instruction of horses' trainers. The racing industry has faced persistent challenges in attracting enough trackwork riders because of the physical nature of the work, high risk in exercising horses (especially in fast-work riding), timing of shifts (mostly in the early morning) and often casual and part-time contracts[103].

To address shortages, the industry previously relied on experienced, but unqualified, track riders on visas such as the Temporary Work Skilled Visa (Subclass 457). Government policy was later amended so that international workers were required to undertake training however, industry stakeholders noted several barriers, including training being at too high an AQF level, Recognition of Prior Learning not being offered, and few RTOs delivering the *RGR Training Package*, especially in regional areas with thin markets and limited trainers.

While this situation was challenging, pandemic-related international border restrictions nullified the supply of workers and worsened shortages of track riders.

The ANZSCO update of track rider has changed it from being a sub-category of 'stablehand' under the 'livestock farm workers' grouping to being defined in its own right, alongside 'horse trainer', under the 'animal attendants and trainers' grouping. This has been welcomed by industry as the classification now reflects a key skilled job role that has been experiencing job shortages which will potentially unlock opportunities for funding and worker attraction programs not previously available.

Shortage of skilled workers

The Agribusiness, Food and Fibre Industries continue to be constrained by widespread labour shortages, jeopardising the short- and long-term viability of many businesses (see **Appendix: Skills Priority List Occupations**). The NFF has emphasised the critical importance of industry participants, whose skills, knowledge and expertise are essential to the growth of the Agribusiness, Food and Fibre Industries[104]. However, the shortage of skilled workers endangers Australian agriculture's ambitious target of exceeding $100 billion in farm gate output by 2030, as well as the productivity of each of the Agribusiness, Food and Fibre Industries that are value chain partners.

Labour shortages mean businesses' produce goes uncultivated and unpicked, or their services go unfulfilled, which lowers industry-wide productivity and on-going business viability. COVID-19-related restrictions and border closures have exacerbated the level and impact of labour shortages which are particularly acute in horticulture. As businesses struggle to maintain operations it becomes increasingly challenging to establish solutions for meeting the needs both of the employer and employee in fostering productive and enduring workplace arrangements.

[103] FutureNow (2022); *Industry Snapshot: Racing, Equine and Farriery*
[104] National Farmers' Federation (2022); *Pre-Budget Submission 2022-23*; p.22

Case Study: Meat Industry Labour Shortages

The Australian Meat Industry Council (AMIC) conducted a survey of stakeholders in February 2022 to establish the extent of industry labour shortages and reasons for them. Results included:

- Current operating capacity of businesses:
    - Two-thirds of meat/smallgoods processors are operating below 80% capacity
        - Around one-quarter of meat/smallgoods processors are only operating at 50-60% capacity
    - Almost half of retail butchers are operating below 80% capacity
- Current gap in skilled workers:
    - For meat/smallgoods processors to operate at full capacity, businesses would require an average of 26 additional skilled workers
    - For retail butchers to operate at full capacity, businesses would require an average of four additional qualified retail butchers
- Labour shortage reasons:
    - A general unwillingness to work in the industry
        - Meat/smallgoods processors: 85%
        - Retail butchers: 81%
    - Other business and employment opportunities locally are more appealing
        - Meat/smallgoods processors: 63%
        - Retail butchers: 33%
    - A lack of international worker availability
        - Meat/smallgoods processors: 80%
        - Retail butchers: 11%
    - Failure to pass pre-employment medical requirements
        - Meat/smallgoods processors: 20%
        - Retail butchers: 5%
    - Low unemployment in the region
        - Meat/smallgoods processors: 27%
        - Retail butchers: 2%

AMIC is calling for urgent action by federal and state governments to protect vulnerable food supply chains across Australia, as COVID-19 continues to force essential workers to stay home and businesses to temporarily close or operate at very low staffing levels[105].

[105] AMIC (2022); *Domestic meat shortages loom as processors face COVID- induced labour shortage*; https://amic.org.au/domestic-meat-shortages-loom-as-processors-face-covid-induced-labour-shortage/; viewed 17/03/2022.

The steady stream of international backpackers, who undertook three months of Agribusiness, Food and Fibre work in regional Australia, has been curtailed. Backpackers and employers have experienced an uneasy relationship over the years, with accusations concerning working conditions, pay and productivity flowing in multiple directions. As a result, some stakeholders are now attempting to attract young Australian residents to work in regional, rural and remote areas, although with limited reports of success at this early stage (see Regional, Rural & Remote Summary for further details).

Despite the various schemes enacted by industry to attract local workers to careers in Agribusiness, Food and Fibre, there has so far been limited uptake of these careers by domestic workers. Multiple factors explain this, such as the often-isolated locations of regional, rural and remote industries and perceptions of there being few long-term career paths. The NFF state that to attract local workers to regional, rural and remote industries, there must be better incentives. This includes by the Federal Government, who the NFF have called on to incentivise young Australians to enrol in vocational education and training (VET) and regional work simultaneously, notably in agribusiness, food, fibre, tourism and hospitality sectors. This would align two key policy requirements, namely providing workers with the needed skills and experience and growing the labour pool of willing workers in regional Australia.

Workforce management and planning strategies

Strategies for attracting industry employees

A major and on-going challenge caused by the COVID-19 pandemic has been the reduced availability of overseas workers taking up casual and contract positions. The *National Agricultural Workforce Strategy* (NAWS) reports that the pandemic has exposed the vulnerability of every stage of the Agribusiness, Food and Fibre value chain (pre-farm, farm, and post-farm) to workforce and skills shortages, both from local and overseas sources. As such, a well-trained workforce, which consistently upskills, is more critical than ever for sustaining and growing operations across the Agribusiness, Food and Fibre Industries.

Multiple approaches have been implemented to attract new employees to careers across the Agribusiness, Food and Fibre Industries, including targeted advertising to school leavers, VET and university graduates and other job seekers, as well as facilitated work placements and other pathways into these industries[106]. Existing approaches have been designed for:

- challenging widely held community misconceptions and so the poor image of working in the Agribusiness, Food and Fibre Industries
- showcasing jobs and careers with a modern image
- brokering employment experiences for young people to enter the Agribusiness, Food and Fibre Industries
- making general information available on the location, timing and labour requirements for Agribusiness, Food and Fibre roles
- providing targeted industry entry pathways (training, experience, mentoring and ongoing positions/education).

Industries have established specific programs to attract workers such as:

- BackTrack: agricultural skills training for at-risk rural young people
- Thoroughbred Industry Careers: training and mentoring for young Australians through two innovative programs, the Accelerator Program and the Explorer Cadetship

[106] J. Azarias, R. Nettle & J. Williams (2020); *National Agricultural Workforce Strategy: Learning to excel*; National Agricultural Labour Advisory Committee, Canberra, December; pp.165-169

- Hay Inc. Rural Education Program: hands-on training and bush skills to help young people on to a career pathway
- Cows Create Careers – Farm Module: a Dairy Australia program designed to promote dairy industry careers and industry education to school students
- Work Experience Pathway Project: a pilot run by Centrefarm Aboriginal Horticulture Limited, which provides a unique training and commercial facility that aims to establish a pathway for Alekarenge community members to gain employment on the nearby Desert Springs Farm and ALEDA's proposed horticultural developments on the Warrabri and Ilyarne Aboriginal Land Trusts
- Cotton Gap program: a Cotton Australia program to attract new industry entrants to an on-farm gap year.

With the development of Industry Clusters as part of the Australian Skills system, industry stakeholders are beginning to consider attraction methods based on workplace-based experience and training opportunities for transferable skills that may be applied across multiple industries, including those outside of Agribusiness, Food and Fibre. While the Agribusiness, Food and Fibre industries wish to attract new entrants into specific occupations, there have been difficulties attracting initial interest, which may be overcome by providing work experience. For example, prospective learners looking for an advantage in seeking careers requiring digital capabilities may choose to gain initial experience in regional, rural and remote -based industries, where there are likely to be greater levels of opportunity. These experiences may serve to then attract and retain future workers.

There remains a challenge in attracting new entrants to regional, rural and remote industries because of trend of younger people staying at home or with family for longer periods, which has only increased during the COVID-19 pandemic. It may be unrealistic to expect that there will be many young people aged 15-17 who are willing to spend extended periods away from their families in regional, rural and remote locations for entry-level work opportunities.

Strategies for retaining and developing employees

Various approaches have been developed for retaining and progressing the capabilities of the workforce, which include:

- understanding the reasons for the high turnover of employees
- identifying factors that improve employee retention, including workplace diversity and safety
- assisting business owners to become better people managers
- offering employees the opportunity to develop their skills
- providing career advice and support
- acknowledging and empowering women in rural communities and business roles
- fostering Aboriginal and Torres Strait Islander participation and leadership.[107]

Industries have established specific programs to retain and develop workers, for example:

- SeSAFE: an initiative to raise awareness and improve safety performance in the fishing and aquaculture industry across Australia
- Junior Indigenous Marine and Environmental Cadets Program: provides pathways for young Indigenous people in regional Australia to train and receive formal qualifications in both the marine

[107] J. Azarias, R. Nettle & J. Williams (2020); *National Agricultural Workforce Strategy: Learning to excel*; National Agricultural Labour Advisory Committee; Canberra, December.

and environmental industries

- CBH Group pilot program: an agribusiness program that promotes training and career pathways for women and harvest casuals.

The National Agricultural Workforce Strategy (NAWS) and the trained workforce

The NAWS[108] provides a comprehensive overview of, and recommendations for, strategies to attract, retain and develop the workforce, now and into the future. The NAWS stresses that 'agriculture' must be understood as more than just the farm. It describes the interdependencies and cooperation required across the value chain stages,

Within each stage of the value chain, the current and future workforce will have to adapt to myriad challenges: changing global markets; increasing international competition; technological disruption (robotics, automation); transformation of industry structures; climate change; water scarcity; increasing threats from pests and diseases; and changing consumer demands (including ethically produced products with provenance and traceability monitoring).

The NAWS is clear in its judgement that industries' success in navigating these challenges will be the *outcome* of having a skilled workforce, not the other way around. Those trained to develop the required technical skills and knowledge will be most adaptable, and hence in demand, across occupations and industries because of possessing the cross-sectoral capabilities that help raise the productivity, sustainability and profitability of industries. The NAWS emphasises that continuous learning should be promoted by all leaders across the Agribusiness, Food and Fibre spectrum.

In developing a roadmap for success, the NAWS cites examples from other countries that show both learners and industry benefitting from greater investment in enabling provisions for education and careers. Research indicates that investing in peoples' capabilities development facilitates the greater attraction and retention of workers and so helps to address shortages and high attrition rates. Comparable challenges have been faced by all developed countries, e.g. Canada, UK, New Zealand and Netherlands, and positive outcomes in these countries have been reported following funded projects to develop curriculum and instructional materials, support teacher training, and bring together training providers and businesses. The NAWS recommends that Australian industry businesses similarly pivot away from simply filling labour gaps towards creating better learning resources, jobs and career paths.

To ensure that training is offered where and when it is needed, the NAWS highlights that it should be demand-driven and designed with extensive industry consultation. Industries must contribute by better articulating 'the demand for education and training and do so with greater clarity.' As the nature of work in the primary industries changes, with new technologies and roles being introduced, 'industry leadership is required to guide education and training development in emerging and new areas that span sectors and states such as digital agriculture and ethical supply chain auditing'.

The NAWS warns, however, that:

> 'It is the Committee's view that the current mechanisms by which the sector can demonstrate leadership in education and training are insufficient to influence education and training provision at the depth, scale and rate required to meet future agricultural workforce needs. In addition, there is not enough incentive for education and training providers to respond to industry needs in a timely and meaningful way. Further, decades of underinvestment by the sector itself and government to leverage education and training outcomes for the sector have undermined performance.'
> *J. Azarias, R. Nettle & J. Williams (2020); National Agricultural Workforce Strategy: Learning to excel; National Agricultural Labour Advisory Committee; Canberra, December; p.133*

[108] J. Azarias, R. Nettle & J. Williams (2020); *National Agricultural Workforce Strategy: Learning to excel*; National Agricultural Labour Advisory Committee; Canberra, December.

Efforts by the Australian Government, industry and the VET system have already started addressing these concerns[109]. Through the Heads of Agreement for Skills Reform, all governments have committed to VET system reform to improve quality and relevance as part of a series of high-level reform priorities. These include:

Table 3: Proposed VET Reform Industry Cluster functions

Function	Key objective	Related activities
Workforce planning	To understand and address workforce challenges	• Examining current, emerging and future workforce challenges • Identifying strategies to address workforce and skills needs • Prioritising a forward plan for training product development • Drawing on and informing labour market analysis and other evidence developed by the National Skills Commission
Training product development	To develop training products that meet evolving industry needs	• Developing training products that comply with the Training Package Organising Framework and Standards for VET Accredited Courses • Testing new approaches to skills and workforce development
Implementation, promotion and monitoring	To drive improvements in the development and delivery of training and assessment	• Building engagement in the national training system • Collaborating with employers and education and training providers • Identifying and promoting relevant career pathways, working with the National Careers Institute • Supporting end-to-end development and delivery of training
Industry stewardship	To provide a strong, strategic industry voice	• Providing intelligence on industry workforce issues • Establishing feedback loops across the training system • Providing strategic advice to Ministers on workforce and skills needs, policies and standards, and system improvements • Working with other Industry Clusters

Source: Transition Advisory Group (2021); Final Advice – New Industry Engagement Arrangements; p.6

To support, inform and collaborate on this important work, the National Skills Commission (NSC) was established in 2020 and immediately commenced projects to improve labour market intelligence, industry employment data and identify demand for capabilities development. The NSC is working with policymakers, influencers, educators and VET students to prepare Australians for current and future workforce opportunities and is partnering with the National Careers Institute to provide people with complementary access to accurate careers information and support.

[109] Department of Agriculture, Water and the Environment (2021); *Australian Government roadmap to attract, retain, upskill and modernise the agricultural workforce*; p.6

2021-22 Budget measures for attracting workers to the Agribusiness, Food and Fibre industries

The Federal Government's 2021-22 Budget assigns around $30 million to assist the agricultural sector in securing, skilling and building its workforce[110].

To attract workers to agriculture, $25.2 million is to be provided over four years for AgATTRACT. AgATTRACT aims to shift perceptions of work in the Agribusiness, Food and Fibre industries and showcase the diverse career opportunities on offer. AgATTRACT provides:

- $5.1 million in administered funding for AgCAREERSTART pilot: a structured and supported gap year in agriculture for school leavers
- $7.3 million in administered funding for AgUP pilot: a grants program to support industry-led projects that create opportunities for upskilling and career progression
- $1.3 million in administered funding for research on community views and worker experiences of the agriculture sector
- $1.5 million for ABARES to improve agriculture labour forecasting
- $4.2 million for the Australian Bureau of Statistics (ABS) to update agriculture occupations in the Australian and New Zealand Standard Classification of Occupations (ANZSCO) and to get a better picture of agriculture workers
- $2.7 million for the National Careers Institute to ensure career information reflects modern agriculture occupations with the development of an up-to-date map of careers and pathways.

To help employers, $4.6 million is to be provided over four years for AgFAIR, which will help agricultural employers to adopt best-practice workforce management and planning practices and attract and retain employees. AgFAIR provides:

- $3.2 in administered funding million to support the roll out and fast-track the uptake of the Fair Farms program
- Just under $1 million to procure practical resources to support agriculture employers to implement modern workforce management and planning practices.

To respond to disruptions caused by COVID-19, including the loss of overseas workers (who previously filled up to 50% of casual and contract labour positions), the Government is:

- Investing $15.4 million in AgMove, which provides up to $6,000 to help people take up short-term job opportunities in agriculture.
- Making temporary changes to the Youth Allowance (student) and ABSTUDY independence eligibility criteria to encourage take-up of agriculture work.
- Resuming Pacific labour mobility programs from September 2020. These build on a trial to support the mango industry in the Northern Territory. These programs are demand driven and rely on quarantine capacity that is managed by state and territory governments.
- Making temporary visa changes so workers already in Australia can stay longer and relaxing visa conditions to enable more visa holders to work in agriculture.
- An Australian Agriculture Visa Program was announced in August 2021. This visa is intended to build on the existing Seasonal Worker Programme and Pacific Labour Scheme, but also respond to workforce shortages in agriculture and other primary industry sectors, as well as recent changes to the Working Holiday Maker program developed as part of the UK-Australia Free Trade

[110] Australian Government; *Agricultural Workforce*; https://www.awe.gov.au/agriculture-land/farm-food-drought/agricultural-workforce; viewed 29/10/2021.

Agreement.

- National Agriculture Workers Code to help agriculture workers move across state and territory borders.
- JobMaker Hiring Credit for employers that hire eligible young people.

In their pre-budget submission, the NFF welcomed these Federal Government efforts to address labour and skills shortages[111]. However, they urge further funding to be allocated to ensure that the efforts of the Federal Government have a tangible impact on the widespread labour shortages. Their proposed solutions (recommendations 36-39) include:

- $30 million seed funding to introduce a centrally managed Seasonal Worker Fund to cover upfront costs which discourage uptake.
- $30 million over four years to provide a holistic Vocational Educational and Training (VET) package of programs and incentives to attract students into agricultural vocations and develop an integrated curriculum for agriculture as a career choice.
- $12 million over four years to establish regional workforce counselling services to support farms with migration and local workforce solutions, training options and incentives.
- $4.8 million over four years to re-establish the Education and Training Advisors network for the rural sector.

Training Summary

VET training products

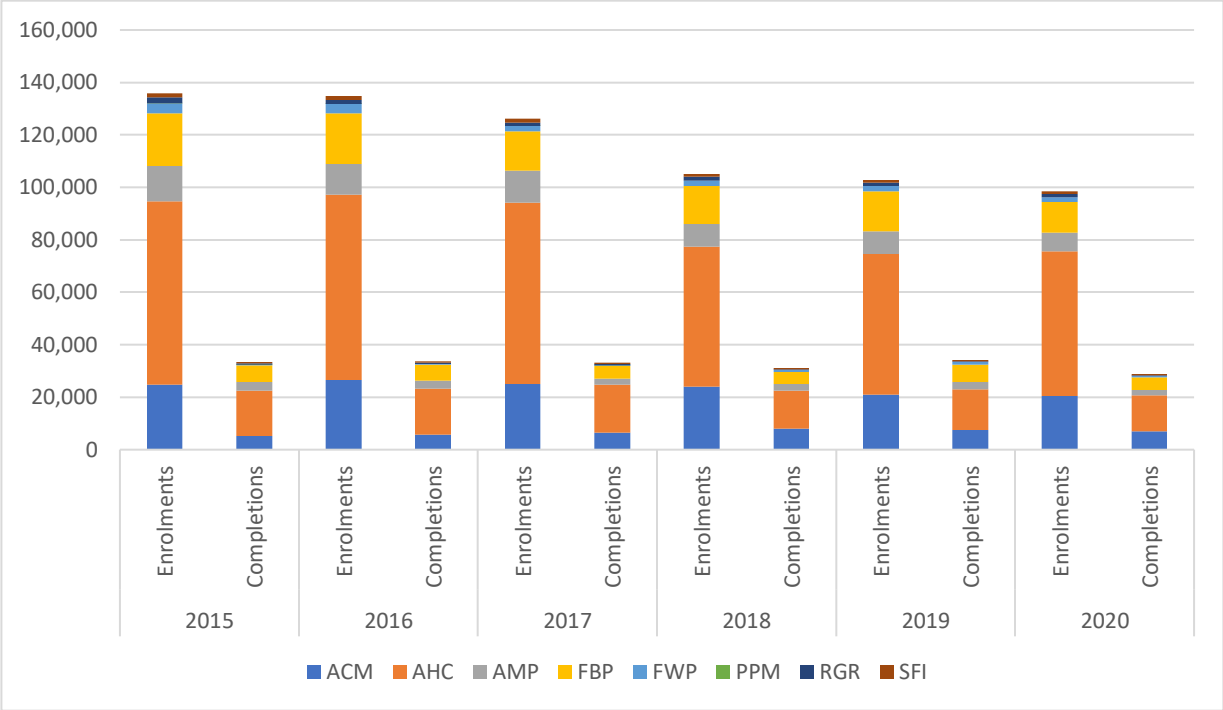
Agribusiness, Food and Fibre Qualifications

In 2020, there were 98,382 enrolments in Agribusiness, Food and Fibre-related training package qualifications. The overall downward yearly trend closely mirrors the trend for qualification enrolments across all of VET, indicating that enrolment trends for *all* training packages are influenced by similar factors besides industry demand, not least funding availability.

There were 28,731 relevant qualification completions in 2020. This also reflects the general yearly trend across VET but is notable given that a large proportion of products from these training packages require face-to-face learning, including with live plants and animals, which has been more difficult to arrange during the pandemic.

[111] National Farmers' Federation (2022); *Pre-Budget Submission 2022-23*; p.23

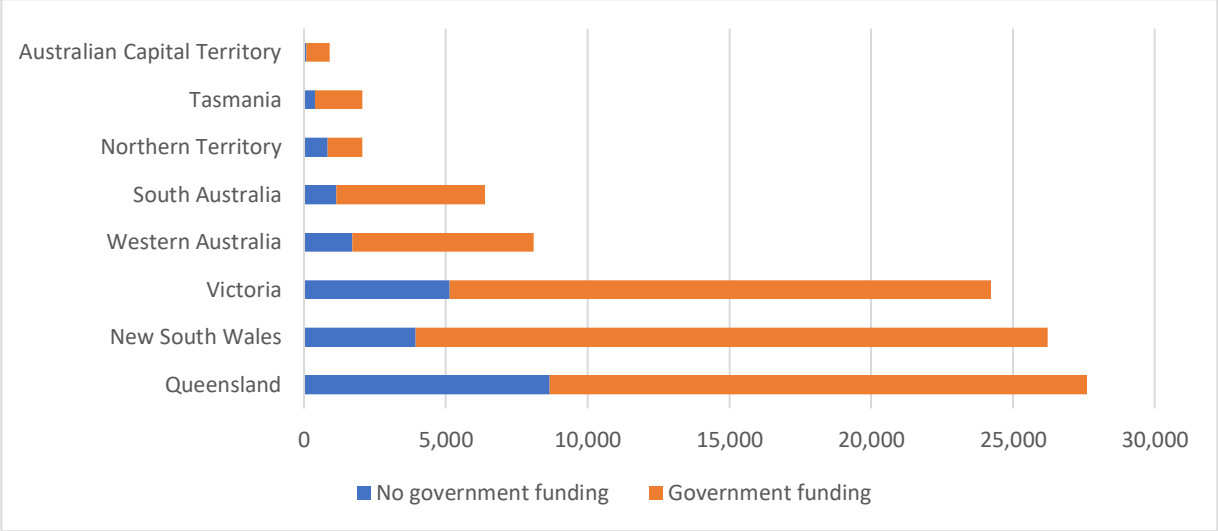
Figure 14: Cluster Training Package Qualification Enrolments and Completions by Year



Source: NCVER VOCSTATS, TVA program enrolments 2015-2020

The greatest number of qualification enrolments in 2020 were in Queensland, followed by New South Wales and Victoria.

Figure 15: Cluster Training Package Qualification Enrolments by State and Funding Source (2020)



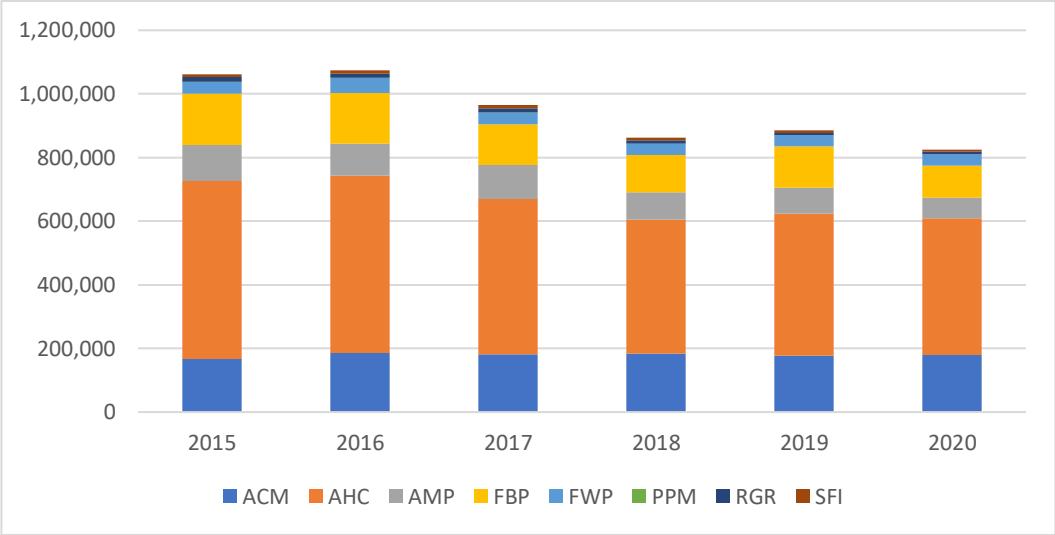
Source: NCVER VOCSTATS, TVA program enrolments 2015-2020

Apprenticeship and traineeship opportunities in the Australian Agribusiness, Food and Fibre Industries are growing. According to the latest statistics released by the National Centre for Vocational Education Research (NCVER), apprenticeship and traineeship commencements across Agribusiness, Food and Fibre qualifications have increased nationally to 3,255 (or by 65%) in the June quarter of 2021 compared to the same period in 2020. The rise in the June quarter continues the trend from the March quarter 2021, which showed an increase of 40% compared with the March quarter in 2020. Since the start of 2020, 22,630 learners have commenced apprenticeships or traineeships in the Australian Agribusiness, Food and Fibre Industries (up to the June quarter 2021). In the June quarter 2021, there were also 1,200 completions, up 19.4% compared with the June quarter in 2020.

Agribusiness, Food and Fibre Units of Competency

In 2020, there were 825,795 enrolments in Agribusiness, Food and Fibre units of competency (hereafter 'units'). This includes enrolments through qualifications (in any training package), apprenticeships and non-apprenticeships, skill sets and micro-credentials. The yearly trend is similar to the one shown for all unit enrolments.

Figure 16: Cluster Training Package Unit Enrolments by Year



Source: NCVER VOCSTATS, TVA subject enrolments 2015-2020

Training package units across the Agribusiness, Food and Fibre cluster are developed with multiple industries, and delivered by the training providers servicing those multiple industries, because of their capacity to be contextualised. Such transferability ensures the training system supports individuals to move easily between related occupations and sectors. Table 4, below, demonstrates the number of times units from this cluster's training packages are imported into training packages also in this cluster, as well as training packages outside of this cluster.

Table 4: Agribusiness, Food and Fibre Industry Cluster Unit Importation

Cluster training package unit	Instances of unit importation into training package qualifications from	
	this Industry Cluster	outside this Industry Cluster
ACM	87	129
AHC	207	545
AMP	5	196
FBP	214	346
FWP	56	376
PPM	0	332
RGR	20	164
SFI	7	183

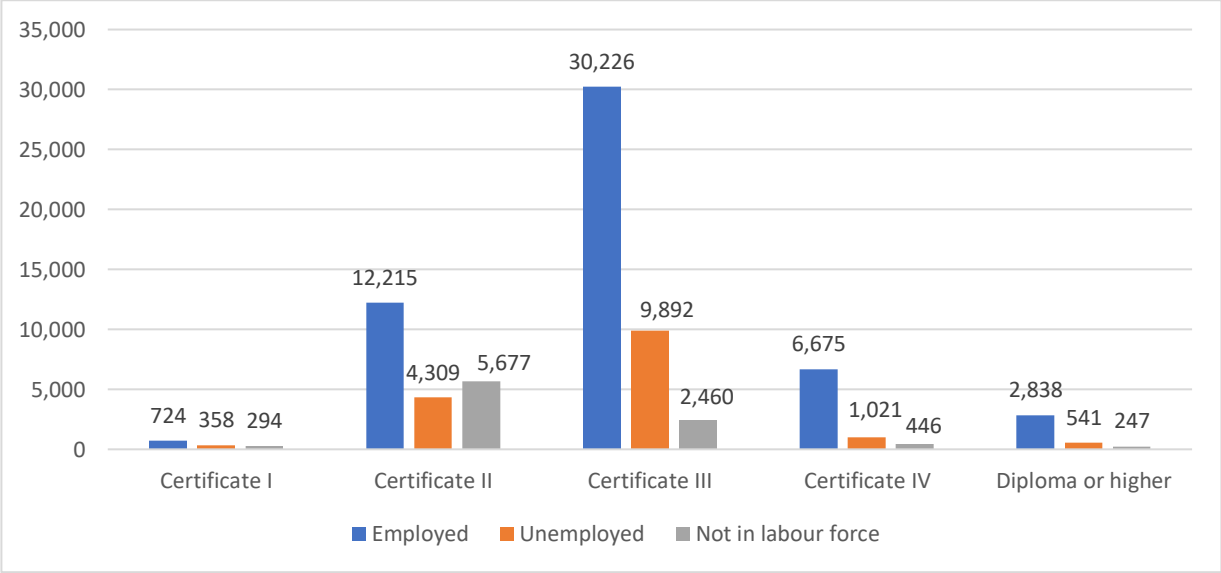
Source: training.gov.au

Such is the transferability of units in the *FWP Training Package*, for example, that there were more enrolments in FWP units under AHC qualifications (5,347) than in FWP qualifications (4,600) in 2020. This highlights the interdependence of sectors across the Agribusiness, Food and Fibre Industries.

Learners: motivations for undertaking training and outcomes

The greatest proportion of learners who enrolled in Agribusiness, Food and Fibre qualifications in 2020 did so at Certificate III-level and were already employed.

Figure 17: Employment status of Industry Cluster Qualification Enrolees (2020)

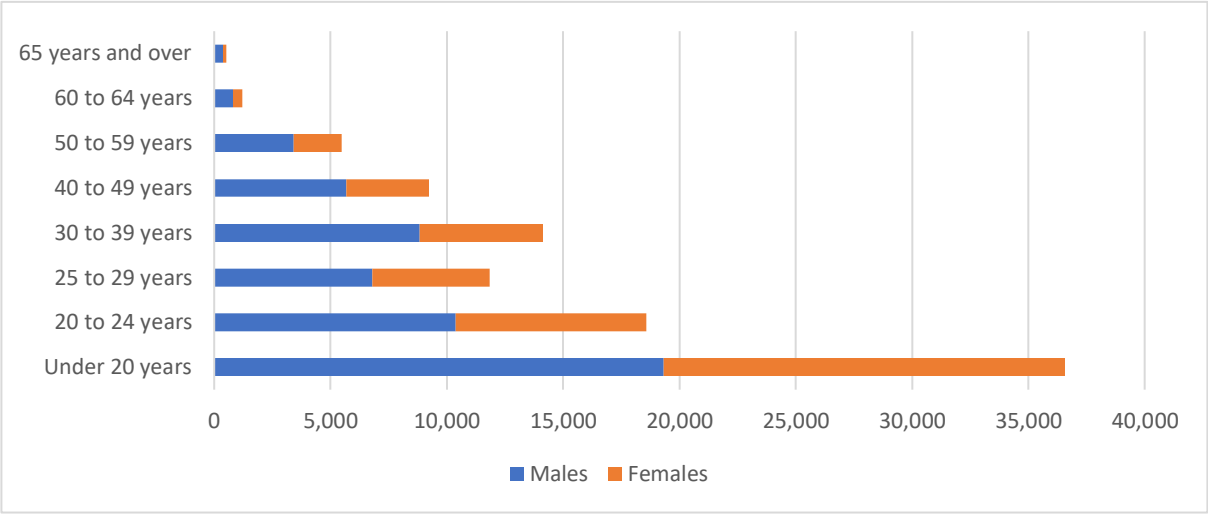


Source: NCVER VOCSTATS; TVA program enrolments

Given that the greatest proportion of learners in 2020 were under 25 years old (see Figure 18), training was mostly undertaken by new entrants to an industry and existing members of an industry workforce in the

early stages of a career.

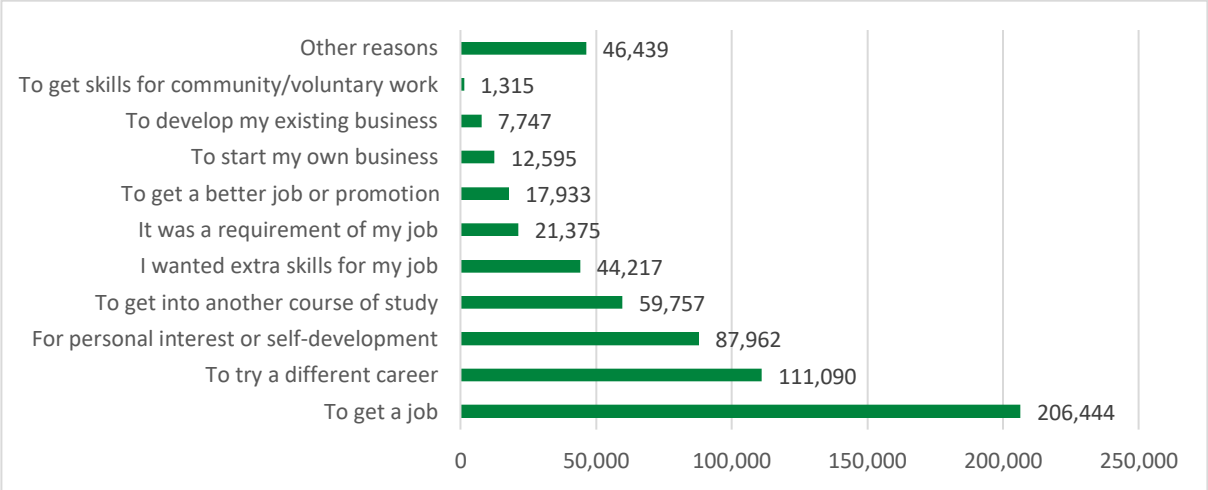
Figure 18: Cluster Training Package Qualification Enrolments by Age Group and Gender



Source: NCVER VOCSTATS; program enrolments

At a unit level, the study reasons of enrolees strongly suggest that despite many being employed, many were not intending for their training to help them progress within their current job, but rather a new one (whether their first, or in a different occupation or industry: see Figure 19).

Figure 19: Study Reason of Industry Cluster unit Enrolees (2020)



Source: NCVER VOCSTATS; TVA subject enrolments

Around three-quarters of qualification completers and two-thirds of part-completers were employed after training, but only around one-quarter were immediately employed in the occupation for which their training was intended (see Table 5). However, many of those not employed immediately in an intended occupation following training either enrolled in further study or at least found the training to be relevant and beneficial to their current job.

Table 5: VET Student Outcomes 2021 – Average of Industry Cluster Training Packages

VET student outcomes 2021	Qualification completers	Qualification part-completers
Employed after training	76.5%	67.6%
Employed in different occupation to training course and training is relevant	28.6%	20.2%
Employed in same occupation as training course	25.1%	21.2%
Employed or in further study after training	85.1%	74.3%
Enrolled in further study after training	32.2%	22.1%
Enrolled in further study at a higher level after training	21.5%	12.2%
Improved employment status after training	65.6%	50.8%
Satisfied with the training overall	88.9%	79.7%
Achieved main reason for doing the training	85.2%	82.0%
Main reason for undertaking training: employment-related	77.2%	73.4%
Main reason for undertaking training: further study	9.4%	8.5%
Main reason for undertaking training: personal development	13.4%	19.3%
Of those employed after training: found the training relevant to their current job	70.0%	53.6%
Of those employed after training: received at least one job-related benefit	79.7%	66.1%
Of those employed before training: better job after training	39.6%	32.8%
Of those employed before training: employed at a higher skill level after training	13.5%	11.1%
Of those employed in the same job as before training: improved skills	53.2%	37.5%
Of those not employed before training: employed after training	57.8%	36.8%
Training shifted to online learning due to the COVID-19 pandemic	38.3%	41.7%
Undertook a work placement (not part of an apprenticeship or traineeship)	46.0%	40.5%

Source: NCVER (2021); VET Student Outcomes DataBuilder

With 88.9% of completers and 79.7% of part-completers satisfied with their training overall, combined with 85.2% of completers and 82.0% of part-completers achieving their main reason for doing the training – despite relatively low levels of employment in the same occupation as the training course – there is clearly a need for future research to establish clearer links between learners' motivations for undertaking training and the outcomes that they report.

According to the Transition Advisory Group, which provided guidance for the implementation of proposed VET reforms, an Industry Cluster under a new approach to industry engagement would be empowered to 'build capability to use both nationally available data and evidence alongside local intelligence to monitor training outcomes and impacts'[112]. There is also a recognition that training products could be promoted more effectively and so delivered to a broader cohort than mainly new entrants and early career employees.

[112] Transition Advisory Group (2021); *Final Advice – New Industry Engagement Arrangements*; Australian Government Department of Education, Skills and Employment; p.5.

This will be enabled through Industry Clusters having a strong role engaging with industry to create 'buy-in' from employers, who will be encouraged to use the training system to develop people across all levels of experience, skills and knowledge.

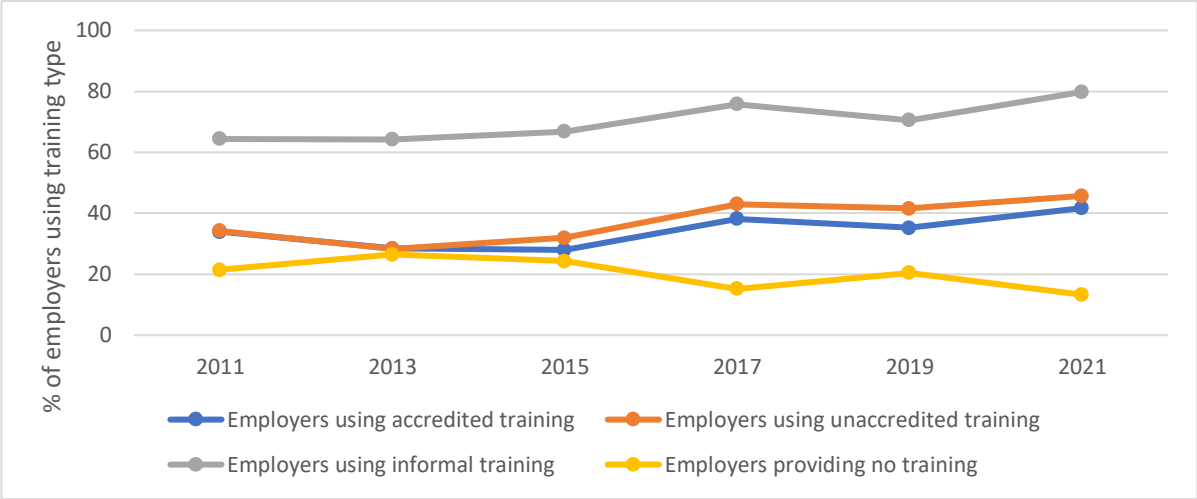
Employers' use and views of VET and other forms of training

Many employers adopt a mixed model of training

According to research, the exclusive and 'conventional' use of nationally recognised training by agriculture, forestry and fishing employers is relatively rare[113]. While some employers exclusively use nationally recognised training, the majority of employers adopt a mixed model, using nationally recognised (qualifications, skill sets, accredited courses) *and* non-nationally recognised (unaccredited and informal) training[114].

Multiple approaches to capabilities development are evidenced in NCVER's *Employers' use and views of the VET system 2021* data. Figure 20 shows that almost 80% of employers use some form of informal training, 46% of employers use unaccredited training, 42% use accredited training, while 13% do not provide training (engagement with the different forms of training are discussed below). It should be noted that 23% of agriculture, forestry and fishing employers include vocational qualifications as a job requirement (up almost 8% from 2019), thus many businesses are looking for job-ready graduates who require only informal training as part of their induction.

Figure 20: Type of Training used by Agriculture, Forestry and Fishing Employers



Source: NCVER (2021); Employers' use and views of the VET system 2021: data tables; NCVER, Adelaide.

The different types of training engaged by employers is not always a straightforward choice: it is impacted by access to training, as well as by businesses' needs, motivations, capacity, opportunities, barriers and

[113] K. Bowman & V.J. Callan (2021); *Engaging more employers in nationally recognised training to develop their workforce - employer interviews - support document 3*; NCVER, Adelaide; p.10.

[114] *Accredited/nationally recognised training/formal learning* refers to learners who are enrolled in a training program under a qualification, skill set, unit of competency or accredited course, which can lead to a formal qualification or award. *Unaccredited training/non-accredited training/non-formal learning* refers to a program of structured training or instruction that does not lead to the attainment of a formal qualification or award (e.g. short courses or product-, industry- or business-specific training). *Informal training/informal learning* refers to unstructured training that usually occurs on the job through interactions with co-workers as part of day-to-day work (e.g. on-the-job coaching, mentoring or casual internet-based research). See: I. White, N. De Silva & T. Rittie (2018); *Unaccredited training: why employers use it and does it meet their needs?*; NCVER, Adelaide.

other such variables. Some large employers with human resources and industrial relations capacity are able to establish regular training programs, whereas others, often small businesses can only provide training on an ad hoc basis. Options for training may be determined by local availability, training provider reputation, and management's knowledge of and experience with different options for training.

Research also suggests that employers tend to be less concerned about who provides training (and whether it is through VET) than on the perceived relevance and convenience of the training in meeting their needs[115]. Unaccredited or informal training is sometimes used to complement and enhance employees' VET learning[116], as is documented in the red meat industry[117]. NCVER discusses a large grain producer, which is agile in responding to the particular skills needs of its staff and then establishes appropriate training for different employment levels (manager, supervisor, irrigation controller, maintenance controller). An example is provided to illustrate the training approach taken by a large, vertically integrated business, which breeds, feeds and slaughters cattle, then packs and markets the meat for distribution and retail.

> 'They use a wide variety of nationally recognised training to ensure that they 'are on par with industry standards and using best practice'. They use apprenticeships and traineeships, industry accredited short courses, and standard generic industry courses. They also make use of non-nationally recognised online modules in their internal learning management system, accessing multiple topics including leadership, communication, safety, emotional intelligence, and Microsoft suites.'
>
> *K. Bowman & V.J. Callan (2021); Engaging more employers in nationally recognised training to develop their workforce - employer interviews - support document 3; NCVER, Adelaide; p.11*

Licensing and regulatory requirements are a primary driver of at least some engagement with the VET sector. To complement such accredited training, many large businesses also retain in-house trainers and assessors who deliver internal programs, which may be designed with reference to VET training packages and align with Australian Qualifications Framework (AQF) guidelines.

Businesses operating within niche industries report specific challenges in establishing formal training with the depth that they require. A honey producer in NCVER's research, for example, discussed that the delivery of the *Certificate III in Beekeeping* by an RTO merely *reinforces* the informal, specifically tailored training that is provided on the job. The latter is considered an essential aspect of capabilities development, while the qualification is perceived as being too general to be relied upon without supplementary learning.

COVID-19 has also influenced employers' adoption of a mixed model of training. Many businesses have had to redesign their training programs, particularly where previously there were arrangements for training providers to enter the workplace for training and assessment. For example, meat processing businesses without embedded trainers, have been forced to discontinue regular face-to-face training and find alternative options that are compatible with both strict food safety regulations and COVID-19-related restrictions. NCVER[118] also describe how a parks and gardens maintenance organisation in need of skilled staff overcame hesitations over using online delivery and began using software platforms to access both nationally recognised and non-nationally recognised training.

In 2021, one-third of agriculture, forestry and fishing employers had new training requirements due to the impacts of COVID-19 pandemic[119]. The trend of employers utilising more than one type of training to meet their business needs appears likely to continue, and even increase, as operational pressures, exacerbated

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[115] I. White, N. De Silva & T. Rittie (2018); *Unaccredited training: why employers use it and does it meet their needs?*; NCVER, Adelaide

[116] I. White, N. De Silva & T. Rittie (2018); *Unaccredited training: why employers use it and does it meet their needs?;* NCVER, Adelaide

[117] C. Shah (2017); *Employers' perspectives on training: three industries*; NCVER, Adelaide.

[118] K. Bowman & V.J. Callan (2021); *Engaging more employers in nationally recognised training to develop their workforce - employer interviews - support document 3*; NCVER, Adelaide; p.12

[119] NCVER (2021); *Employers' use and views of the VET system 2021: data tables*; NCVER, Adelaide.

by the pandemic, compel employers to offer the most convenient and timely training available. Industry feedback also suggests that this trend may be accelerated by the need to source training related to the introduction of new technology, which will often need to be sourced from the vendors who have the access to the only skilled trainers on their equipment, at least during the initial years of introduction of the product.

NCVER found that the reasons for organisations having new pandemic-induced training requirements were:

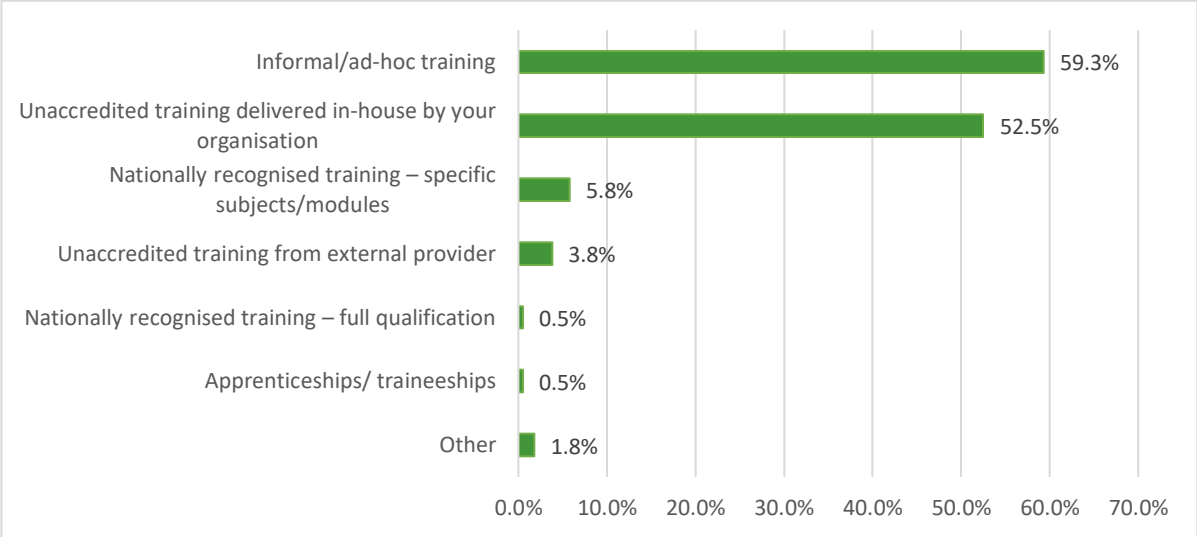
- needed so we could effectively/safely operate in COVID environment: 92% of employers
- needed to train staff to undertake new tasks and/or responsibilities: 26%
- needed to access training to help manage business operations in COVID environment: 15%
- legality/compliance requirements: 11%
- pre-existing skills not readily transferable to new operations/services/products: 1.5%.

The key areas of training these new training requirements covered were:

- infection control skills training: 77%
- sales and customer service training: 17%
- induction training: 17%
- personal development and leadership training: 1%
- computing skills and data literacy training: 5%
- health and safety training: 62%
- diversity and inclusion training: 1%
- legality/ compliance requirements: 3%
- other: 3%.

The majority of this training was delivered informally or through unaccredited training in-house (see Figure 21).

Figure 21: Types of Training used to cover new skills requirements related to COVID-19



Source: NCVER (2021); Employers' use and views of the VET system 2021: data tables; NCVER, Adelaide.

Employers' reasons for choosing a particular type of training (during the pandemic) included:

- immediate need to respond to the rapidly changing training needs: 53%
- satisfied with this type of training in the past: 29%
- availability: 24%
- responsiveness/promptness of training provider to request for training: 20%
- good value for money: 17%
- not sure if nationally recognised training was necessary: 16%
- required by government, industry, head office or clients: 14%
- other: 13%.

It should be noted that during the high points of the pandemic, access to formal VET training was often limited by the closure or suspension of operations of RTOs, or by decisions to limit offerings to minimise operational and/or financial risk.

Moving into the future, 89% of employers expect that their training priorities for the next 12 months will be the same as in the last 12 months. Most (70%) employers also expect that the *amount* of training their organisation will provide in the next 12 months will stay the same, while 26% anticipate an increase.

Employers' use of nationally recognised training

Products from various training packages are sought out by employers for specific reasons, including for licensing and regulation, safety requirements, machinery operation, business operations and mental health training. The 'legitimacy' of a nationally recognised qualification is not necessarily a motivating factor, though some industry employers value being involved in the development of training package products and the career pathways that formal participation can unlock[120].

In 2021, 42% of agriculture, forestry and fishing employers used accredited training to meet their skills needs (up 7% from 2019). By different methods of engagement:

- 23% of employers had jobs that require vocational qualifications (up 8% from 2019)
- 13% had apprentices and trainees (similar to 2019)
    - Of these, 49% had increased the number of apprentices and trainees they employed in the last 12 months, whereas 15% had decreased the number they employed.
    - Of the employers who changed the number of apprentices and trainees they employed in the last 12 months, 17% stated it was due to the impact of the COVID-19 pandemic.
- 27% arranged or provided their employees with other nationally recognised training (up 5% from 2019)
    - Of these, 24% had increased the number of employees undertaking nationally recognised training in the last 12 months, whereas 5% had decreased the number of employees trained.
    - Of the employers who changed the number of employees undertaking nationally recognised training in the last 12 months, 21% stated it was due to the impact of the

[120] K. Bowman & V.J. Callan (2021); *Engaging more employers in nationally recognised training to develop their workforce - employer interviews - support document 3*; NCVER, Adelaide.

COVID-19 pandemic.

Of agriculture, forestry and fishing employers using nationally recognised training in 2021, there was an even split between those using full qualifications (50.2%) and those using specific subjects or modules (49.8%)[121].

Despite less than half of employers using accredited training to meet their needs, there is strong evidence that exposure to quality VET-related outcomes is an indicator of employers valuing the system and regarding it as a yardstick. In 2021, the proportion of agriculture, forestry and fishing employers satisfied that training met their skill needs was:

- 74% for employers with vocational qualifications as a job requirement
- 77% for training provided to apprentices and trainees
- 69% for other nationally recognised training.

This suggests that where employers appreciate the development of employees, and benefit from increased workplace efficiency and productivity, they will continue to engage with the VET system. Exposure to such positive outcomes is contingent upon not only having engaged with formal training in the first place but also various other factors, such as the relevance of training to the workplace and relationship with the training provider.

Barriers to employers using nationally recognised training

NCVER's data on employer's views of the VET system cites the principal reasons for dissatisfaction with nationally recognised training (whether it is graduates recently hired or current learners, including apprentices and trainees) as:

- not enough focus on practical skills
- poor access to training in regional/rural areas
- relevant skills are not taught
- training is of a poor quality or low standard.

Other issues include:

- employers question the work-readiness of 'competent' students
- training packages perceived as unresponsive to industry needs
- difficulties for RTOs attracting and retaining qualified trainer and assessors with dual VET/industry experience.

One of the trends in VET is an increasing level of institutional delivery and less workplace delivery. In previous periods of widespread skills shortage, there has often been an uptake in VET training by employers because of the need for new and less-experienced staff to gain skills quickly, which could be done in the workplace with minimal disruption to productivity. According to Wendy Cato, Managing director, RPLAssist, there may be an emerging difference this time: it is possible in the current skills shortage that employers may be less likely to engage in VET because the disruption caused by institutional delivery has greater impacts on productivity, at a time when productivity is vital to business viability.

If employers have low expectations of VET satisfying their organisational objectives, the value of, and

[121] NCVER (2021); *Employers' use and views of the VET system 2021: data tables*; NCVER, Adelaide.

engagement with, formal training diminishes. The Transition Advisory Group for VET reform acknowledge such challenges and recommends 'an end-to-end system approach that reduces the disconnect between training product development and longer-term workforce development, and consequent delivery 'on the ground'.' For this to occur, there needs to be a nuanced understanding of the experiences and contexts that explain the areas of dissatisfaction listed above.

The following sub-sections address notable prevailing challenges and elaborate on the parallel difficulties employers and RTOs face in engaging with one another, as summarised in **Table 6** below.

Table 6: Industry & RTOs: Corresponding Challenges for Formal Training

Industry Perspective: Barriers to Uptake	RTO Perspective: Barriers to Delivery
Industry demand for trained and qualified workers	
Lack of capacity/willingness to finance and engage with formal training	Difficulties in basing RTO business strategy on low-volume training package products
Difficulties identifying a workforce need and linking it with a training solution	Difficulties in forward planning and responding quickly to industry demand signals
Lack of HR management in industry businesses to drive RTO partnerships	Limited business development opportunities
Limited options for enrolling in short courses with 'just in time' delivery	Limited government funding for skill sets/micro-credentials
Preference for informal/non-accredited learning	Competition with informal/non-accredited options
Practical participation/delivery barriers	
Training not delivered where it is required	Difficulties offering training in regional, rural and remote areas/thin markets with dispersed clients
Difficulties releasing staff for dedicated training time, especially during skills shortages	Flexible delivery stretches resources and creates inefficiencies
Difficulties offering employees workplace-based learning experiences	Difficulties developing 'work-ready' graduates
Quality of available training	
Qualification learning and assessment content and materials considered outdated/too general	Prohibitive cost of researching, developing and updating learning and assessment materials
Concerns over responsiveness of training solutions and flexibility of delivery methods	Onerous compliance requirements and concerns over risk
Trainers and assessors felt to lack industry currency	Lack of available qualified/experienced trainers and assessors with industry expertise

Source: Skills Impact/ForestWorks research 2019

Industry culture and educational backgrounds

Employers in Agribusiness, Food and Fibre Industries report that a formal training culture is as yet unrealised. Owner-operators in 'agriculture, fisheries and forestry' have a low level of formal educational attainment compared with most industries (many 'inherited' their career and knowledge from family members), while higher skilled agricultural employees have the lowest educational attainment relative to higher skilled counterparts in *all* industries[122]. The low value assigned to educational attainment by employers appears to be self-perpetuating, with many businesses having 'their own ways of doing things', which creates significant behavioural and social barriers to investing in skills and workforce development[123]. For example, NCVER[124] found that only 39% of 'Agriculture, forestry and fishing' employers talk to anyone external to their business about their skill needs. Of these, only 20% approach RTOs about meeting their requirements (compared, for example, with 58% who speak with 'Other contacts in the industry, friends/family' and 33% who contact a 'Professional or Industry Association').

Some business owners may be reluctant to engage with formal educational because they lack confidence that their knowledge and processes will align with training packages. This can reflect inexperience with formal education and a corresponding fear of being 'exposed'[125]. Similarly, some employers feel that their employees are incompatible with VET because of generally low levels of language, literacy and numeracy (LLN) skills[126]. The Rural Jobs and Skills Alliance (RJSA)[127] report that LLN skills in agriculture are declining, and that there are few, if any, support mechanisms for improving these prior to training commencement. Further, VET can be especially challenging for the relatively high proportion of people working across the Agribusiness, Food and Fibre Industries who are from non-English speaking backgrounds, who may need greater LLN support as part of any training[128], which can be challenging for RTOs to provide[129].

Business structures and seasonal workforce requirements

Various practical barriers to employers engaging with VET concern the structure and timing of business operations. The NFF describe that:

> 'The vast majority of farms are micro businesses, employing at most one or two casual staff on a permanent basis. Most farmers, who manage the business in addition to undertaking the farming activities, have neither the time nor the resources to develop a human resources and industrial relations capacity to the level of sophistication and professionalism necessary to adequately address [labour shortages and skills gaps].'[130]

Small and family businesses, which are prevalent in regional economies, are often unaccustomed to investing in training and workforce development because their informal structures do not include the 'middle managers' and human resource experts who would prioritise long-term learning strategies as a way of translating human capital into an advantage for the business[131].

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[122] Department of Agriculture, Water and the Environment (2020); *National Agricultural Workforce Strategy literature review;* Canberra, February; p.15

[123] Parliament of Victoria (2012); *Inquiry into agricultural education and training in Victoria*; p.41

[124] NCVER (2019); *Australian vocational education and training statistics: Employers' use and views of the VET system 2019*; NCVER, Adelaide

[125] K. Bowman & V.J. Callan (2021); *Engaging more employers in nationally recognised training to develop their workforce - employer interviews - support document 3*; NCVER, Adelaide; p.13

[126] A. Smith, G. Burke, M. Long & T. Dumbrell (2008); *Approaches to measuring and understanding employer training expenditure*; NCVER, Adelaide.

[127] Rural Jobs and Skills Alliance (2020); *Submission to the National Agriculture Workforce Strategy*; p.25

[128] Parliament of Victoria (2012); *Inquiry into agricultural education and training in Victoria*; p.120

[129] Commonwealth of Australia (2019); *National Regional, Rural and Remote Tertiary Education Strategy*; p.27

[130] National Farmers' Federation (2022); *Pre-Budget Submission 2022-23*; pp.37-38

[131] Acil Allen Consulting (2014); *Impact Analysis of The Workforce Development Activities of Industry Skills Councils – And Lessons For The Future*; Report To The Industry Skills Councils, Canberra; p.2

Having informal business structures entails employers who may not hire staff under the clear job roles for which there is articulated training. The Dairy Industry People Development Council, for example, describe how even medium-sized family farms will only have three or four staff, meaning that employees will undertake general and ad hoc tasks, 'and so it is difficult to have structured roles with opportunities for ongoing formal training and work progression within the business'[132].

Furthermore, the seasonal nature of regional, rural and remote industries constrains formal training provision. During peak seasons, when businesses experience elevated pressure to maximise productivity, employers will often hire a predominance of casual and contract labour who are not expected to stay beyond that season. With these arrangements, employers have little incentive to invest in workers' capabilities development and are often reluctant to allow even new or inexperienced staff time away from their usual work to train when the business does not anticipate long-term benefits[133].

Difficulties establishing and clarifying VET information

Research suggests that employers who are unfamiliar with VET, but are hoping to establish employee training programs, find it difficult to source information about appropriate formal training options[134] and providers (especially as the VET system is now comprised of many small and very small providers[135]). The Rural Jobs and Skills Alliance (RJSA)[136] found that a major barrier to engagement with VET is a 'lack of understanding of what qualifications are there and what they mean, the processes involved, delivery options, or career paths and terminology used'.

Consequently, 'employers and learners generally do not have sufficient information to assess whether there is likely to be a return on investment in training and workforce development activities, or whether the training offered is likely to be of adequate quality or relevance'[137]. Employers also experience difficulties in establishing whether employees are eligible for Recognition of Prior Learning (RPL) to articulate their existing skills and knowledge. There is evidence of RTOs utilising the RPL process inconsistency, frustrating employers such that they disengage from negotiating VET-related activities[138].

Underinvestment in formal training is further sustained through perceptions that it caters only to career establishers, new entrants and younger, less experienced employees; not older, more experienced workers[139]. This suggests low appreciation for the range of VET, including higher AQF-level qualifications and skill sets, that can be used for upskilling.

RTO Delivery Challenges and Thin Markets

There is a relative absence of RTOs delivering quality training across the dispersed regional, rural and remote areas in which the Agribusiness, Food and Fibre Industries operate. These areas are generally low-profit training environments because there is a double burden of high capital investment requirements (i.e. having to access expensive machinery and equipment to deliver the training) and student cohorts being spread over a broad geographic range, leading to low learner-to-trainer ratios in any delivery location. As a result, the cost per learner is generally much higher for the RTO than in a metropolitan area and any extra

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[132] Dairy Industry People Development Council (2011); *Inquiry into Higher Education and Skills Training to Support Future Demand in Agriculture and Agribusiness in Australia*; p.13

[133] S. Yu (2015); *Creating vocational streams: what will it take?;* NCVER, Adelaide.

[134] C. Shah (2017); *Employers' perspectives on training: three industries*; NCVER, Adelaide.

[135] P. Korbel & J. Misko (2016); *VET provider market structures: history, growth and change*; NCVER, Adelaide.

[136] Rural Jobs and Skills Alliance (2020); *Submission to the National Agriculture Workforce Strategy*; p.25

[137] Acil Allen Consulting (2014); *Impact Analysis of The Workforce Development Activities of Industry Skills Councils – And Lessons For The Future*; Report To The Industry Skills Councils, Canberra; p.2

[138] Commonwealth of Australia (2019); *National Regional, Rural and Remote Tertiary Education Strategy*

[139] A. Hall, L. Turner & S. Kilpatrick (2019); Understanding Tasmanian dairy farmer adoption of pasture management practices: a Theory of Planned Behaviour approach; *Animal Production Science*; CSIRO Publishing; https://doi.org/10.1071/AN18321

subsidies (location and equity loadings[140]) paid to the RTO to account for these higher delivery costs are reported by many stakeholders as being insufficient[141]. For many RTOs, continuing to deliver training becomes unviable – especially if there are options for its business strategy to instead concentrate on other, high enrolment, low-cost, training packages.

Compounding these issues, training for these industries is often technical and requires adherence to strict safety regulations, making them challenging to deliver and necessitates that people in trainer and assessor roles are highly proficient; however, RTOs operating in regional, rural and remote areas experience similar skilled worker shortages as in the regional, rural and remote industries (for reasons including uncompetitive salaries[142] and difficulties with access to formally qualifications in Training and Education[143], on top of the usual regional, rural and remote workforce issues)).

Table 7, below, displays some of the primary factors that influence whether an RTO will seek to, or continue to, offer particular training package qualifications and units given their operational realities.

Table 7: Factors in an RTO's Decision to Apply to add or Remove a Training Package Product from their Offerings (scope)

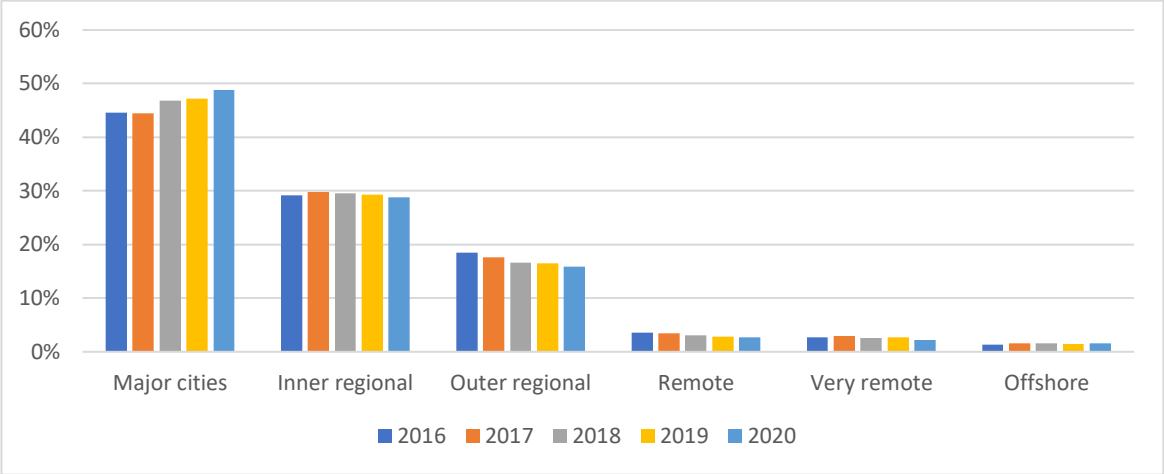
Factor	Proportion of respondents
Availability of prospective students	90%
Availability of skilled and qualified trainers	88%
Availability of equipment, infrastructure, or other resources	87%
WHS or other risks associated with delivery	82%
Cost of course design and\or materials	74%
Access to public funding to support delivery	72%

Source: S. Hodge, D. Cox, and J. Skues (2021); A focus on learning: Balancing outcomes and development in Australian Vocational Education and Training.

The primary result of these issues is that formal training providers are reluctant to fund potentially risky investments by developing training and assessment strategies and materials for these industries. This means fewer RTOs enter the training market to deliver Agribusiness, Food and Fibre training products. The combined effect of RTOs leaving this training market and others choosing not to enter it in the first place is that the overall 'supply' of VET reduces in rural regional and remote areas. Figure 22, below, shows that, each year, enrolments by learners in outer regional, remote and very remote areas are decreasing as a proportion of overall enrolments in Agribusiness, Food and Fibre qualifications.

[140] Productivity Commission (2020); *National Agreement for Skills and Workforce Development Review, Interim Report*; p.143
[141] Skills Impact (2021); *Thin Markets and RTO Delivery Challenges*; https://www.skillsimpact.com.au/vetinsights/thin-markets-and-rto-delivery-challenges/; viewed 11/02/2022
[142] Parliament of Victoria (2012); *Inquiry into agricultural education and training in Victoria*
[143] E. Smith (2019); The Importance of VET Teacher Professionalism: An Australian Case Study; pp. 1627-1646; in S. McGrath et al. (eds.); *Handbook of Vocational Education and Training*; https://doi.org/10.1007/978-3-319-94532-3_23

Figure 22: Proportion of Industry Cluster Qualification Enrolments by Remoteness Area



Source: NCVER VOCSTATS; TVA program enrolments

In the relative absence of formal training delivery, enterprises seek alternative training options for their staff, leading to an overall lowering of 'demand'. With both supply and demand suffering, these VET markets are characterised as 'thin'.

An example of a thinning VET market is typified by the discontinuation of the highly regarded Equine Section at Richmond TAFE from February 2022. Richmond TAFE delivered skills for horsemanship and safety for a vibrant equine industry in Hawkesbury, including a range of major horse breeding operations and horse racing. The courses, including *Certificate II in Racing Industry*, *Certificate III in Racing (Stablehand)*, *Certificate III in Racing (Trackwork Rider)* and *Certificate III in Performance Horse*, qualified people for occupations with skills shortages, including track riders. The decision to cease operations came amidst financial pressures to focus on high-volume training activities over those for niche industries, even in the context that the Equine Section offered learner outcomes, with a steady stream of skilled workers developed for the internationally renowned Godolphin stables[144].

Unaccredited and informal training

There are various reasons why employers use unaccredited and informal training. Research[145] indicates that many businesses are more comfortable and satisfied with non-formal arrangements, citing flexible structures, shorter durations and learning based only on relevant equipment and workplace practices. It may also reflect the type of education favoured by workplace employees, who often prefer 'informal interaction amongst themselves or with the speakers rather than the formal knowledge transfer'[146]. In this light, employers have consistently rated satisfaction with unaccredited training higher than with nationally recognised training and apprenticeships and traineeships delivered through the VET system[147].

Of agriculture, forestry and fishing employers using unaccredited training, NCVER found that 14% actively

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[144] Hawkesbury Post (2022); *Equine courses axed at Richmond TAFE, leaving horse industry, students, and teachers stunned*; https://www.hawkesburypost.com.au/post/equine-courses-axed-at-richmond-tafe-leaving-the-horse-industry-students-and-teachers-stunned; viewed 11/02/2022.

[145] G. Mawer & E. Jackson (2005); *Training of existing workers: issues, incentives and models*, NCVER, Adelaide.

[146] D.Wright, A. Grand, B. MacLeod & L.K. Abbott (2018); Training as Part of the Capacity-Building Ladder in Australian Agriculture; *Int. J. Agr. Ext.* (2018). 83-97; p.93

[147] I. White, N. De Silva & T. Rittie (2018); *Unaccredited training: why employers use it and does it meet their needs?*; NCVER, Adelaide; p.12

chose this training option over comparable nationally recognised training, 61% did not find comparable nationally recognised training, and 25% did not investigate the availability of nationally recognised training[148]. Employers with a *preference* for unaccredited and informal training over nationally recognised training cited the principal reasons as:

- approach that was tailored to our needs: 38%
- more cost effective: 34%
- convenient or flexible times: 28%.

For some, especially large, businesses, a desire for self-sufficiency drives their choices, and may lead to tailoring resources and training to their own in-house needs (as has been discussed of the pulp and paper industry[149]). Time and resource-limited smaller businesses, on the other hand, report being more constrained in their decision-making and have to engage with whichever option is most convenient and cost-effective.

Some employers actively choose non-formal training because of dissatisfaction with VET experiences, information availability or speed to market. In the case of an NCVER research participant:

> 'The slow pace of training package approval around digital skills and artificial intelligence currently was being managed by instead accessing non-nationally recognised and vendor training, using skilled and experienced industry experts who design and deliver tailored training to best match employer training needs.'
> *K. Bowman & V.J. Callan (2021); Engaging more employers in nationally recognised training to develop their workforce - employer interviews - support document 3; NCVER, Adelaide; p.14.*

As this excerpt attests, many employers across Agribusiness, Food and Fibre perceive that the most effective training is provided by industry experts outside of the VET system, who work closely with that business to impact immediate results.

Unaccredited training case study: extension programs

When the availability or value of VET is not apparent to regional industries, they often 'become adept at managing their skills development needs through a variety of strategies that do not necessarily use what local TAFE institutes are offering'[150]. It is important here to consider specific industry, geographical and socio-economic contexts surrounding employers' uptake of non-VET training services. Informal and unaccredited training has traditionally played a prominent role in disseminating the latest developments in research, technology and practices to help drive productivity in the agriculture, fisheries and forestry sectors[151].

This 'extension', which continues to compete with VET, involves 'the use of communication and adult education processes to help people and communities identify potential improvements to their practices and then provides them with the skills and resources to effect these improvements'[152].

In the 1940s, the then-Department of Agriculture separated extension programs from formal training, only maintaining control of the extension training market. In the late 1980s, however, the government began charging fees for extension services and gradually reduced what was on offer. Now, the market is

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[148] NCVER (2021); *Employers' use and views of the VET system 2021: data tables*; NCVER, Adelaide.
[149] Skills Impact (2018); *IRC Skills Forecast and Proposed Schedule of Work, 2019–2022: Pulp and Paper Manufacturing Industry Sector*
[150] S. Gelade & T. Fox (2008); *Reality check - Matching training to the needs of regional Australia*; NCVER; p.8
[151] Department of Agriculture, Water and the Environment (2020); *National Agricultural Workforce Strategy literature review*
[152] The Australasia Pacific Extension Network, in S. Kilpatrick & P. Millar (2006); Extension and the VET sector: Time for closer alignment?; *International Journal of Training Research* 4 (2): 1-21, DOI: 10.5172/ijtr.4.2.1; p.3

comprised of numerous services, outlined in Table 8, that are offered by a range of providers, including the Commonwealth's Rural Research and Development Corporations (RRDCs), state and territory government primary industry agencies, the private sector, the not-for-profit sector, industry bodies, education and training providers, farming systems groups and farmer networks[153].

Table 8: Models, Methods and Media Used for Extension in Australia

Extension model	Methods and media
Technology transfer or information access	Events such as field days to demonstrate new farming technology Meetings to present information to the farming community Print media, including rural newspapers, magazines, newsletters, books and leaflets Radio, television and videos Computer applications Information centres World Wide Web
Programmed learning model	Training programs/workshops Groups of landholders, community members, etc, to increase understanding or skills in defined areas
One-to-one advice or information exchange	Farm management consultancy Diagnostic services Rural financial counselling Informal information exchange between farmers
One-to-one technical advisory services	Formal or structured education and training University courses TAFE courses Training modules in Property Management Planning programs Other structured learning programs such as PROGRAZE One-off events based on adult learning principles
Group empowerment	Landcare groups Catchment groups Community development workshops

Source: S. Kilpatrick & P. Millar (2006); Extension and the VET sector: Time for closer alignment?; International Journal of Training Research 4 (2): 1-21; p.4

There is extensive evidence of regional businesses using a variety of informal and unaccredited training to increase their capabilities and capacity, including through grower groups or activities such as field days[154]. Research has found that 61% of Tasmanian dairy farmers engage with extension programs to enhance their sustainability and profitability[155].

In selecting training options, regional businesses focus on what most suits the learning preferences of participating employees. Many of the workers in Agribusiness, Food and Fibre are characterised as social learners, who prefer interacting informally with peers and using a 'hands on' approach[156]. Employers choose extension activities because information about them is disseminated throughout their networks, entailing a pre-existing sense of belonging amongst the learner cohort, and 'safe spaces' in which to learn (including informal, on-farm settings). Grower groups, for example, constitute 'communities of practice', wherein like-minded people problem-solve shared challenges, with learning that they can take back to their farm or workplace.

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[153] Parliament of Victoria (2012); *Inquiry into agricultural education and training in Victoria*; p.217

[154] Commonwealth of Australia (2019); *National Regional, Rural and Remote Tertiary Education Strategy*; p.27

[154] D.Wright, A. Grand, B. MacLeod & L.K. Abbott (2018); Training as Part of the Capacity-Building Ladder in Australian Agriculture; *Int. J. Agr. Ext.* (2018): 83-97

[155] A. Hall, L. Turner & S. Kilpatrick (2019); Using the theory of planned behaviour framework to understand Tasmanian dairy farmer engagement with extension activities to inform future delivery; *The Journal of Agricultural Education and Extension*; DOI: 10.1080/1389224X.2019.1571422; p.3

[156] D.Wright, A. Grand, B. MacLeod & L.K. Abbott (2018); Training as Part of the Capacity-Building Ladder in Australian Agriculture; *Int. J. Agr. Ext.* (2018). 83-97; p.94

Formal workshops have been found to be less relevant to *farmers* but are preferred by consultants and agronomists because they provide interactions with credible specialists[157].

Such findings indicate that demographic characteristics, including job roles and specialisation, influence the type of training that individuals will attend, and are suggestive of the need to both market and promote targeted training to cohorts.

The extension sector is also attractive to producers as it is perceived to be responsive to their immediate and practical needs. This includes applied training facilitated by the supplier, vendor or consultant agribusiness for recently purchased machinery, systems or tools[158]. A participant in research by the Parliament of Victoria clearly illustrates the approach of many employers[159]:

> 'Often the informal stuff is about what they need. It is the new technologies, it is the new plant varieties, it is the new stuff they need to do there and then, or it is the compliance stuff they need to address there and then. Because the VET system takes so long to get that into place, the informal stuff will always win hands down, because it is a *now* situation; they need to do it.'

The immediacy of extension activities is felt to enable swift business and financial outcomes[160].

Future directions: raising engagement through productive partnerships and best practices

Attracting young people to VET training for occupations in Agribusiness, Food and Fibre Industries

Attracting more people, whether school leavers, career changers or upskillers, to enter pathways for industry occupations necessitates a better understanding of the variables that impact on their decision-making.

People who continue their formal learning post-school must choose what, why and where to learn. The most influential factors in shaping these choices161 include:

- location of training: the number and composition of RTOs within travel distance
- job prospects: the opportunities available in local areas
- influences: trusted 'influencers' who impart advice and information (parents, teachers, careers advisers)
- outcomes: the cost of training and potential returns on this investment
- affordability and access: entitlement to government-subsidised training
- quality: the reputation of the training provider.

Industry participants suggest that *where* someone lives is crucial to the options that they can pursue, while *choice* is often constrained given the fixed offerings delivered locally. It also appears that learner decision-making about VET is not always fully informed and independent. Broader social influences are pervasive,

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[157] ibid.

[158] R. Nettle, N. La & E. Smith (2018); *Research Report A: Farmer demand for agricultural extension services*; Prepared for: 'Stimulating private sector extension in Australian agriculture to increase returns from R&D' (May 2018). A project of the Department of Agriculture and Water Resources (SAWR) Rural R&D for profit program, University of Melbourne, Melbourne, Australia.

[159] Parliament of Victoria (2012); *Inquiry into agricultural education and training in Victoria*; p.216

[160] S. Kilpatrick & P. Millar (2006); Extension and the VET sector: Time for closer alignment?; *International Journal of Training Research* 4 (2): 1-21, DOI: 10.5172/ijtr.4.2.1; p.2

[161] J. Brown (2017); *In their words: student choice in training markets – Victorian examples*; NCVER, Adelaide.

including parents, whose negative attitudes about VET can impact on young peoples' choices[162].

Likewise, schools' curricula and career advice services are frequently cited as neglecting to equip students with information about regional industries and rewarding occupational opportunities[163].

While there is growing recognition among governments that practical career guidance can enhance student choices and outcomes generally, there remains a challenge in encouraging young people to engage in capabilities development for industry careers outside of their immediate sphere of influence (whether regional or familial)[164]. It is well documented that there are widespread negative perceptions of careers in industries such as agriculture and forestry, which are construed as 'risky'[165]. Recent disasters, such as drought, flooding and bushfires, have only exacerbated long-held perceptions of regional industries offering manual, physically demanding occupations, with long hours and scarce modern technology, in a workforce that is predominately male and ageing[166]. There is also public scepticism over the Agribusiness, Food and Fibre Industries' record on environmental and animal welfare issues, with 'social licence' an on-going challenge[167]. Research in Western Australia observed that:

> 'The appeal of the sector is low due to a misunderstanding of what a career in agriculture offers. The technological innovation that is taking place within the sector and the new careers that are possible are not being communicated to students. In particular, urban students are unlikely to realise that the majority of roles in the agriculture sector occur after the farm gate.'
> *YouthInsight (2017); Developing student interest in the agriculture sector; Southern Forests SEED Program, Shire of Manjimup*

The Department of Agriculture, Water and the Environment identify that 'Efforts to attempt to change how agricultural occupations are perceived will require a multi-faceted approach that engages both the individual and the broader socio-economic system'[168]. Further, they see value in Pratley's recommendations[169] to strengthen agricultural education and so reframe it as a modern industry with a large array of technical jobs, with extensive career development opportunities and mobility, including for women, young people and career changers[170].

The *National Agricultural Workforce Strategy* (NAWS), Shergold Review and Joyce Review all support strengthening VET in Schools arrangements. According to the Shergold Review, improved outcomes from VET in Schools depend on effective collaboration between education authorities and industry bodies and, at a local level, between schools and employers.

A traineeship or apprenticeship scheme is highlighted by the NAWS as a possible solution for improving VET participation and outcomes. It argues that industry must engage strenuously in developing traineeships and apprenticeships to promote employment and career opportunities. This is because the combination of formal learning and on-the-job training offered through apprenticeships and traineeships leads to workplace-ready graduates, who experience better employment outcomes.

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[162] J. Gore, H. Ellis, L. Fray, M. Smith, A. Lloyd, C. Berrigan, A. Lyell, N. Weaver & K. Holmes (2017); *Choosing VET: investigating the VET aspirations of school students;* NCVER, Adelaide

[163] Rural Jobs and Skills Alliance (2020); *Submission to the National Agriculture Workforce Strategy*; p.26

[164] H. Bray & B. Cay (2018); *Room to Grow: Challenges for the future of food and fibre education in Australia*; Primary Industries Education Foundation Australia, Canberra.

[165] Dairy Industry People Development Council (2011); *Inquiry into Higher Education and Skills Training to Support Future Demand in Agriculture and Agribusiness in Australia*; p.22

[166] Workplace Gender Equality Agency (2019); *Gender Segregation in Australia's Workforce;* https://www.wgea.gov.au/data/fact-sheets/gender-segregation-in-australias-workforce; accessed 13/08/2020

[167] Parliament of Victoria (2012); *Inquiry into agricultural education and training in Victoria*; p.20

[168] Department of Agriculture, Water and the Environment (2020); *National Agricultural Workforce Strategy literature review;* Canberra, February; p.29

[169] J. Pratley (2013); *Review into agricultural education and training in New South Wales report*; Charles Sturt University, Wagga Wagga.

[170] Various initiatives have already been implemented to promote careers in agriculture, including: AustralianFarmers (2020); *Diversity in Agriculture Leadership Program*; https://farmers.org.au/campaign/diversity-in-agriculture-leadership/; accessed 13/08/2020

Training information and enabling services

There is extensive evidence that formal training and workforce capabilities development raises the productivity and so profitability of individual businesses and the wider industries in which they operate. However, it remains a challenge to effectively communicate that industry stakeholders can be confident in investing in training.

Stakeholders have observed an enigma in which businesses demand workers with the skills best gained through workplace experience but less commonly invest in offering such experience for learners. Adding to this difficulty, RTOs are largely unable to simulate farm, forest, animal care or food processing environments effectively and are highly reluctant to develop training and assessment materials and provisions for workplaces that they may not be able to access.

To address the challenge of attracting skilled labour, the NFF has recommended a nationwide workforce counselling service for businesses who lack the capacity and organisational professionalism to effectively navigate the labour and training market[171]. They envisage a coordinated service provider operating 'on the ground' to explain the plethora of training and employment program options, including local workforce solutions and VET training incentives, to individual businesses based on their needs and ability to facilitate training and associated obligations.

Similarly, the new industry engagement arrangements for Industry Clusters proposed by the Transition Advisory Group[172] point towards potential solutions, including:

- Build buy-in across industry by promoting opportunities for employers and learners.
- Form partnerships with training providers and across the training sector to connect national training products with delivery of training 'on the ground' and longer-term workforce development.
- Develop resources for training providers, trainers, assessors and employers to improve training and assessment practices, including in-workplace assessment.
- Develop learning materials and other resources to support registered training organisations in delivering training to meet workforce and skills needs, particularly within small or 'thin' markets such as regional, rural and remote areas.
- Map learning pathways, encourage work placements and support transition points across the education lifecycle via collaboration with the National Careers Institute, schools and higher education providers.
- Establish mechanisms to monitor employer and learner outcomes from training delivery, including identifying where RTOs are getting good outcomes, to identify opportunities to strengthen the quality of training delivery and pathways.

It should be noted that, to maximise their potential, the new industry engagement arrangements need to be supported by changes to training package policy and process, including qualification reform, to provide innovative opportunities to work across industry sectors with qualifications that work to lift opportunities and productivity levels.

Broader recognition for *all* types of training

As detailed previously, employers are likely to continue engaging with the most cost-effective, convenient and timely options from across accredited and unaccredited training.

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[171] National Farmers' Federation (2022); *Pre-Budget Submission 2022-23*; pp.37-38.

[172] Transition Advisory Group (2021); *Transition Advisory Group Final Advice – New Industry Engagement Arrangements*; Australian Government Department of Education, Skills and Employment; p.6.

Meanwhile, barriers to employers investing in employees' capabilities development have led to growing calls for shorter, sharper and cheaper training[173], which is not a new phenomenon. Publications from the early 2000s report that businesses were seeking shorter-form learning to meet urgent skills needs 'rather than adopting a more planned approach underpinned by training which leads to a qualification'[174]. There is now a renewed demand for training in stand-alone units of competency, micro-credentials and skill sets[175], reflecting employers' desire for lower costs, greater flexibility and 'just in time' incremental upskilling[176], while employees are 'increasingly assembling their own mix of qualifications from a blend of short courses and micro-credentials in a world of more frequent career changes'[177].

The Transition Advisory Group's advice[178] for new industry engagement arrangements recommends a more holistic recognition of the skills and training ecosystem and industry's role within it. There is a:

> '… critical need to broaden the role for industry to move beyond a narrow focus on training package development to add value across the economy and across all education pathways … Plans must be developed to meet workforce and skills needs across industry sectors through different education and training pathways (i.e. nationally recognised training, other forms of training and higher education) and any required training product development.'
> *Transition Advisory Group (2021); Final Advice – New Industry Engagement Arrangements; Australian Government Department of Education, Skills and Employment; pp.2 & 6.*

There is a need for greater recognition of the plethora of training solutions across the Agribusiness, Food and Fibre Industries. VET is not the *only* solution but a critical and valued element of the capabilities development landscape. Learners and employers engage different types and modes of training based upon their needs, preferences and limitations. Industry benefits most when their options are clearer because this engenders greater confidence in decision-making and participation. The *National Agricultural Workforce Strategy* (NAWS) asserts that this should not represent a threat to the VET system because different types of training are appropriate for different situations and that, crucially, considering rapid technological change and the need for management skills, demand for the higher-order capabilities and knowledge training that VET can deliver will only grow[179].

In this context, researchers have argued that a 'closer look at VET providers and the factors that enhance and hinder their ability to match primary producer clients' learning and assessment preferences is warranted'[180]. Various studies further suggest a potential solution to training market inconsistencies through the closer alignment of extension and VET to mutually strengthen each offering.

For example, while catering to the shorter-form learning many prefer, extension training tends not to differentiate sessions according to the existing skills and experience of the learner (with resulting retention issues).

Training packages describe the skills standards relevant to different levels of occupations (and learners are enrolled as appropriate)[181]. There is a greater potential for partnership working by blending the immediacy

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[173] National Skills Commission (2020); *A snapshot in time: The Australian labour market and COVID-19*
[174] G. Cane (2004); *Jumping hurdles: Overcoming the barriers of 'thin markets' and rural locations*; Australian National Training Authority; p.23
[175] PWC (2020); *Where next for skills? How business-led upskilling can reboot Australia*
[176] S. Joyce (2019); *Strengthening Skills: Expert Review of Australia's Vocational Education and Training System*; Commonwealth of Australia, Department of the Prime Minister and Cabinet
[177] Productivity Commission (2020); *National Agreement for Skills and Workforce Development Review, Interim Report*; p.5
[178] Transition Advisory Group (2021); Final Advice – New Industry Engagement Arrangements
[179] Department of Agriculture, Water and the Environment (2020); *National Agricultural Workforce Strategy literature review*; pp. Xi & 46
[180] S. Kilpatrick & P. Millar (2006); Extension and the VET sector: Time for closer alignment?; *International Journal of Training Research* 4 (2): 1-21, DOI: 10.5172/ijtr.4.2.1; p.16
[181] A. Hall, L. Turner & S. Kilpatrick (2018); Using a participatory approach to refining and prioritising recommendations for future extension delivery in the Tasmanian dairy industry; *Rural Extension & Innovation Systems Journal* 2018 14(2): 43-52

of industry expertise imparted through non-formal training with the rigorous framework of VET.

Current Industry Reference Committees (IRCs), believe that this could be achieved by industry stewardship, with leaders working more closely with bodies such as Research and Development Corporations (RDCs), who produce and deliver extension education, to share knowledge. Partnerships in this space could then help accelerate industries' adoption of innovative practices and technologies by co-developing training based on the products of RDCs' work.

Alongside calls for flexible and collaborative approaches to training, there is an urgency for more coherent methods of registering learners' credentials across the various training types. Several contributors to the NAWS, for example, proposed a 'white card' arrangement akin to the one implemented successfully in the construction industry. This would help to ensure that people have a record of their achievements and experiences, and that these are recognised by prospective employers. Such 'career currency' would enhance a worker's evidence of transferable skills, which would then boost an employer's confidence in hiring them for a new occupation or industry and also assist in the identification of any training or skills gaps[182].

The Shergold Review of senior secondary pathways into work, further education and training has recommended that:

> 'In collaboration with industry, and VET and higher education providers, Education Council should codesign a digital Education Passport for lifelong learning – a living document that allows young people to capture progressively their education and training qualifications and workplace experience.'
> *P. Shergold, T. Calma, S. Russo, P. Walton, J. Westacott, D. Zoellner & P. O'Reilly, (2020); Looking to the future: report of the review of senior secondary pathways into work, further education and training, Education Services Australia, Council of the Australian Governments Education Council, Canberra; p.22*

Some industries and sectors have already taken this approach through self-directed initiatives:

- Dairy Australia offers a 'Dairy Passport', an online tool for people in the sector to identify their learning experiences and needs[183]. The tool can help keep track of training undertaken with high schools, extension providers, RTOs, universities, and other providers.
- The forestry industry's FOLS is a national skills verification program that enables workers to record their training and industry currency in an online system, which can be shared with employers[184].

Such initiatives and resources have the potential to be rolled out across related industries, with likely benefits to both workers and employers, especially for identifying training gaps and skills transferability, ensuring professionalism, and enabling WHS risk management during all industry operations.

A broader evidence base to enable decision-making across the skills ecosystem

Some training markets may appear as 'thin', but only when considering RTO enrolment statistics exclusively. In many areas, there may be healthy training markets facilitated by *non*-VET providers (whether utilising training packages or otherwise), although this is far less likely in regional, rural and remote Australia. Ferrier *et al.*[185] conclude that 'the extent of 'thin markets' may be overstated. Considerable training

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[182] J. Azarias, R. Nettle & J. Williams (2020); *National Agricultural Workforce Strategy: Learning to excel*; National Agricultural Labour Advisory Committee; Canberra, December; p.145.
[183] Dairy Australia (2022); *Dairy Passport*; https://thepeopleindairy.org.au/farm-safety/dairy-passport/; viewed 11/02/2022.
[184] ForestWorks (2019); *FOLS Skills Verification Program*; http://www.forestworks.com.au/wp-content/uploads/2019/07/FOLS-brochure.pdf; viewed 15/03/2022.
[185] F. Ferrier, T. Dumbrell & G. Burke (2008); *Vocational education and training providers in competitive training markets*; NCVER, Adelaide; p.37

is sought and delivered in thin markets but goes unrecognised because it is not of the type delivered by the formal VET system'. The Victorian TAFE Association[186], meanwhile, suggest 'It is possible that, under demand-driven training provision, unmet demand for training has largely been absorbed. If this is the case, then it would partly explain declining student numbers in the VET system'. Delays in training package development and complexities in negotiating desired training has led businesses to develop in-house training or turn to services such as extension programs (discussed above). In regions where this *is* the case, thin markets for nationally recognised training might appropriately be reconceptualised as 'the failure of the public VET system to respond to the needs of industries and enterprises'[187], although others may suggest that this comment should be extended to VET providers generally.

Industry stakeholders suggest there is a need to monitor activities across multiple training markets. Continuous monitoring of training supply and demand will assist the prompt detection of, and response to, changing and emerging skills needs, which will help to ensure that publicly funded investments and infrastructure are directed to where they are needed most[188].

The development of such mechanisms has so far been hampered for several reasons, including an inability to quantify the contribution of non-VET training to overall industry capabilities development. There are also competition and commercial-in-confidence considerations affecting the ability to gather the needed data. There is much evidence that these activities *are* occurring (e.g., extension training), but less on the *breadth* of delivery. A question, therefore, remains over the true extent to which industry demand for training – no matter whether it is nationally recognised – is unfulfilled.

Capturing a more accurate picture of industry training would assist practitioners to develop appropriate and targeted solutions, including innovative options for new types of delivery, for example, through VET and non-VET providers fostering explicit, collaborative relationships to cater to industry needs based on demand. Further opportunities could be explored for 'Employers, industry representative bodies and Rural Research and Development Corporations to play a role in aggregating this demand and working with universities and vocational education and training providers to redesign existing courses or establish new courses required by the market'[189]. Additionally, if businesses are serviced by non-VET providers that use training packages as a framework for training materials, it may be appropriate that the value of such products be recognised (qualitatively and quantitatively) in addition to RTO enrolments (which, at present, appear to be the only measure).

Addressing the Standards for Streamlining of VET

During recent work to streamline VET qualifications, it has become clear that some of the Standards will need to be re-considered if this work is to continue. In essence, the standards have been developed considering a standard approach to training product development, however more flexible approaches are needed in many circumstances, including:

- Reviewing units of competency that are imported into multiple qualifications, including those not within the same Training Package as that of the units
- Conducting a unit sector review where the unit sector crosses over multiple qualifications and training packages
- When detailed industry consultation during a project leads to the development of training products and recommendations for inclusion into qualifications which have not been directly reviewed in that

[186] Victorian TAFE Association (2015); *VET Funding – Responding in thin markets*; Submission to the VET Funding Review; p.4
[187] F. Ferrier, T. Dumbrell & G. Burke (2008); *Vocational education and training providers in competitive training markets*; NCVER, Adelaide; p.31
[188] Food, Fibre and Timber Industries Training Council (2015); *Thin Markets: Improving workforce development opportunities in thin markets of the food, fibre and timber industries*; p.7
[189] Department of Agriculture, Water and the Environment (2020); *National Agricultural Workforce Strategy literature review;* Canberra, February; p.xii

specific project

- Where the needs of industry are for upskilling or undertaking more than one specialty stream within a qualification.

These are examples of issues that have arisen over the last three years as priorities have shifted from updating training products to development to meet current and future industry needs, as well as meeting Ministers Priorities and the streamlining and prioritisation approaches guided by the AISC.

Learn from examples of best-practice initiatives in nationally recognised training

Learnings can be taken from existing programs for increasing the uptake of training and facilitating better outcomes for learners and employers alike. Some of these programs and current outcomes are outlined below.

AgSkilled, devised through a partnership between Cotton Australia, the Grains Research and Development Corporation (GRDC) and NSW Government, is an industry-led, demand-driven and collaborative initiative within the VET sector. Its current iteration, AgSkilled 2.0, is a three-year, $15 million program to upskill and better prepare the agricultural workforce for rapid change driven by industry innovation, research and technology. Administered under the NSW Government's Smart and Skilled program, AgSkilled 2.0 provides fee-free part-qualifications training (i.e., short courses that target identified skills gaps), covering several agricultural sectors, namely plant-based fibre (e.g., cotton), grains, production horticulture, viticulture and rice.

AgSkilled is intended to help both with attracting and retaining staff and improving farm productivity. By January 2022, AgSkilled had facilitated 3,372 enrolments across 299 industry courses in 117 locations in regional New South Wales. The most popular course was Drones in Agriculture and overall, there was a 77% completion rate for participants who commenced training. Evaluations of the training by Cotton Australia have shown that AgSkilled courses are supporting practice change. Upskilling of the workforce helps improve the quality, productivity and timeliness of work delivery, such as better crop management to avoid yield loss, especially as regional industries continue to recover from the effects of drought.

The **AgFood Connect Pilot** (a Youth Jobs PaTH Industry Pilot Project) is being promoted as an innovative way of creating employment opportunities in the food and agribusiness industries and associated value chains. Its objectives include creating full-time traineeships and full-time jobs from multiple casual or part-time positions for people aged between 17 and 24 years. The project further aims to support young people in finding apprenticeships, traineeships or full-time, part-time, casual, contract and seasonal work, in addition to creating career pathways across food, agriculture and other industries. It accesses existing group training for apprentice and trainee employment and labour hire structures, while participants are hosted by two or more employers to help them develop and so maximise employment opportunities[190].

The **SuniTAFE SMART Farm**[191] is a state-of-the-art, purpose-built research and training facility in Mildura for utilising the latest digital innovations, such as driverless tractors, drones, data integration and robotics, to transform horticulture training. SuniTAFE invests in training people in SMART farming equipment, technologies and best practice processes in order to prepare a future-ready workforce that is also productive, efficient and sustainable in the present. By providing accessible support, information and training to horticulture workers, new networks are being created that are hoped to encourage the uptake of automation and technology across digital farming jobs.

[190] K. Bowman & V.J. Callan (2021); *Engaging more employers in nationally recognised training to develop their workforce - employer interviews - support document 3*; NCVER, Adelaide; p.16

[191] SuniTAFE (2021); *SuniTAFE SMART Farming - Horticulture Training & Innovation Hub*; https://www.sunitafe.edu.au/smart-farm/; viewed 01/02/2022.

Through the **Arbre Forest Industries Training and Careers Hub**[192], Arbre designs and facilitates forest industry training in partnership with schools and RTOs. The Hub is overseen and managed by a board comprising forest industry leaders, including Sustainable Timber Tasmania and Norske Skog. The Hub promotes industry careers (especially in harvesting, transport and silviculture), acts as a referral agency to industry-endorsed training providers and also facilitates the introduction of job seekers to prospective employers.

Other organisations and governments are starting to pay attention to the successes of programs like AgSkilled and are recommending similar approaches and scoping studies.

In recognition of the contribution of the GRDC to AgSkilled, Wine Australia has highlighted opportunities for leveraging the role of other RDCs to enhance existing programs and encourage new ones[193]. The Victorian State Government has launched a *Future of Agriculture Training Review*, which will examine the key factors required to attract students to agriculture training and to develop courses that meet the needs of employers and learners[194].

Critical success factors for industry-led training

Underpinning each of the strategies in this section are factors that are common across all successful, industry-led initiatives for training and development. The NAWS[195] summarises these as:

- Early and collaborative engagement between training providers and local industry leadership to co-design training that addresses prevalent place-based issues and needs.
- Building upon the success of existing programs and initiatives to maximise the impact of new products.
- Offering programs in regional, rural and remote communities, specifically at times employees and employers can participate (considering, for example, peak harvest periods).
- Recognising that different employees, employers and industries are all at different stages in their workforce journey.
- Effectively engaging with learners to assist decision-making on training and intended career outcomes.
- A strong commitment to education from the farming community, industry bodies, rural research and development corporations (RDCs), other research organisations and local governments.
- Enabling support from state and territory governments and the Australian Government.

Regional, Rural & Remote Summary

Challenges facing regional, rural and remote areas

Primary production is concentrated in Australia's regional, rural and remote areas because producers can access land and water. Regional, rural and remote industries have always been inherently linked to regional, rural and remote towns and communities, with the success of one dependent on the other:

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[192] Arbre (2021); *Arbre Forest Industries Training & Careers Hub*; https://www.arbre.net.au/; viewed 01/02/2022.
[193] J. Azarias, R. Nettle & J. Williams (2020); *National Agricultural Workforce Strategy: Learning to excel*; National Agricultural Labour Advisory Committee; Canberra, December; p.133.
[194] Victorian Government (2021); *The Future of Agriculture Training Review*; Department of Education and Training; https://engage.vic.gov.au/future-agriculture-training-review; viewed 05/10/2021.
[195] J. Azarias, R. Nettle & J. Williams (2020); *National Agricultural Workforce Strategy: Learning to excel*; National Agricultural Labour Advisory Committee; Canberra, December; pp.173-174.

> ‘Many of our regional, rural and remote towns were born as service centres for local farming, fishing and forestry businesses. In turn, the rural sector’s reliance on the regions for labour, inputs, connectivity, transport and infrastructure, to name a few, cannot be understated.’
> *ACIL Allen Consulting (2021); The intersection of agriculture and regional development; AgriFutures: National Rural Issues*

Yet, while these areas offer many natural advantages, regional, rural and remote communities continue to fall behind in substantive social and economic progress compared with cities, where 64% of people in Australia live and, correspondingly, where most jobs are available[196].

There is somewhat of a catch-22 in that, despite various predominately regional, rural and remote industries designated by federal and state governments as ‘essential’, infrastructure development is not prioritised in areas where few people live; correspondingly, not many people would choose to live in areas with minimal infrastructure. The interconnectedness of regional, rural and remote communities and industries is weakening, requiring that many taken-for-granted aspects of the relationship be reassessed to ensure that appropriate policies are implemented for mutual benefits to be realised now and into the future.

Various studies of regional, rural and remote challenges emphasise education opportunities as central to a regionalisation agenda. This is because good schools and other educational services are attractive to families considering moving to regions. They also enable social mobility and develop the skilled workers that industries require. Regional, rural and remote school students, however, have a far greater likelihood of experiencing developmental vulnerability compared to their city counterparts, with young adults in regional Australia twice as likely to leave school before completing secondary education[197]. With regional industries crying out for skilled workers, there is clearly a strong requirement for stimulating spending on improving education retention rates, experiences and outcomes for regional Australia[198].

Alongside urban/rural differentials, there is competition *between* regional, rural and remote areas to invite investment and services and become more attractive locations for industries and workers. AgriFutures describes how the contribution of the agriculture, forestry and fisheries industries to regional development is variable across different parts of the country. An important success driver is a presence of and further opportunities for other industries in the value chain (see, for example, the Darwin seafood processing facility case study below). Around half of value-adding to farmed products occurs regionally; for example, food processors often benefit from being located close to their inputs, especially perishable goods. For other food processors, strategic imperatives dictate that, instead of situating near value chain industries, they locate operations closer to markets, where a substantial or specifically skilled workforce is more accessible. Such variability entails the regions with clusters of value chain industries and jobs are achieving growth while others are declining due to not having similar levels of comparative advantage, investment and infrastructure.

[196] National Farmers’ Federation (2022); *Pre-Budget Submission 2022-23*; p.11
[197] D.K. Houghton (2019); *The Future of Regional Jobs*; Regional Australia Institute.
[198] K. McRobert and T. Fox (2021); *Stronger ag sector, stronger regions*; Australian Farm Institute; p.13

Case study: Darwin Seafood Processing Facility Scoping Study

There is currently limited seafood processing in the Northern Territory (NT), with the majority of NT seafood being sent to southern states for processing. The NT Government engaged KPMG to undertake a scoping study to assess the viability of a Darwin seafood processing facility as a value-adding proposition. KPMG's final report[199] advises that:

- A processing facility presents an opportunity to build a resilient and vibrant industry and promote consistency and quality of product, greater exports, industry co-operation, branding co-development, and research and development.
- Low production volumes necessitate a development approach focussed on high value and quality products that are mainly for export: in particular, black jewfish and barramundi (wild-caught) bladders, pearl meat, trepang and pelagic species, with a range of other species that could be smoked or turned into high-value niche products.
- Government and industry should continue to co-ordinate and facilitate the discussions required to move forward with an industry-driven project.
- A significant objective for a new facility would be job creation through its on-going operations.
- Change will be a challenge, while industry is supportive of the processing facility concept, seafood processing is not well-established in the NT and will require development of industry operations and culture, including a focus on training. Stakeholder feedback indicated hesitations over a ready access to skilled labour and recommended that a training facility to upskill the workforce and create jobs be established in collaboration with an RTO.

There is a sense that before meaningful development can occur in less favoured locations, people must *want* to live and work there. At present, there are multiple barriers:

- Where a competing industry, such as mining, already provides most of the employment in a local community, other industries are less likely to move there because of an inability to match wages and benefits and hence compete for labour. Lower in-migration is a consequence of there being few jobs available for people who do not wish to work in the dominant industry. The growth and culture of that area will be relatively self-limiting.
- A region is likely to be more vulnerable to net out-migration and social decline if the available jobs, housing or educational opportunities are not perceived as desirable by skilled workers. Such locations will often have a low unemployment rate but a high, yet unmet, demand for workers[200].
- Many people who work in regional areas do so only during seasonal harvests, for example. These casual, 'gig' workers will usually leave the region for other types of work if there are few opportunities for applying their existing skills in other local industries.
- Some jobs in the Agribusiness, Food and Fibre Industries have difficulty attracting new entrants because of the nature of the work being exacerbated by a lack of enabling infrastructure; for example, meat processing industry stakeholders report that jobs are physically demanding, and shifts often commence extremely early, before public transport begins operating. Ride sharing initiatives are difficult to maintain as people tend to live significant distances from one another. Health services are limited, and housing can be very expensive in some areas, making it difficult

[199] KPMG (2020); *Darwin Seafood Processing Facility Scoping Study*; Northern Territory Government
[200] Regional Australia Institute (2022); *Regional Labour Market at Full Employment*; http://www.regionalaustralia.org.au/home/regional-labour-market-at-full-employment/; viewed 02/03/2022.

for new workers to establish themselves. Frequent 'couch surfing' occurs, but such arrangements are unsustainable. Community initiatives to support workers do exist but are not widespread.

Investing in the regions is likely to help attract and retain workers, but such investments can be a risk, particularly where populations and industries are not established. People generally do not move to the regions to take up employment unless there is an agreeable level of liveability, while economic and industry growth do not develop without sustained opportunities and workers. It is clear that policies to develop regional communities and industries must be indivisible.

Searching for growth solutions

Industry stakeholders have explored various measures involving organisations, communities and government to support regional growth. The potential growth of regional, rural and remote industries and communities, however, will continue to be constrained by their *remoteness* unless there are measures to develop infrastructure in and around them. Whether stakeholders support greater 'urbanisation' in regional, rural and remote Australia remains an open question and currently there appear to be no clear policy approaches supporting that direction.

In March 2022, Infrastructure Australia released its *Regional Strengths and Infrastructure Gaps Overview*, which provides an analysis of challenges and opportunities for regional, rural and remote areas. 'Agriculture, forestry and fishing' was identified as a key regional growth industry in a greater number of regions than any other industry, denoting a strong existing presence in those regions, with potential to grow and increase competitive advantage[201]. Of the eight top assets of regional, rural and remote areas, five were directly connected to the work of the Agribusiness, Food and Fibre industries:

- natural environments
- education and research institutions
- natural resources
- cultural heritage
- climate and topography.

However, the top four barriers to growth and infrastructure gaps were:

- availability, diversity and affordability of housing
- broadband and mobile connectivity
- water security
- access to further education and skills training.

All these issues have been identified previously as key factors affecting growth potential and opportunities in regional, rural and remote Australia, and create barriers for access to training.

This report, and the Australian Parliament report *Pride of Place: Inquiry into the Future of Regional Australia* (also released in March 2022), make it clear that broader solutions are required to address the issues of workforce and training accessibility in Australia, and these issues are largely out of the hands of industry and the skills and VET system.

To attract industry operators and stimulate the migration of skilled workers to the regions, the interconnectedness of regional, rural and remote communities and industries must be reinvigorated through

[201] Infrastructure Australia (2022); *Regional Strengths and Infrastructure Gaps: Overview*; p.8.

investments in infrastructure, services, culture, climate change adaptation and disaster support.

The National Farmers' Federation's Regionalisation Agenda[202] proposes placed-based regional development to expand a network of economic and social infrastructure across Australia. Included in this agenda are proposals for education and employment pathways, available and affordable housing, cultural and social amenity, digital connectivity and improved health services. The NFF have further expanded on this agenda by recommending 20 potential regional development precincts[203], where there could be a greater concentration of Agribusiness, Food and Fibre value chain industries and a complementary growth in population, infrastructure and skills. The Food and AgriBusiness Growth Centre's (FIAL) contribution to the NFF's regional development precincts agenda is to highlight *clusters*, comprising interconnected businesses, government organisations and research institutions, as an organising principle for establishing 'local ecosystems of resources, knowledge and relationships to support the growth of small to large businesses to increase the share of Australian food in the global marketplace'[204]. Such clusters would promote the values of cooperation and strategic alliances through physical and virtual networks to stimulate regionalisation activities, including skills and workforce development.

AgriFutures suggests a national evidence-based strategy would help to identify and understand gaps and opportunities in each region[205]. This place-based approach would aim to help industries capture upstream and downstream benefits by designing strategies that span the whole value chain. For this to happen, policymakers need to better understand the ecological comparative advantages of regions – i.e. what enables industries' successes in different places – and develop policies that harness associated growth opportunities. Connections between industries on a local and regional basis are a key indicator of progress, and these connections need to be promoted to encourage partnership working across the value chain and the sharing of enabling infrastructure, technologies and workers. This would likely stimulate regional economies and markets and in so doing, help mitigate the risk of investing in infrastructure and local services, including education. Industry partnerships would encourage mutual investments in the region and its workforce, who would benefit from the diversification of jobs and skills required in and across industries.

On a similar note, the Australian Farm Institute describe a 'virtuous economic cycle' (see Figure 23) which would be designed to ensure 'the availability of regional jobs and financial capital, and improved regional liveability are not only linked with strong regional industries but interdependent'[206]. Among their five stated investment, incentivisation and intervention priorities, number one is 'regional jobs, education and training'.

> 'The skills needs of the agrifood sector are in a state of transition. Identification of appropriate training and education for emerging skillsets must come from the agricultural industry and the regional communities who need those skills. Attracting workers and improving employment opportunities are issues strongly aligned with uptake of digital technology, education opportunities, better liveability and physical access to markets. Investment in initiatives which grow the agrifood sector will in turn lead to more jobs which interact with agriculture.'
> *K. McRobert and T. Fox (2021); Stronger ag sector, stronger regions; Australian Farm Institute; p.2*

Improved education and training have the potential to improve the productivity and profitability of regional industries, which in turn will lift regional economies, with positive implications for connectivity, infrastructure and the workforce.

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[202] National Farmers' Federation (2021); *Regionalisation Agenda*
[203] National Farmers' Federation (2022); *Regional Development Precincts*
[204] National Farmers' Federation (2022); *Regional Development Precincts; p.22*
[205] ACIL Allen Consulting (2021); *The intersection of agriculture and regional development*; AgriFutures: National Rural Issues
[206] K. McRobert and T. Fox (2021); *Stronger ag sector, stronger regions*; Australian Farm Institute; p.2

Figure 23: A virtuous cycle for stronger regions and stronger regional industries

Source: K. McRobert and T. Fox (2021); Stronger ag sector, stronger regions; Australian Farm Institute

The Transition Advisory Group suggest that a reformed VET system, with a special focus on supporting 'registered training organisations in delivering training to meet workforce and skills needs, particularly within small or 'thin' markets such as regional, rural and remote areas,' will better support these activities[207]. The Transition Advisory Group have recommended that industry engagement proceeds on a *strategic* level, to prioritise the development of training products, and *operational* level, to ensure delivery meets employer needs, including in the small and niche industries that populate many regional areas, but who often lack the capacity to engage in the current system.

Australia's first Regional Education Commissioner appointed in December 2021

In December 2021, the Hon Fiona Nash has been appointed as Australia's first Regional Education Commissioner and will oversee implementation of recommendations from the *National Regional, Rural and*

[207] Transition Advisory Group (2021); *Transition Advisory Group Final Advice – New Industry Engagement Arrangements*; Australian Government Department of Education, Skills and Employment; p.6.

Remote Tertiary Education Strategy ('the Napthine Review')[208].

Senator the Hon Bridget McKenzie, Minister for Regionalisation, Regional Communications and Regional Education, has said that 'The role of the Commissioner will bring a national focus and direction for regional and remote education and champion the educational needs of students in regional communities. This will include advocating for the improvement of education policies spanning early childhood education and care, schools, and tertiary education to better support regional, rural and remote students.'[209]

The sustainability and growth of regional Australia and its industries is entwined with factors such as the viability of businesses and their ability to attract and develop the next generation of workers. This, according to the Napthine Review, is facilitated by the provision of tertiary education:

> 'Increased educational attainment across regional, rural and remote communities will lead to increased productivity and further strengthen industries, economies and communities. Enhancing regional, rural and remote industries and communities will also help to attract more students and professionals to the regions. Families will have greater confidence in relocating to, or remaining in, regional, rural and remote locations if they know their children will have equal opportunities to undertake tertiary education. […] Investments to overcome the disparity in educational outcomes between metropolitan and regional, rural and remote areas will 'future proof' Australia and provide the foundation for national success.'
> *Commonwealth of Australia (2019); National Regional, Rural and Remote Tertiary Education Strategy; pp.16-17*

Implementing the recommendations of the Napthine Review will complement the VET reform agenda as well as efforts by regional, rural and remote industries to improve productivity and profitability. The Transition Advisory Group[210] are clear that businesses in regional areas must be adequately represented in the reformed VET system so that appropriate training is delivered where and when it is needed. This requires improving employer engagement with the national training system, creating collaborative relationships between employers and training providers, and working towards longer-term workforce development objectives. Training providers in regional, rural and remote areas are likely to have a greater role in reskilling regional, rural and remote workforces that are adapting to the destabilising effects of automation and industry change[211], and may help invigorate local economies by matching skills development with local employment opportunities and requirements[212].

Aboriginal & Torres Strait Islander Peoples Summary

Aboriginal and Torres Strait Islander peoples' participation across the Agribusiness, Food and Fibre industries

Australia's Aboriginal and Torres Strait Islander peoples are highly active across the Agribusiness, Food and Fibre industries. The renewed national focus on custodianship of the land and water has engendered a greater recognition of the agricultural and ecosystem management practices that had been adopted for centuries by Aboriginal and Torres Strait Islander peoples, including grain crop production and seed trading across the continent; intricate systems of haystacks holding grain grasses ready for threshing; controlled burning practices to manage natural resources; garden terraces in the south; complex irrigation sites like

[208] Commonwealth of Australia (2019); *National Regional, Rural and Remote Tertiary Education Strategy*.
[209] Senator the Hon Bridget McKenzie (2022); *Australian Government appoints first Regional Education Commissioner*; https://ministers.dese.gov.au/mckenzie/australian-government-appoints-first-regional-education-commissioner; viewed 04/02/2022.
[210] Transition Advisory Group (2021); *Final Advice – New Industry Engagement Arrangements*; Australian Government Department of Education, Skills and Employment; p.2.
[211] Victorian TAFE Association (2019); *Submission to the Regional Education Expert Advisory Group*; p.6.
[212] Commonwealth of Australia (2019); *National Regional, Rural and Remote Tertiary Education Strategy*; p.39

large dams; and aquaculture systems[213].

There are numerous successful businesses run by Aboriginal and Torres Strait Islander peoples across the Agribusiness, Food and Fibre industries. For example, Kimberley Agriculture and Pastoral Company (KAPCO) is an Aboriginal-owned initiative that is 'revitalising Aboriginal pastoral industry in the Kimberley and is a cooperative comprising four Indigenous-owned pastoral stations' with a 50,000-strong herd. The enterprise leverages 'economies of scale by working together to develop a year-round supply chain leveraging modern breeding, herd management and cropping techniques' while providing on-country employment and skills training[214].

Activities by Aboriginal and Torres Strait Islander peoples are often at the forefront of emerging sectors, coinciding with national demand for greater transparency around provenance and sustainable practices. The Northern Land Council[215] has stressed the significance of 'flexible, adaptive and creative' undertakings for developing economic activities that are compatible with Aboriginal and Torres Strait Islander skills and approaches. They emphasise Aboriginal peoples' contributions to sectors with substantial growth opportunities, such as the bush foods sector, while highlighting the promise of activities associated with areas such as blue carbon farming (carbon stored in coastal and marine ecosystems).

A broad variety of emerging enterprises are based on customary ecological knowledge, including products and services associated with bush foods, plant nurseries, seed harvesting, and botanical-based medicinal products[216]. Bush food production is founded upon harvests with minimal intervention and impacts on the environment of traditionally managed estates (with the active involvement of Aboriginal communities and Indigenous ranger groups), as well as different models of cultivation, such as enrichment planting and horticulture[217].

Through progressive self-determination policies and productive partnership working, there have been numerous cross-sector business achievements over recent years. In the 2020-21 period in northern Australia, the Indigenous Land and Sea Corporation (ILSC)[218] has reported:

- eight new enterprises developed, specialising in tourism, land management, carbon, pastoral, bush food and medicine, tree farm and horticulture
- policy development and new opportunities created across nine projects, including to:
    - increase Indigenous representation in the South Australia tuna fishing industry
    - expand service networks in regional, rural and remote locations
    - implement strategies to protect Indigenous traditional knowledge and intellectual property
    - monitor business outcomes through a joint venture assessment framework
    - participate in carbon abatement projects
    - deliver an Indigenous-led training program for registered savanna burning.

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[213] J. Azarias, R. Nettle & J. Williams (2020); *National Agricultural Workforce Strategy: Learning to excel*; National Agricultural Labour Advisory Committee; Canberra, December. CC BY 4.0; p.9.

[214] Joint Standing Committee on Northern Australia (2022); *The engagement of traditional owners in the economic development of northern Australia*; Parliament of the Commonwealth of Australia; Canberra, January 2022; pp.78-79 (Kimberley Land Council submission).

[215] Joint Standing Committee on Northern Australia (2022); *The engagement of traditional owners in the economic development of northern Australia*; Parliament of the Commonwealth of Australia; Canberra, January 2022.

[216] Australia State of the Environment (2021); *Production systems: Indigenous agribusiness development*; https://soe.dcceew.gov.au/biodiversity/pressures/industry#production-systems; accessed 25/08/2022.

[217] J. Gorman, D. Pearson & P. Wurm (2020); Old ways, new ways – scaling up from customary use of plant products to commercial harvest taking a multifunctional, landscape approach; *Land* 9(5):171.

[218] Joint Standing Committee on Northern Australia (2022); *The engagement of traditional owners in the economic development of northern Australia*; Parliament of the Commonwealth of Australia; Canberra, January 2022; pp.78-79 (Kimberley Land Council submission); p.53

- almost 1,600 indigenous trainees completed training through ILSC funded projects
- more than 200 land and water-based acquisition and management projects established

Such examples highlight the importance of increasing opportunities and recognition for Aboriginal and Torres Strait Islander Peoples' participation across the Agribusiness, Food and Fibre Industries (see, for example, the case study below).

Case study: Increasing recognition for Aboriginal and Torres Strait Islander Peoples' participation in the fishing industry

At the 2021 World Fisheries Congress, Matthew Osborne (Program Leader, Aquaculture and Regional Development in Northern Territory Fisheries) promoted recognition of the importance of the fishing industry for Aboriginal and Islander people and the contributions that they continue to make[219]. Indigenous fishing adds value and diversity to the Australian fishing community in its blending of cultural, recreational, commercial, and environmental practices. It has the ability to connect sectors and support a collective representation of Australia's fisheries.

Various programs have been established in northern Australia, including through funded research dedicated to progressing Indigenous participation in fisheries decision-making, capacity building and economic development. Projects have also been developed and funded across Australia to empower communities and support change, which requires strategies both to impact attitudinal change and regulator policies.

There are recent examples of greater collaboration between Aboriginal and Torres Strait Islander people, government, industry and other fishing stakeholders. These include the development of culturally aligned, community-based fishing operations in the Northern Territory, where Aboriginal people are building coastal fishing businesses and supplying their communities with fresh, affordable seafood. This is resulting in economic development and self-determination opportunities and enabling the continuation of cultural practices.

Underpinning the success of many of these ventures are meaningful employment opportunities, including in occupations such as Indigenous Ranger. The National Native Title Council[220] note that:

> 'Ranger work provides people in remote communities with meaningful employment, training and development opportunities in natural and cultural resource management, and opportunities for intergenerational knowledge transfer and the maintenance of connection to country. A number of studies have reported the economic, environmental and social benefits associated with ranger employment – amongst them the proven net reduction in government support.'

There are persisting challenges in unlocking opportunities for Aboriginal and Torres Strait Islander peoples due to education provision shortcomings, a lack of tailored resources, and inadequate support for traditional owner organisations to generate substantive outcomes.

Despite the legacies of Aboriginal and Torres Strait Islander peoples' agricultural activities, only 1% of people employed in agriculture identified as Aboriginal and Torres Strait Islander in the 2016 Census. The

[219] FRDC (2021); *Celebrating the story of Indigenous fishing on a world stage*; https://www.frdc.com.au/fish-vol-29-3/celebrating-story-indigenous-fishing-world-stage; viewed 14/02/2022.
[220] Joint Standing Committee on Northern Australia (2022); *The engagement of traditional owners in the economic development of northern Australia*; Parliament of the Commonwealth of Australia; Canberra, January 2022; pp.78-79 (Kimberley Land Council submission); p.76

National Agricultural Workforce Strategy reports on calls for increasing diversity, both to meet workforce needs and shortages, and to recognise the value and benefit of a more diverse workforce to improving innovation and productivity.

Regarding education, the *National Regional, Rural and Remote Tertiary Education Strategy* describes that Aboriginal and Torres Strait Islander learners in remote and very remote areas are particularly vulnerable to attrition in thin VET markets, where low levels of access and support impact negatively on completion rates and subsequent participation at higher AQF levels[221]. The report cites a lack of flexible, face-to-face and on Country delivery, with RTOs often unable to facilitate flexible modes of delivery that are co-designed and co-implemented with the local Indigenous community[222]. Such research highlights the need for greater engagement with Aboriginal and Torres Strait Islander communities, including for strategies to increase business development, education retention, workforce entry and development pathways.

Census (2016) data also shows that only 2% of Aboriginal and Torres Strait Islander peoples employed in the Agribusiness, Food and Fibre Industries had a university degree (compared to around 30% for the overall population). According to the NAWS, while 29% had a VET qualification, 'It would seem to be a priority in any agricultural workforce strategy to engage with the Aboriginal and Torres Strait Islander communities and provide them with the educational opportunities enjoyed by their non-Aboriginal and Torres Strait Islander counterparts. This is perhaps an imperative given that Aboriginal and Torres Strait Islander peoples now control and manage around 40% of the national landscape.'[223]

Indigenous Ranger Sector Strategy

The National Indigenous Australians Agency (NIAA) is developing a new strategy for the Indigenous Ranger sector. The strategy guides the future growth and empowerment of community-based Indigenous ranger organisations across Australia. The development and delivery of the Strategy will be a collaborative effort by Indigenous Australians, governments, and the private sector.

The Vision and Purpose of the strategy is described on the consultation website:

> 'The Strategy is intended to support an integrated, national approach between Indigenous, government and private sector stakeholders to address the challenges and aspirations of rangers over the next six years and into the future. The vision is to develop a vital Indigenous ranger sector empowered to manage Country sustainably, strengthen culture, provide economic and career opportunities for Indigenous people and communities and have a recognised role and voice in land and water management. The Strategy aims to support the wider aspirations of rangers and ranger organisations that go beyond funded programs.'
> *National Indigenous Australians Agency (2022); Indigenous Ranger Sector Strategy; https://www.niaa.gov.au/indigenous-affairs/environment/indigenous-ranger-sector-strategy; viewed 29/08/2022.*

The NIAA is considering a proposal for the creation of an Indigenous Ranger Industry Body. It is proposed that this body may "*oversee the development of any accredited Indigenous land and water skills curriculum and training packages*". Indigenous rangers and broader Aboriginal and Torres Strait Islander organisations and businesses need the capacity to participate in and influence outcomes in the new system. Any new cluster operation operating in the agribusiness, food and fibre industries should establish better and more effective Aboriginal and Torres Strait Islander representation and influence in the new system. Skills and job development works best when there is a direct connection between training and employment. It is important that the training provided for Indigenous Rangers and other Aboriginal and Torres Strait Islander

[221] Commonwealth of Australia (2019); *National Regional, Rural and Remote Tertiary Education Strategy*
[222] Commonwealth of Australia (2019); *National Regional, Rural and Remote Tertiary Education Strategy*; p.36
[223] J. Azarias, R. Nettle & J. Williams (2020); *National Agricultural Workforce Strategy: Learning to excel*; National Agricultural Labour Advisory Committee, Canberra, December; p.33.

people leads to better job outcomes. The IRCs acknowledge the importance of Aboriginal and Torres Strait Islander people guiding and directing their economic and social development.

Engagement Approaches

During 2021 and 2022, the Amenity Horticulture, landscaping and Conservation & Land Management IRC worked with Aboriginal and Torres Strait Islander peoples across Australia on the Respect for Country Job Skills project to review existing training related to On Country Management and Cultural Sites Work specifically related to Aboriginal and Torres Strait Islander culture and practices. The current and proposed qualifications include Aboriginal and Torres Strait Islander Elder Assessment to ensure ongoing ownership and oversight of the cultural knowledge included in delivery of the training, not just at consultation level.

This work was conducted in line with the requirements of the current program to review training packages, and while efforts were made to adapt consultation and engagement processes to be culturally suitable, the ability to make adaptation was limited by the program guidelines. More structured engagement driven by Aboriginal and Torres Strait Islander peoples will be needed to be built to ensure appropriate future engagement and sharing of knowledge and skills.

It remains clear to the IRCs that additional work is required to properly identify and implement evidence-based approaches. Some of the preliminary observations from completed consultations are:

- Education, training and skills are critical for young Indigenous people, especially those parts of the system that retain young people in formal education at least until Year 12 – school-based traineeships and apprenticeships structured appropriately for Indigenous learners are a critical part of retaining these learners in the formal education system.
    - There is a critical economic and social need for training and employment that keeps young Indigenous people motivated, engaged and occupied in worthwhile learning and jobs, especially those that can contribute to community wellbeing.
- There is a view and acceptance that employers are in the best position drive identification of skills needs and training requirements, as they are the only ones who can guarantee jobs, however industry are rarely achieving this within the context of work in and for Indigenous communities.
- Native Title currently covers about 55% of the Australian land and sea mass providing the opportunity for communities and nations to do business and undertake commercial development and activities.
- As Indigenous communities finalise title processes and are able to focus more on economic development, they are also encountering the need to change the way work is being done (including by non-Indigenous service providers) and the skills being used on their land and sea.
- Issues related to access to water, both offshore and onshore, are of increasing concern for industry and communities, and may require both policy approaches and training related to innovative access and delivery that comply with and respect the approaches of rights holders.
- Work in Indigenous communities is increasingly based on fee for service and gig economy approaches that may be more suited to local culture-based economies, and there is a need for different approaches to training access, support and delivery.
- There are an increasing number of schemes designed to support Indigenous people to live, be educated and obtain employment in cities and major regional centres, while remote communities and smaller regional centres are finding economic and skills development increasingly difficult, which may be resulting in reliance on local training which is not accredited, recognised outside the community, or quality-controlled.
- Working with and in partnership with Indigenous communities requires direct relationships, and this requires going to the communities first, to show respect and to establish trust – there is significant

work to build relationships because of the history of broken promises and failure to deliver outcomes.

Closing the Gap

The new National Agreement on Closing the Gap was released in July 2020 and set new priority outcomes and targets. Of particular interest in the Australian Skills and VET system are:

- **Target 5**: By 2031, increase the proportion of Aboriginal and Torres Strait Islander people (age 20-24) attaining year 12 or equivalent qualification to 96 per cent (specifically, completion of Certificate II and III or higher by those who do not have Year 12, based on Vocational Education and Training (VET) administrative records)
- **Target 6:** By 2031, increase the proportion of Aboriginal and Torres Strait Islander people aged 25-34 years who have completed a tertiary qualification (Certificate III and above) to 70 per cent
- **Target 7:** By 2031, increase the proportion of Aboriginal and Torres Strait Islander youth (15-24 years) who are in employment, education or training to 67 percent
- **Target 8:** By 2031, increase the proportion of Aboriginal and Torres Strait Islander people aged 25-64 who are employed to 62 per cent.

The Productivity Commission[224] reports that no new data on these outcomes has been released since 2016. Future editions of the Productivity Commission's Annual Data Compilation Report will aim to address this significant monitoring gap, however progress on this reporting was not achieved in time for the 2022 update report.

[224] Productivity Commission (2021); *Closing the Gap: Annual Data Compilation Report July 2021*; https://www.pc.gov.au/closing-the-gap-data/annual-data-report/2021; viewed 22/02/2022.

Appendices

Appendix: Qualifications and Licensing, Legislative or Certification requirements

Qualification Title	Licensing, Legislative or Certification requirement
Certificate III in Animal Technology	Regulatory compliance with the Australian Code for the Care and Use of Animals for Scientific Purposes applies to some units of competency. In addition, individual units of competency may specify relevant licensing, legislative and/or regulatory requirements. Specific determination should be sought through the relevant State or Territory body.
Certificate IV in Animal Regulation and Management	Some animal control functions administered by state/territory and local governments require licensing or authorisation. Legislative requirements vary across jurisdictions and users are advised to check with the relevant regulatory authority for current requirements.
Certificate IV in Veterinary Nursing	The scope of practice for veterinary nurses is determined by state and territory legislative and regulatory requirements. Users of this qualification must refer to the relevant legislation and regulations in the development of training and assessment strategies.
Diploma of Equine Allied Health	Equine allied health providers must work within the legislative and regulatory requirements relevant to animal welfare, biosecurity, veterinary practice, and pharmacy, controlled drugs and use of prohibited substances. The scope of practice for equine service providers varies according to state/territory legislative and regulatory requirements.
Certificate II in Arboriculture	Legislation, regulations and by-laws relating to the treatment and removal of trees apply in some States and Territories.
Certificate III in Arboriculture	Legislation, regulations and by-laws relating to the treatment and removal of trees apply in some States and Territories.
Certificate III in Sports Turf Management	Legislation related to the installation of irrigation and the storage, handling and application of chemicals applies in some States and Territories.
Certificate III in Beekeeping	Legislation, regulations and by-laws relating to beehive ownership and biosecurity codes of practice apply in some States and Territories.
Certificate IV in Pest Management	Some job functions covered by this qualification may require occupational licensing or certification. Specific determination should be sought through the relevant State or Territory agency.
Diploma of Arboriculture	Legislation, regulations and by-laws relating to the establishment, treatment and removal of trees apply in some States and Territories.
Advanced Diploma of Arboriculture	Legislation, regulations and by-laws relating to the establishment, treatment and removal of trees apply in all States and Territories.
Graduate Diploma of Arboriculture	Legislation, regulations and by-laws relating to the establishment, treatment and removal of trees apply in all States and Territories.

Qualification Title	Licensing, Legislative or Certification requirement
Certificate IV in Meat Processing (Meat Safety)	People seeking registration as a meat inspector should check the current requirements with their state or territory food authority or the Australian Government – Agriculture, as appropriate, when selecting electives. This qualification differs from the Certificate III in Meat Processing (Meat Safety) in that it addresses the skills and knowledge necessary to oversee the implementation of Approved Arrangements and workplace health and safety programs.
Diploma of Food Safety Auditing	Regulatory food safety audits in Australia are covered by State, Territory and Commonwealth legislative frameworks that support the requirements of the National Food Safety Audit Policy 2009. Users must check requirements with the relevant regulatory authority before delivery.
Certificate II in Racing (Greyhound)	Licensing, legislative, regulatory or certification requirements may apply to this qualification. Refer to your State or Territory controlling body or principal racing authority for current licence or registration requirements.
Certificate III in Racing (Stablehand)	This qualification is required for industry licensing and registration in some states and territories. Users are advised to check with the relevant Principal Racing Authority for current requirements.
Certificate III in Racing (Driving Stablehand)	This qualification is required for industry licensing and registration in some states and territories. Users are advised to check with the relevant Principal Racing Authority for current requirements.
Certificate III in Racing (Trackwork Rider)	This qualification is required for industry licensing and registration in some states and territories. Users are advised to check with the relevant Principal Racing Authority for current requirements.
Certificate IV in Racing (Racehorse Trainer)	This qualification is required for industry licensing and registration in some states and territories. Refer to the relevant state or territory Principal Racing Authority for current requirements.
Certificate IV in Racing (Jockey)	This qualification is required for industry licensing and registration in some states and territories. Refer to the relevant state or territory Principal Racing Authority for current requirements including selection into an apprentice jockey program.
Certificate IV in Racing (Harness Race Driver)	This qualification is required for industry licensing and registration in some states and territories. Users are advised to check with the relevant Principal Racing Authority for current requirements.
Diploma of Racing (Racehorse Trainer)	This qualification is required for industry licensing and registration in some states and territories. Refer to the relevant state or territory Principal Racing Authority for current requirements.

Qualification Title	Licensing, Legislative or Certification requirement
Certificate III in Aquaculture	Some SFI and imported units in the elective bank are subject to licensing, legislative or certification requirements, including: • Occupational diving is regulated independently by each state and territory workplace health and safety authority. Users are advised to check with the relevant authority to confirm current requirements. • The MAR units that appear in the elective bank are subject to licensing and regulatory requirements. These units must be implemented in line with the MAR Maritime Training Package and Australian Maritime Safety Authority (AMSA) requirements. • The TLI licensing units must be implemented in line with the TLI Transport and Logistics Training Package.
Certificate III in Fishing Operations	Some SFI and imported units in the elective bank are subject to licensing, legislative or certification requirements, including: • Occupational diving is regulated independently by each state and territory workplace health and safety authority. Users are advised to check with the relevant authority to confirm current requirements. • The MAR units that appear in the elective bank are subject to licensing and regulatory requirements. These units must be implemented in line with the MAR Maritime Training Package and Australian Maritime Safety Authority (AMSA) requirements. • The TLI licensing units must be implemented in line with the TLI Transport and Logistics Training Package.
Certificate III in Fisheries Compliance	All work is carried out to comply with workplace procedures, according to state/territory health and safety, food safety, biosecurity and environmental regulations, legislation and standards that apply to the workplace. Licences will be required if operating vessels and vehicles. The MAR units that appear in the elective bank are subject to licensing and regulatory requirements. These units must be implemented in line with the requirements of the MAR Maritime Training Package and Australian Maritime Safety Authority (AMSA) requirements. Statutory/legislative requirements may apply to holders of this qualification and may vary across states and territories. Users are required to check with the relevant jurisdiction for current requirements.

Appendix: Skills Priority List Occupations

The National Skills Commission (NSC) regularly reviews the national skills needs of Australia and, from June 2021, has responsibility for releasing a Skills Priority List (SPL) annually. A key element of the SPL is the determination of occupational shortages. An occupation is considered to have a shortage when 'employers are unable to fill or have considerable difficulty filling vacancies for an occupation or cannot meet significant specialised skill needs within that occupation, at current levels of remuneration and conditions of employment and in reasonably accessible locations'[225].

The SPL provides a current labour market rating (i.e. whether there is a shortage) and a future demand rating for occupations nationally. The future demand rating is a proportional measure that expresses the prospects for an occupation relative to that occupation's size.

It is worth noting that the SPL is based on the ANZSCO, the recent update of which included various occupations in the Agribusiness, Food and Fibre Industries. Importantly, this ANZSCO update did not occur prior to the SPL's 2021 release. Numerous stakeholders believe that, with the benefit of refined and improved classifications, future releases of the SPL will display shortages in a *greater* number of occupations associated the Agribusiness, Food and Fibre Industries.

Stakeholders also believe that the methodology of the SPL will always under-represent skills shortages in occupations that are predominately regional, rural and remote-based. Because SPL uses data sources such as the Internet Vacancy Index (IVI), which monitors only mainstream job websites, e.g., Seek. Therefore, SPL cannot quantify the multitude of jobs advertised by regional, rural and remote businesses locally, through informal networks and on social media – and therefore, is unable to quantify skills shortages in these places. The SPL methodology paper states that attempts were made to balance the proportion of employers in metropolitan and regional areas. However, stakeholders' concerns persist over the SPL not reflecting their industry knowledge.

The table below displays the Agribusiness, Food and Fibre occupations included on the SPL.

ANZSCO Code	Occupation	Current national shortage overall?	Future demand (five-year period)	Training package
351111	Baker	Yes (especially regional areas)	Strong	FBP
351112	Pastrycook	Yes (especially regional areas)	Strong	FBP
234111	Agricultural Consultant	Yes	Strong	AHC
234112	Agricultural Scientist	Yes	Strong	AHC
361211	Shearer	Yes	Strong	AHC
721111	Agricultural and Horticultural Mobile Plant Operators	Yes	Strong	AHC
234711	Veterinarian	Yes	Strong	ACM
362212	Arborist	Yes	Strong	AHC
362213	Landscape Gardener	Yes	Strong	AHC
351211	Butcher or Smallgoods Maker	Yes	Strong	AMP
121216	Mixed Crop Farmer	Yes	Soft	AHC
121318	Pig Farmer	Yes	Soft	AHC
121215	Grape Grower	Yes	Soft	AHC
121321	Poultry Farmer	Yes	Soft	AHC

[225] National Skills Commission (2021); *Skills Priority List Methodology*; p.5

311111	Agricultural Technician	Yes	Moderate	AHC
322113	Farrier	Yes	Moderate	ACM
362311	Greenkeeper	Yes	Moderate	AHC
362411	Nurseryperson	Yes	Moderate	AHC
311312	Meat Inspector	Yes	Moderate	AMP
839312	Product Grader	Yes	Moderate	AMP
394213	Wood Machinist	Yes	Moderate	FWP
234113	Forester	No (shortage in NSW)	Strong	FWP
361112	Horse Trainer	No (shortage in NSW)	Strong	RGR
362211	Gardener (General)	No (shortage in NSW & NT)	Strong	AHC
899212	Fishing Hand	No (shortage in WA)	Moderate	SFI
899211	Deck Hand	No (shortage in NT)	Moderate	SFI
231211	Master Fisher	No (shortage in NT)	Moderate	SFI
399911	Diver	No (shortage in NT)	Moderate	SFI
361311	Veterinary Nurse	No (shortage in NSW)	Moderate	ACM
234212	Food Technologist	No (shortage in NSW)	Moderate	FBP
611311	Sales Representative (Building and Plumbing Supplies)	No (shortage in NSW)	Moderate	FWP
452318	Dog or Horse Racing Official	No (shortage in NSW)	Moderate	RGR
311413	Life Science Technician	No (shortage in NSW & NT)	Moderate	ACM
142111	Retail Manager (General)	No (shortage in NSW & NT)	Moderate	AMP
621511	Retail Supervisor	No (shortage in NSW & NT)	Moderate	FBP
121313	Dairy cattle Farmer	No (shortage in SA, TAS & NT)	Soft	AHC
121217	Sugar Cane Grower	No (shortage in QLD)	Soft	AHC
121214	Grain, Oilseed or pasture Grower	No (shortage in NT)	Soft	AHC
121218	Turf Grower	No (shortage in NT)	Soft	AHC
121111	Aquaculture Farmer	No (shortage in NSW, SA, TAS & NT)	Soft	SFI
121311	Apiarist	No (shortage in NSW & NT)	Soft	AHC
361113	Pet Groomer	No	Strong	ACM
361114	Zookeeper	No	Strong	ACM
361115	Kennel Hand	No	Strong	ACM
361111	Dog Handler or Trainer	No	Strong	ACM
139912	Environmental Manager	No	Strong	AHC
232112	Landscape Architect	No	Strong	AHC
841913	Pest Controller	No	Strong	AHC
323315	Saw Doctor	No	Strong	FWP
721112	Logging Plant Operator	No	Strong	FWP
361111	Dog Handler or Trainer	No	Strong	RGR
233912	Agricultural Engineer	No	Moderate	AHC
399917	Wool Classer	No	Moderate	AHC
611112	Stock and Station Agent	No	Moderate	AHC
149911	Boarding Kennel or Cattery Operator	No	Moderate	ACM

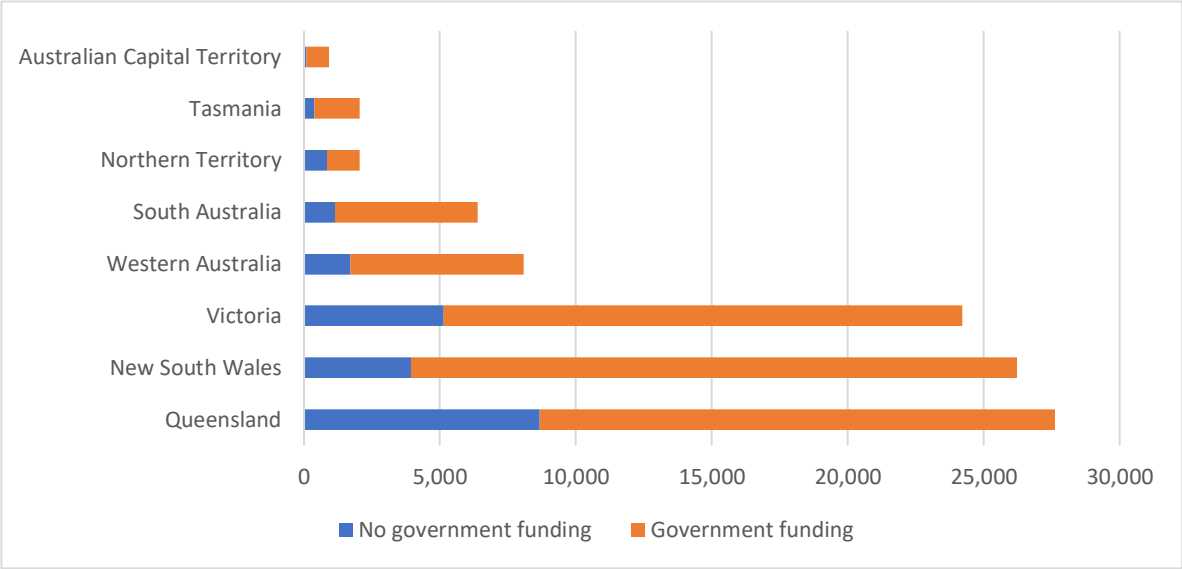
234311	Conservation Officer	No	Moderate	AHC
234312	Environmental Consultant	No	Moderate	AHC
234314	Park Ranger	No	Moderate	AHC
234515	Botanist	No	Moderate	AHC
362111	Florist	No	Moderate	AHC
831211	Meat Boner and Slicer	No	Moderate	AMP
831212	Slaughterer	No	Moderate	AMP
234213	Wine Maker	No	Moderate	FBP
394214	Wood Turner	No	Moderate	FWP
841311	Forestry Worker	No	Moderate	FWP
841312	Logging Assistant	No	Moderate	FWP
841313	Tree Faller	No	Moderate	FWP
133511	Production Manager (Forestry)	No	Moderate	FWP
331211	Carpenter and Joiner	No	Moderate	FWP
711313	Sawmilling Operator	No	Moderate	FWP
711314	Other Wood Processing Machine Operator	No	Moderate	FWP
712916	Paper and Pulp Mill Operator	No	Moderate	PPM
133512	Production Manager (Manufacturing)	No	Moderate	PPM
711311	Paper Products Machine Operator	No	Moderate	PPM
452413	Jockey	No	Moderate	RGR
311311	Fisheries Officer	No	Moderate	SFI
121211	Cotton Grower	No	Soft	AHC
121212	Flower Grower	No	Soft	AHC
121213	Fruit or Nut Grower	No	Soft	AHC
121221	Vegetable Grower	No	Soft	AHC
121212	Beef Cattle Farmer	No	Soft	AHC
121314	Deer Farmer	No	Soft	AHC
121315	Goat Farmer	No	Soft	AHC
121317	Mixed Livestock Farmer	No	Soft	AHC
121322	Sheep Farmer	No	Soft	AHC
121411	Mixed Crop and Livestock Farmer	No	Soft	AHC
121316	Horse Breeder	No	Soft	RGR

Appendix: VET Delivery

The following VET training statistics include all training packages under the Agribusiness, Food and Fibre cluster:

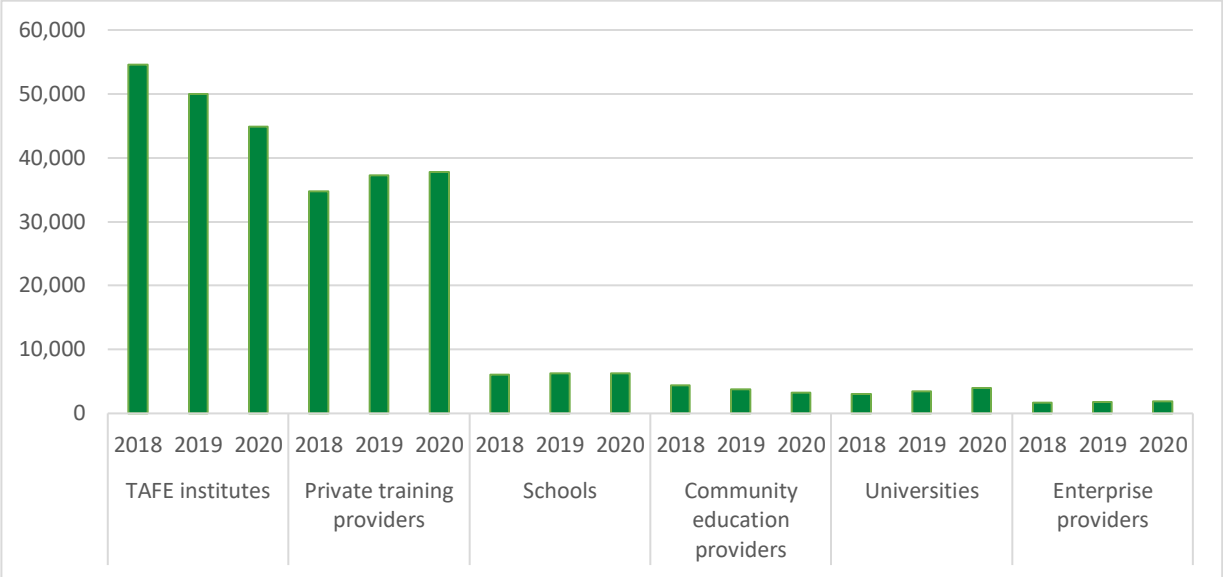
- ACM - Animal Care and Management
- AHC - Agriculture, Horticulture and Conservation and Land Management
- AMP - Australian Meat Processing
- FBP - Food, Beverage and Pharmaceutical
- FWP - Forest and Wood Products
- PPM - Pulp & Paper Manufacturing Industry
- RGR - Racing Industry
- SFI - Seafood Industry

Figure 24: State of Qualification Delivery and Funding Source, 2020



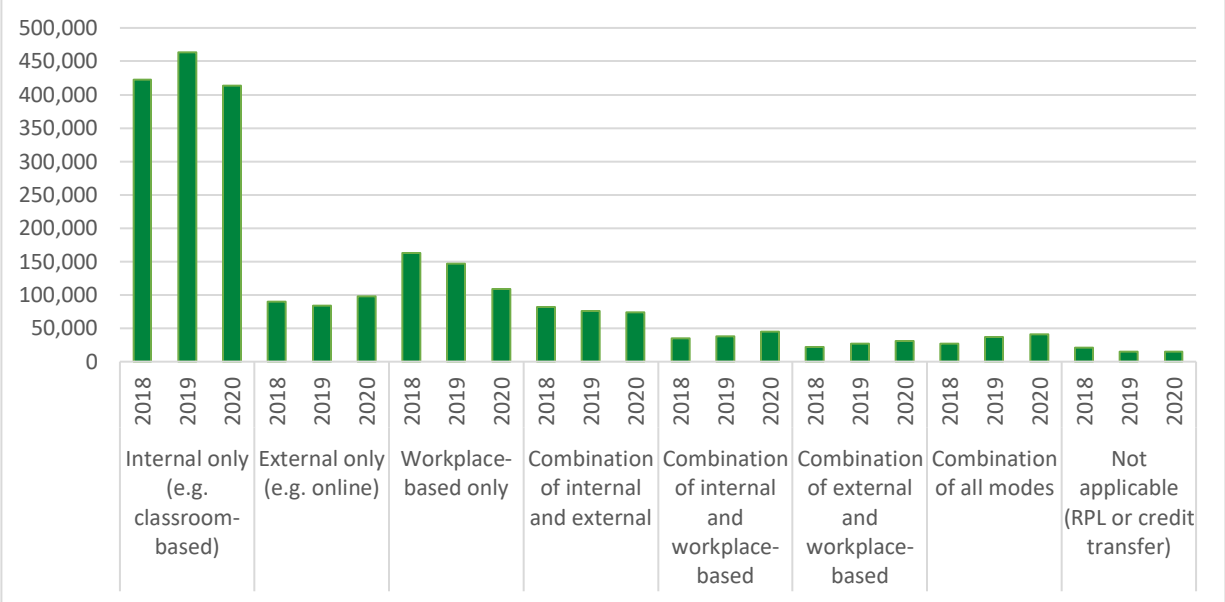
Source: NCVER VOCSTATS, TVA program enrolments

Figure 25: Qualification Provider Type, 2018-2020



Source: NCVER VOCSTATS, TVA program enrolments

Figure 26: Unit Mode of Delivery, 2018-2020



Source: NCVER VOCSTATS, TVA subject enrolments