



RURAL SAFETY &
HEALTH ALLIANCE

RSHA03

Identifying and prioritising WHS overlaps across the Agriculture and Fisheries Sectors

Final Report

September 2020

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This project has been funded by the Rural Safety and Health Alliance, a a cross-sectoral collaboration involving nine Rural Research and Development Corporations (RDCs): AgriFutures Australia, Australian Eggs, Australian Pork Limited, Australian Wool Innovation, Cotton Research and Development Corporation, Dairy Australia, Fisheries Research and Development Corporation, Grains Research and Development Corporation, and Meat and Livestock Australia.

Foreword

Australia's agricultural and fishing sectors are key to rural communities and make a fundamental contribution to the Australian economy and way of life. There have been significant improvements in health and safety over many years, however gains have stagnated in the last 15 years, which leaves an ongoing and unacceptably high burden of death, injury and disease. The Rural Safety & Health Alliance is a cross-sectoral collaboration of nine Rural Research & Development Corporations working together to undertake research, development & extension for health and safety improvement.

This study has sought to examine the available fatality and injury data with a view to assessing hazards and risks relevant to each of the participating sectors and the commonalities across sectors. Consultation with participating sectors provided qualitative input to this quantitative picture. The results indicate that there is considerable overlap of the hazards and risks present within these sectors.

Recommendations are provided to address some of the highest priority hazards and risks across sectors, while also reinforcing those unique to specific commodities. Furthermore, attention to future technological developments and their impact on health and safety, along with risks imposed by fatigue, are flagged.

Despite health and safety performance not changing much in the past 15 years, this new research report may appear to simply reinforce existing knowledge. On the contrary, what has been missing is a clear picture of multi-sectoral commonalities, which makes this both new and critical research to inform cross-sectoral investment for the Rural Safety & Health Alliance. Persistent and often complex challenges like these demand that we ask better questions, and test new approaches to delivering on-farm and on-boat impact, in both human and economic terms.

This report is an addition to a diverse range of research publications by the Rural Safety & Health Alliance and the Alliance Partner RDC's on health and safety. Auspiced by AgriFutures as part of the National Rural Issues program, this work also aligns with RDC strategic priorities of workforce development, and sustainability.

Rural Safety & Health Alliance publications, and links to RDC partner publications are accessible online at www.rsha.com.au

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Acknowledgments

Our thanks are extended to the staff of the National Coroners Information System for on-going assistance with the coronial records. Additionally, we thank the team from Safe Work Australia including Sivam Perumal, Rissa Raymundo and Majid Hmedidan for their considerable assistance with the Workers Compensation data. Finally, we acknowledge the numerous individuals from the respective commodity sectors, the Research and Development Corporations and mental health professionals that have provided input to the study.

Abbreviations

ABS	Australian Bureau of Statistics
AMSA	Australian Maritime Safety Authority
ANZSIC	Australian and New Zealand Standard Industry Classification
FRDC	Fisheries Research and Development Corporation
HBM	Health Belief Model
ICD	International Classification of Disease
MHW	Mental Health & Wellbeing
NCIS	National Coronial Information System
NDS	National Data Set for Compensation-Based Statistics
NEC	Not Elsewhere Classified
RD&E	Research, Development and Extension
RDC	Research & Development Corporations
RSHA	Rural Safety & Health Alliance
SSV	Side by side vehicle
SWA	Safe Work Australia
WHS	Work Health and Safety
YTD	Year to date

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Executive Summary

What the report is about

This report identifies Work Health and Safety (WHS) overlaps across nine members of the Rural Safety and Health Alliance (RSHA): AgriFutures Australia, Australian Eggs, Australian Pork Limited, Australian Wool Innovation, Cotton Research and Development Corporation, Dairy Australia, Fisheries Research and Development Corporation, Grains Research and Development Corporation, and Meat and Livestock Australia.

The report is designed to provide a detailed matrix outlining the commonalities of injuries, deaths and risks across rural sectors. This evidence-based information will then be used to make informed collaborative cross-sectoral Research Development and Extension (RD&E) investment decisions, where investment can have both human and economic impact.

Who is the report targeted at?

The report is directed to the RSHA and their nine stakeholder RDCs for investment in projects to target and reduce workplace injury and deaths in Australia's agricultural and fishing (inclusive of commercial wild-catch fishing and aquaculture) sector. The findings provide an opportunity for targeted preventative actions for individual sectors and across sectors.

Where are the relevant industries located in Australia?

Participating farming and fishing sectors for this study are situated nationwide. These include; aquaculture, beef, cotton, dairy, export fodder, grain, pork, poultry (eggs), poultry (chicken meat) thoroughbreds and wild-catch fisheries.

Across Australia, the agriculture and fishery sectors are substantial employers nationwide and play a major economic role. The gross value of agricultural production in 2019/20 was around \$60 billion, with the fisheries and aquaculture sectors contributing over \$5 billion to the Australian economy in 2017/18 (Fisheries Research and Development Corporation, 2019; National Farmers Federation, 2020).

All of these agricultural, fishing and aquaculture commodities contribute to the social and economic fabric of Australia's regional communities and are stakeholders in this study. Consequently, the high importance towards health, safety and wellbeing within these industries is fundamental to the future of farming and fishing.

Background

Over the past 20 years there has been a reduction in the number of farm-related non-intentional injury deaths across Australia from approximately 100 to 75 per year, however the rate of fatal incidents (16.6 per 100,000 workers), has remained stubbornly steadfast since 2005 (Lower, Rolfe, & Monaghan, 2017). Furthermore, deaths in the agriculture, fishing and forestry sector account for around 25% of all work-related cases nationally (Safe Work Australia, 2020b). While any reduction is welcome, the subsequent levelling out is cause for concern and has not been in line with reductions in other known high-risk sectors such as mining and construction. A key to Work Health and Safety (WHS) improvements is having solid evidence upon which interventions can be developed and promoted.

The legal situation in Australia in and of itself provides a strong business case for the adoption of WHS practices, with significant penalties being potentially enforced. However, having evidentiary data on the nature and common causal injury factors, in tandem with measures relating to the costs to industry sectors, can assist in targeting specific WHS practices.

WHS hazards and risks in the agricultural and fishery sectors are diverse. For example, some sectors have the increased risk of machinery and vehicle injuries, whilst other are at higher risk of coming into contact with animals. Notwithstanding these differences, research indicates that targeted WHS inputs to reduce risk, will prevent injury and increase profitability (Lower & Pollock, 2017; Safe Work Australia, 2012a, 2012b). With the establishment of collaboration between aligned RDCs, this provides an opportunity to work with key stakeholders to enable the identification of commonalities for future action, define implementation approaches that align with industry specific requirements and further reduce the burden of injury.

Aims/objectives

The study aims to provide a comprehensive overview of the commonalities of injury, illness and deaths, plus health and safety risks associated with the agricultural and fisheries sectors. Consequently, the overview provides the RSHA, with evidence-based information upon which priority investment in projects to reduce the injury burden can be made.

Methods used

Data from four sources, informed the development of the individual sector profiles and detailed matrix assessing the commonalities of risks across sectors. This included: (a) fatality data - from the National Coroners Information System (NCIS) for the period (2014-15 to 2018-19); (b) workers compensation data - from the National Data Set for Compensation-Based Statistics (NDS) managed by Safe Work Australia (2013-14 to 2017-18p); (c) zoonotic illness information from the Australian National Notifiable Diseases Surveillance System (2016-2020 YTD); and (d) qualitative feedback from a range of stakeholders within each of the participating industry's RDC's and external providers, inclusive of issues addressing mental health and wellbeing (MHW). Information within the sectoral profiles, included the identification of specific hazards based on the data. These were then accorded a severity, frequency of exposure and overall risk rating.

Results/key findings

There were 207 fatal agricultural and 16 fisheries cases in the period (2014-15 to 2018-19) that could be directly linked to one of the relevant industry classification codes (Australian and New Zealand Standard Industry Classification - ANZSIC). The majority of deaths in the agriculture sector are work-related (80%), with all in the fishing sector being work-related. For the agricultural sectors - quads (16% of total), tractors (13%), mobile plant (9%), utes (6%) and motorbikes (6%) are common agents, accounting for just under half (48%) of all fatal incidents. For commercial wild-catch fishing and aquaculture, unsurprisingly drowning is the major issue, with all fatalities limited to the wild-catch sector. Key activities being undertaken at the time of the incidents for agriculture are mustering (16% of all cases), travel while inspecting stock (13%), feeding and watering stock (10%), machinery maintenance (9%) and working with stock (5%). As such, these five activities account for over 50% of fatal incidents.

Over 70% of all non-fatal incidents across the sectors involved either body stressing (e.g. manual handling), being hit by a moving object (e.g. animal, vehicle etc.), or falls, trips and slips as the mechanism. Within the agricultural sectors there was some differentiation between the large animal based sectors (hit by moving object) and those working with cotton, cropping, fodder, poultry or shearing (body stressing). For wild-catch fishing and aquaculture, body stressing was the leading mechanism, with being hit by moving objects also prevalent. There was some variation with the wild-catch sub-component having a higher proportion of cases involving hitting objects with a part of the body than their aquaculture counterparts.

For the agency of workers compensation claims, animal, human and biological agencies accounted for over one-third of all cases and was particularly evident for the large animal based sectors. By way of contrast, cropping, cotton and fodder, had greater involvement of mobile plant and transport. Poultry (eggs and chicken meat), both had a more significant profile involving non-powered hand tools and equipment. The injury burden associated with shearing plant (within the machinery and fixed plant category), is also clearly discernible for the shearing sector. For wild-catch fishing and aquaculture, almost half of the wild-catch cases (41%), involved non-powered hand tools and equipment, compared to 29% in the aquaculture sub-component. Similar proportions of incidents involved environmental, material and substance factors across wild-catch and aquaculture, although the aquaculture grouping had 14% of incidents that involved mobile plant and transport.

The total estimated economic cost of fatal incidents (\$446M) and workers compensation claims (\$395M) in the period, was over \$840M (annual mean \$168M). Data for the agricultural sectors revealed a fatality estimate of \$414M and workers compensation claims of \$375M. Meanwhile the data for wild-catch fishing and aquaculture estimated the fatality costs at \$32M and workers compensation at \$20M. Notwithstanding this considerable financial impost, it is worth noting that these figures will markedly under-estimate the true burden. Importantly much of this “uncalculated” financial burden, will be covered by out of pocket payments made by self-employed (owner-operator) farmers and fishers.

Mental health and wellbeing is seen as an important issue by all RDC stakeholders, however there is some variation in how this should be addressed. The existing quality of evidence underpinning interventions for farmers and fishers, requires attention. Currently, there are major financial investments being made in this area, however these are significantly fragmented within and among sectors. Access to services and the appropriateness of these services is an ongoing issue of concern. There is a strong emphasis on locally contextualised and community-driven approaches to address mental health and wellbeing that will require commitment to a partnership approach.

Overall, there were 16 of 34 hazards identified as common to all 12 sectors. Those more likely to result in a fatal outcome (n=9), involved (tractors, ute-car-truck-Side by Side Vehicle [SSV], water, mobile plant, fixed plant, fuels/fertiliser, electrical powerlines/systems, falls from structures, confined spaces). Of the data for the most recent five-year recording period (2014-15 to 2018-19), there were:

- Nine sectors in which tractor fatalities occurred, accounting for 26 deaths (runovers 14, rollovers 7, maintenance 5)
- Eight sectors in which mobile plant (excluding tractors/quads) fatalities occurred, accounting for 19 deaths (feed/water livestock 5, harvesting, planting, maintenance, loading/unloading, fencing)
- Eight sectors in which ute-car-truck-SSV fatalities occurred, accounting for 26 deaths (utes 13, car / truck 7, SSV 6)
- Three sectors in which water-related fatalities occurred, accounting for 18 deaths (14 at sea)

- Four sectors in which electrical related fatalities occurred, accounting for six deaths.

The seven non-fatal hazards common to all sectors were: zoonoses, bending/twisting/lifting, hand tools, noise, insect/particles, machinery fires and heat. In assessing the workers compensation data, there is a relatively consistent pattern of mechanisms involving either being hit by moving objects, body stressing (manual handling etc.), vehicles, plus falls, trips and slips across sectors. When matched alongside the agency of injury, there is some evidence of variation with cropping sectors (grain, cotton, fodder), more likely to have mobile plant as the leading agency, while the large animal sectors (beef, dairy, horses, pork, sheep), were more likely to involve animal, human or biological agencies. Meanwhile the fishery and poultry (eggs and chicken meat) sectors, clearly had non-powered hand tools as an elevated risk. The shearing sector was the only one with an enhanced risk for fixed plant (noting that fixed plant was also one of the nine common fatal hazards across all sectors).

Further, there were an additional eight hazards that were identified as being present in at least 75% (n=9-11) of the sectors involved in the project. These included quads (nine sectors - 34 deaths); livestock/fish (nine sectors - 24 deaths: horse 10, cattle 9, fish, sheep, deer); trees (nine sectors - 6 deaths); and, silos (ten sectors - 3 deaths).

Implications for relevant stakeholders

There is a large array of hazards and risks with potentially fatal outcomes and/or serious injury consequences within the participating sectors. While there are undoubtedly individual variations across the sectors, as a general rule the sectors are more similar to each other than not. Overall, of the 34 hazards identified, 24 of these were present across at least 75% (nine) sectors. This provides an opportunity for co-investment to address relevant identified risks.

Recommendations

The following recommendations are in accordance with the RSHA objective of using evidence-based information to make informed collaborative RD&E investment decisions, where investment can have both human and economic impact.

Recommendation 1: Initiate a cross-sectoral implementation program addressing five key risks. Fatalities - from mobile plant, vehicles and electrical hazards: Serious Injury - from manual handling, along with slips, trips and falls.

These hazards are universal across all sectors and impose a disproportionate burden. Mobile plant - which is inclusive of boats, tractors, quads, bobcats, forklifts, harvesters etc., results in 43% of all deaths in the participating sectors. Meanwhile, vehicles (utes, cars, trucks, SSV, trailers, aircraft and motorbikes), account for a further 25% of deaths. Electrical hazards are well recognised as a risk and while modest in their contribution to the overall burden in this dataset (n=6 fatalities), could provide a conduit through which to implement an effective intervention program. While there are other hazards that are universal across all sectors (or nearly all sectors), notwithstanding the catastrophic consequences for individuals, families and businesses, they are relatively rare events e.g. the next leading agents of death after vehicles is water (n=18; 8%) across three sectors.

The attention to fatalities should be accompanied by addressing those issues that result in serious injury and have a high burden in workers compensation, inclusive of manual handling and slips, trips & falls (noting we are unable to disaggregated falls from height versus those on the same level in the data). The program would be strongly extension focused (i.e. assisting farmers/fishers to implement safety actions/systems). Although there

are numerous barriers that have been highlighted in the literature, there are also clearly defined solutions that not only draw on the hierarchy of controls, but also have some existing traction with agricultural and fishing sectors (Franklin, King, McBain-Rigg, & Lower, 2015). These could form the basis of further work with farmers and fishers to optimise mechanisms that support enhanced WHS practice.

This program of work would be supported by the refinement/development of approaches that are directed at implementation (i.e. extension). Underpinning the project should be a specific research component assessing the impact of the project on fatality/workers compensation data, economic cost-benefits and structural changes (i.e. changes in safety actions/systems) across sectors. These are long term actions that will require sustained inputs to attain the desired outcomes. Further, given the behavioural change aspects required with some of the interventions, a realistic time period for successful action would be 5-10 years as a minimum.

Addressing these five risks would:

- (a) Target high risk fatal and serious injury compensation hazards across all sectors, with the potential to target specific population groups in different sectors where necessary e.g. older or younger cohorts, contractors.
- (b) Optimize safety impacts at farm/boat level.
- (c) Further describe changes in practices/system that enhance safety.
- (d) Provide a measure of cost-benefits by sector to further incentivise the adoption of safety measures/systems.
- (e) By including electrical hazards, it provides an exemplar and point of leverage into WHS where people are:
 - i. Already acutely aware/familiar of the dangers posed by the hazard.
 - ii. Are exposed to the hazard virtually every day and yet generally treat electricity with due caution because it is a “known” hazard - reflected in the relatively small number of fatal (n=6) and proportion of workers compensation cases (<2%) across all sectors.
 - iii. Would be well supported by linkage to electricity and Work Health and Safety agencies (i.e. potential for partnerships on program).
 - iv. There are existing practical controls available that are not onerous to implement (i.e. controls are seen as practical by farmers/fishers).
- (f) Provides an opportunity for co-investment with other agencies/partners e.g. Australian Maritime Safety Authority, Farmsafe Australia, state based Primary Industry organisations, Seafood Industry Australia, Energy Authorities and Work Health and Safety Authorities. For example, the RSHA may wish to focus on the research and evaluative components of such a program, while funding for design and implementation of content are funded through alternate sources. Such an approach would add value to the initiatives, while also enhancing the robustness of the science and evidence-base underpinning investment decisions about what does and does not work to reduce injury.

- (g) The cross sectoral focus on specific issues, does not preclude individual sectors also targeting additional and/or unique risks that they may encounter. For example, the inclusion of non-powered hand tools as a source of injury in the aquaculture, poultry (egg and chicken meat), plus wild-catch sectors, appears highly relevant. Similarly, work around animal handling for those sectors with larger stock, would be beneficial.

Recommendation 2: Maintain a watching brief on Mental Health and Wellbeing (MHW) initiatives and seek suitable partnership arrangements where feasible

A watching brief on MHW issues should be maintained to ascertain developments and potential opportunity for co-investment in relation to enhancing rural mental health research. On-going liaison with the group managing the “Orange Declaration” would be a useful starting point. To maximize outcomes and enhance return on investment, any future programs need robust evaluation and should be undertaken as a partnership with an existing agency working in the field.

- (a) Actions targeting MHW already underway by respective RDCs, should be continued and included as an agenda item at RSHA meetings to facilitate learnings from these activities.

Recommendation 3: Establish an expert panel to assist with the provision of advice on future Work Health & Safety technology developments

Attention be directed to assist in identifying WHS factors associated with the development and adoption of new production approaches/technology. It is proposed that a small panel of experts with suitable expertise (automation, robotics, agronomist/fisher/aquaculturist, work health and safety), be established under the auspices of the RSHA partners. The role of this panel would be to assess new approaches/technologies in relation to potential WHS implications. RSHA partners could submit particular issues to this panel for review and they could report independently to partners. The panel may meet only 2-3 times per year and provide a highly cost-efficient mechanism upon which to gauge future WHS issues of relevance to the sectors. Additionally, the panel should also have the capacity to co-opt persons with high-level expertise for specific issues if deemed necessary.

Subject to the success of the panel in the initial instance, a further extension of this approach could include the assessment of cost-benefits and the determination of behavioural economic factors that may enhance adoption. This would require the inputs of an agricultural and/or health economist to provide some estimation of cost-benefit (or similar), plus inputs from a behavioural economist.

Recommendation 4: Initiate a program of work to assess and reduce the negative impacts of fatigue on WHS in the agriculture and fisheries sectors

Further research on the contribution and role of fatigue, along with examination of approaches to ameliorate the risks, are required across all sectors. It is well established that fatigue increases injury risk, (Lilley et al., 2015) however little is known of approaches to address these risks within agricultural and fishery sectors. It is proposed that specific options that may minimise the impacts of fatigue are identified with each RSHA partner. These should then be mapped against the known controls that have been defined/raised in the literature to assess their validity. Where a solid match is identified, pilot program(s) that incorporate a robust evaluation framework to objectively quantify the impact on fatigue and also qualitatively assess the “acceptability” of these measures to farmers/fishers, should then be undertaken. Drawing on the lessons learnt, which could be shared across RSHA partner sectors, broader extension programs may be developed.

Introduction

The Rural Safety and Health Alliance (RSHA) aims to facilitate cross-sectoral research development and extension (RD&E) to minimise the negative impacts associated with death, injury and illness, plus maximise the benefits of a productive, healthy and safe rural workforce.

This project of the RSHA, is designed to provide a detailed matrix outlining the commonalities of injuries, deaths and risks across rural sectors. This evidence-based information will then be used by the RSHA to make informed collaborative RD&E investment decisions, where investment can have both human and economic impact.

Participating Research and Development Corporations (RDCs), were AgriFutures Australia, Australian Eggs, Australian Pork, Australian Wool Innovation, Cotton Research and Development Corporation, Dairy Australia, Fisheries Research & Development Corporation, Grains Research & Development Corporation and Meat & Livestock Australia.

Objectives

The purpose of the study is:

1. To identify unique and common health and safety risks with the potential for death, injury or illness across different sectors.
 - a. Investigate common injury, illness and deaths across all sectors.
 - b. Investigate common Work Health and Safety (WHS) risks across all sectors.
 - c. Investigate individual sectors unique issues.
 - d. Investigate mental health and well-being issues.
2. To develop a comprehensive matrix outlining the clear overlaps and unique issues for each industry, as well as issues of commonality including mental health and well-being.
3. To identify and provide recommendations on priority investment areas and co-investment opportunities.
4. Compile a final report supporting analysis for the matrix and findings.

Methodology

There are four major data related components to this study that inform the development of the detailed matrix assessing the commonalities of risks across the participating sectors:

1. Fatality data - derived from the National Coroners Information System (NCIS)
2. Workers compensation data - derived from the National Data Set for Compensation-Based Statistics (NDS) managed by Safe Work Australia (SWA)
3. Zoonotic illness information from the Australian National Notifiable Diseases Surveillance System; and,
4. Qualitative Assessments - feedback from a range of stakeholders within each of the participating RDC's and external providers inclusive of issues addressing mental health and wellbeing.

Each of these elements were then drawn upon to develop individual hazard and risk profiles for the participating sectors. These data were then used to develop a matrix identifying hazards and risks that overlap or are unique among the sectors.

Fatality Data

The NCIS, is the central repository of information about every death reported to an Australian coroner. When a death occurs, an electronic file is created (usually within one week of the incident being notified). As part of this file, the location of the incident which causes the death is recorded, with one of the locality indicators recorded being "farm". Data for the wild-catch and aquaculture sectors were identified by reference the respective industry occupation codes within NCIS. For this review, data were assessed from July 1 2014 through to June 30 2019, a period of five years (National Coroners Information System, 2020). For farm-related incidents, all cases are included where: (i) the person died unexpectedly and the cause of death is unknown; (ii) the person died in a violent or unnatural manner; and, (iii) a doctor has been unable to sign a death certificate giving the cause of death. For each case, preliminary information is uploaded into the NCIS and these remain 'open' until the coroner hands down a final determination and the case is then 'closed'. In each NCIS case, a cause of death is determined and recorded by a coroner, with specific cause of death details independently coded by the Australian Bureau of Statistics (ABS) against the International Classification of Disease 10 (ICD-10) (World Health Organisation, 2004).

Data extraction from NCIS involves two inter-related processes. Firstly, a commercial media tracking organisation (Meltwater) is used to scan approximately 2,500 daily, weekly and monthly publications Australia wide. Publications are scanned for various designated search terms (e.g. "farm*", "property", "growers", "producers", "horticulture"). Where a potential on-farm case is identified, the corresponding NCIS case file number is obtained for this 'open' case. This process has been used since 2005 and has proven to be reliable in identifying potential case events for inclusion. However, as not all cases are reported in the media, there is potential for cases to be under-numerated. Consequently, the second approach to identifying cases of relevance relies on keyword searches of the NCIS (farm*) for each year. These cases are then reviewed with those that are not farm-related or are confirmed as intentional by the coroner, being withdrawn from the dataset. Only cases that have been attributed to non-intentional injury have been included in the analyses, with cases involving natural causes (as determined by the autopsy) e.g. a heart attack or other medical condition, excluded.

The available NCIS data for farm-related cases are coded using the Farm Injury Optimal Dataset, with farm fatalities including both work and non-work related activities. The dataset provides specific codes on demographics, Australian and New Zealand Standard Industrial Classification (ANZSIC), role in event (e.g. operator, bystander, passenger), work relatedness, adult supervision, relevant causal agents of injury (dams, tractors, quads, vehicles [utility, truck, car] etc.), mechanism of injury and other context specific information as applicable, such as helmet usage, loads and rollover/runover. The dataset has been widely used in other Australian farm injury studies (Herde & Lower 2013). While tractors and quads are designated as mobile plant and motorbikes are classed as a vehicle, for the purpose of this report, they have been categorised and reported separately given the injury burdens they impose.

Data for all deaths on farms in the five year period under examination through to June 30 2019, were extracted from the NCIS database. To ensure that case numbers are not under-numerated, 'open' cases have been included in this review. The NCIS typically contains the following documents: (a) police investigation reports; (b) autopsy reports; (c) supporting forensic medical reports (such as toxicology); and, (d) coronial findings. Whilst 'open' cases have some limited detail, they do not allow full access to these aforementioned reports until the case is 'closed' by the coroner.

Each NCIS case in the dataset is classified against the relevant ANZSIC code for the respective commodity sector, where feasible. For this review - the ANZSIC codes (and groupings) utilised for the RSHA partners, are outlined in Table 1. For some sectors, most notably beef cattle, sheep/wool, mixed livestock (sheep-beef) and mixed farming (grain/sheep/beef), the available data do not always enable precise industry allocation. For example, while it may be reported that a tractor related fatality occurred on a mixed farming (Grain-Sheep or Grain-Beef) property, there may not be sufficient case detail to align it to specific activities related to grain, sheep or beef related work practices. In such circumstances, it was deemed simply as being a mixed farming incident (i.e. either Grain-Sheep or Grain-Beef). Data for export fodder is linked to a broader cluster of industries that are defined under Other Crop Growing (n.e.c.).

Table 1: ANZSIC codes and sector groupings

Sector	Sub-category	ANZSIC Code
<i>Beef</i>	Beef Cattle Farming (Specialised)	0142
	Beef Cattle Feedlots	0143
	Sheep-Beef Cattle Farming	0144
	Grain-Sheep or Grain-Beef Farming	0145
<i>Chicken Meat</i>	Poultry Farming (Chicken Meat)	0171
<i>Cotton</i>	Cotton Growing	0152
<i>Dairy</i>	Dairy Cattle Farming	0160
<i>Eggs</i>	Poultry Farming (Eggs)	0172
<i>Export Fodder*</i>	Other Crop Growing n.e.c.	0159
<i>Fisheries: Aquaculture</i>	Offshore Longline and Rack Aquaculture	0201
	Offshore Caged Aquaculture	0202
	Onshore Aquaculture	0203
<i>Fisheries: Wild-catch</i>	Rock Lobster and Crab Potting	0411
	Prawn Fishing	0412
	Line Fishing	0413
	Fish Trawling, Seining and Netting	0414
	Other Fishing	0419
<i>Grains</i>	Other Grain Growing	0149
	Grain-Sheep or Grain-Beef Farming	0144
<i>Horses</i>	Horse Farming	0191
<i>Pork</i>	Pig Farming	0192
<i>Sheep</i>	Sheep Farming (Specialised)	0141
	Sheep-Beef Cattle Farming	0144
	Grain-Sheep or Grain-Beef Farming	0145
	Shearing Services	0522

*These data represent figures where fodder production was occurring, however it cannot be determined if this was export specific.

Economic Analysis

Fatality data were collated for each of the industry groupings outlined in Table 1 and a basic estimate of economic costing compiled. The economic model adopted has been previously used with other agricultural death related studies. (Lower, 2013; Pollock, Griffith, & Fragar, 2012) In summary, the model includes loss of future earnings, loss of household contributions, insurance payouts, investigations by Work Health Authorities, police investigations, premature funeral costs, coronial costs, ambulance and hospital expenditure. The estimated cost of each fatality was rounded to \$2 million (based on 2019 AUD) and is in line with other impact studies that have assessed agricultural sectors in recent years (Lower

& Peachey, 2019; Lower & Pollock, 2017). There are also well documented limitations to this costing process, hence it is reasonable to assume that these estimates are conservative in nature and are lower than the true costs e.g. the model does not consider the major social costs associated with such fatal events.

Workers Compensation Data

The National Data Set for Compensation-Based Statistics (NDS), is managed by Safe Work Australia (SWA) and is the primary source of information on work-related injuries and diseases nationally. Each state provides their workers' compensation data to SWA for compilation on an annual basis. Cases are classified as either short term (0–4 days) or serious (5+ days) claims. A standardised coding approach, The Type of Occurrence Classifications System, Version 3.0 (TOOCS3.0), is used to improve the quality of the NDS data by enabling jurisdictions to code more consistently and reduce the use of dump (empty) codes (Australian Safety and Compensation Council, 2008).

Short term claims are those which are accepted for between 0-4 days absence from work. Serious claims are those that are accepted for an incapacity that results in a total absence from work of one working week or more. Claims in receipt of common-law payments are also included. Claims arising from a journey to or from work or during a recess period are not compensable in all jurisdictions and are excluded. Serious claims exclude compensated fatalities.

This study has utilised SWA data for the 5-year period covering 2013-14 to 2017-18. Data for 2017-18 are provisional in nature and it is expected that further cases will be added in time, as cases are compensated. Data provided from SWA included the numerical data on the number of cases, information on the age, gender, mechanism and agency of injury. A summary of these terms is provided in Table 2.

Table 2: Definition of key variables from the NDS

Variable	Description
Mechanism	Is used to describe the action, exposure or event that best describes the most serious injury or disease e.g. falls, trips & slips (how the incident happened)
Agency	The agency of injury/disease refers to the object, substance or circumstance directly involved in inflicting the most serious injury or disease (broad categories).

Within each of these variables there is a further sub-classification with mechanism having 10 codes and agency nine codes. The mechanism code is allocated on the basis of the overall circumstances of the incident, rather than on the specific direct cause of the injury/disease. In contrast, the agency code is related to the direct cause of the injury/disease. (Australian Safety and Compensation Council, 2008) Examples of these fields and coding are provided in Table 3 (mechanism) and Table 4 (agency). For the available data from SWA, the agency data does not provide granular detail e.g. tractors and boats would simply be classed as "mobile plant and transport". Notwithstanding this limitation, some solidly based inferences can be drawn from conjoint examination of both mechanism and agency.

Table 3: Categories of key mechanism variables and typical examples

Categories	Examples
Being hit by moving object	Contacted by an animal/fish, vehicle, machinery, runovers
Body stressing	Lifting, carrying, moving objects
Falls, trips and slips	Includes falls from heights and on same level
Vehicle incidents	Involvement as operator/passenger of car, truck, tractor, forklift, plane, etc
Hitting objects with part of the body	Walking into/cutting from an object, hit with hand tool (e.g. hammer), knife cut
Biological factors	Zoonotic illness e.g. Q Fever, leptospirosis
Heat, electricity and environmental factors	Hot water, welding flash, electrical current, drowning/immersion
Chemicals and other substances	Chemicals & other factors - Acids, dermatitis, pesticides/herbicides, poisonous marine bites/stings, spiders, dust/fibre inhalation
Mental stress	Traumatic event e.g. witnessing fatal incident, work pressure, harassment
Sound and pressure	Noise from equipment, pressure when diving

Table 4: Categories of key agency variables and typical examples

Categories	Examples
Animal, human & biological	Livestock/fish, fatigue, zoonosis
Environmental	Water (ocean, dam, creek, irrigation channel etc), fencing, trees, embankment, hole in ground, steps/walkways
Mobile plant & transport	Tractors, boats, quads, utes, motorbikes,
Non-powered hand tools, appliances & equipment	Hammers, shovels, knives, ladders
Materials & substances	Hay/wool/cotton bales, trees (felled), stockfeed, fire, hot water
Machinery & fixed plant	Irrigation pumps, forklifts, engines, conveyor belts, shearing plant, grain augers
Powered equipment, tools and appliances	Angle grinders, chainsaws, drills, oxy-acetylene, firearms
Chemicals	Animal husbandry, diesel, detergents, herbicides and pesticides
Other & unspecified agencies	

Information on the total and median approved compensation claims for short term (0-4 days) and serious (5+ days) costs was also provided for each of the ANZSIC codes under investigation. Note, there is no standalone ANZSIC code for export fodder, rather it is one component of the code for Other Crop Growing (n.e.c.). Given the disproportionate impact of the serious claims (5+ days) in relation to both the burden of trauma and economic costs, these data are the main focus of attention for the workers compensation findings.

The commercial wild-catch fishing and aquaculture sectors include eight ANZSIC codes. Data for each of these sectors emanating from this report have been made available to the Fisheries Research and Development Corporation (FRDC), whilst a generic "Fisheries" grouping has also been developed that is inclusive of wild-catch fishing and aquaculture. Additionally, based on the recommendation of the FRDC, these data have been aggregated into the "Aquaculture" and "Wild-catch" sub-categories for presentation within this report.

This will also protect the confidentiality of persons' injured, due to low case numbers in several sectors. Unlike the agriculture sector, all fatality and incident data for the wild-catch fishing and aquaculture are 'work-related'. In this manner, any fatalities and/or injuries incurred by recreational fishers are not captured by these sources of data. This in turn represents a considerable underestimate of the safety burden associated with fishing in its broadest sense. However, capturing the safety burden of the recreational fishing sector was not within the scope of this project.

Data are also provided for the "Agriculture" sector (i.e. agricultural ANZSIC codes participating in the RSHA) and the "Fisheries & Aquaculture - F&A" grouping (i.e. all fisheries ANZSIC codes), to provide a basis for comparison for each overall industry sector.

For the economic costings, median figures are presented to limit the disproportionate influence that one (or a small number) of large claims, may have on the results. This approach is consistent with that of SWA. As data were obtained from SWA on an annual basis, the overall median of the yearly figures is presented.

There are known limitations with the workers compensation dataset:

1. While all employees are required by law to be covered by workers' compensation insurance (and their data would be entered into the NDS), employers (self-employed farm and boat owners), are not. Due to the dominance of family-based businesses in the agricultural and fishing sectors, they may not be paying working family members a wage and hence, are not eligible for workers' compensation or are disinclined to claim workers' compensation in the event of an injury. Alternatively, workers may be functioning under share-farming or share-catch agreements, and do not have data recorded in the NDS. Consequently, many injuries are therefore not recorded in the NDS.

"...these data understate the full extent of injuries in this sector because only half of the workers in this sector are eligible for workers' compensation and many of those who are eligible did not put in a claim for their injury (p21)"(Safe Work Australia, 2013).

2. Diseases are significantly under-represented in workers' compensation statistics due to the inability to link long term exposure and/or long latency periods of disease (Safe Work Australia, 2020a).
3. The impact of issues such as fatigue and Alcohol and Other Drugs on the occurrence of incidents is difficult to ascertain.

Zoonotic Illness Data

Whilst the SWA data include zoonoses where they impact on an employee, there are significant limitations to the coverage of these data. Zoonoses are diseases that animals pass to humans (note this does not include mosquito based illnesses such as Ross River or Barmah Forest virus - these are classified separately as vector borne diseases). The Australian National Notifiable Diseases Surveillance System, identifies a total of eight zoonoses (Table 5) (Australian Government Department of Health, 2020).

Table 5: Reportable zoonotic diseases in Australia

Anthrax
Australian bat lyssavirus
Brucellosis
Leptospirosis
Lyssavirus (NEC)
Ornithosis
Q fever
Tularaemia

Of these, the most pertinent to the agricultural sector are *Brucellosis*, *Leptospirosis* and *Q Fever*. Key risk areas include - pig hunters (*Brucellosis*), beef/dairy/horse/sheep producers (*Leptospirosis* & *Q Fever*). Additionally, other zoonoses not listed in this classification that may have an impact include *Cryptosporidium* (dairy), *Salmonellosis* (poultry - eggs/chicken meat), *Chlamydia* and *Hendra* (horse), swine flu (pork) and avian influenza (poultry - eggs/chicken meat and pork).

The profile of potential zoonotic illness in the fisheries sector is markedly different to that of agriculture. The majority of illnesses that can impact on human health from handling fish (i.e. excluding eating product), are bacterially based (NSW Department of Primary Industries, 2020). Typically, these cases involve spine/pincer puncture or open wounds being infected resulting in topically acquired infections (skin infections). Topically acquired zoonoses from fish are not numerous, but individual cases may be severe and have major impacts on human health (Haenen, Evans, & Berthe, 2013).

A list of topically acquired human infections and their clinical effects is highlighted in Table 6.

Table 6: Zoonoses from fish

Bacteria	Clinical Effects
<i>Aeromonas hydrophila</i>	Serious infection uncommon Usually in immuno-compromised individuals; cellulitis, muscle necrosis or septicaemia
<i>Edwardsiella tarda</i>	Soft tissue infections; arthritis; septicaemia; gastroenteritis; meningitis; osteomyelitis
<i>Erysipelothrix rhusiopathiae</i>	Skin infection (on hands), septicaemia, endocarditis (rare); lymphangitis
<i>Streptococcus iniae</i>	Suppurating ulcers; cellulitis; Lymphadenitis; septicaemia; Endocarditis and arthritis
<i>Vibrio spp.</i>	Lesions; gastroenteritis; septicaemia
<i>Mycobacterium marinum</i>	Skin lesions (usually hands); ulceration and inflammation of joints
<i>Salmonellosis</i>	Septicaemia; abdominal pain; diarrhoea; nausea; vomiting

Source: NSW Department of Primary Industries (NSW Department of Primary Industries, 2020)

Qualitative Assessments

There were two sub-components within the qualitative component of this study:

1. Discussion with RDC representatives and associates examining a range of issues within their sector;
2. Examination of issue specific information related to mental health and wellbeing with relevant stakeholders.

RDC Representatives

To optimise stakeholder inputs, each of the RDC representatives were provided by email with one-page infographics (see example Appendix 1). These provided a basic review of the fatal and workers compensation data in their specific sector. A stakeholder protocol guide for the interviews to be undertaken was also developed and circulated with this information (Appendix 2). The interview guide questions were based on the objectives of the study and utilised the Health Belief Model (HBM) as a theoretical basis, upon which future interventions could be based (Becker, 1974). By way of example, the HBM consists of six inter-related elements - in this instance referring to:

1. Perceived susceptibility to injury i.e. do I really think I will be injured?
2. Perceived severity of injury i.e. how badly will I be hurt if things go wrong?
3. Barriers to adopting safety behaviours i.e. what makes it hard for me to make changes?
4. Benefits of adopting behaviours i.e. what's in it for me if I do make changes?
5. Self-efficacy i.e. how much control do I have of the situation to be able to make changes?
6. Cues to action i.e. what would prompt/assist me to make changes?

RDC representatives were provided the opportunity to include any additional persons which they felt could add value to the discussions (Appendix 3).

Information from the interviews were documented by the researchers and were then reviewed to identify recurring themes and overlaps. This information in conjunction with the fatality and workers compensation data and existing WHS regulatory requirements were used to inform the first iteration of summary documents assessing unique hazards and risks in each sector, plus the overlap of these issues across sectors. These summary documents were then distributed to each of the RDC representatives and their networks for subsequent input. Further development of these documents formed the basis of on-going refinements to the final matrix. In the final matrix, related sectors were aggregated for beef cattle-beef feedlots (beef) and sheep-shearing (sheep).

Mental Health & Wellbeing

A snapshot review of existing recent literature pertinent to farmer and fisher mental health and wellbeing, was undertaken focusing of information from 2018-current. Discussions were undertaken with a range of individuals / organisations that are currently, or have, worked in this field (Appendix 3). The discussions centred on several areas of interest:-

1. What research or intervention activities are currently in progress?
2. If undertaking an intervention, what is the evidence-base for this approach?
3. What do they see as the major touchpoints to enhance mental health and wellbeing for farmers/fishers?
4. What does the overall landscape look like for mental health research/initiatives?
5. If they had to invest in initiatives in this area, what would they focus on?
6. Other points of interest that may be important to enhance mental health and wellbeing for farmers/fishers?

Information was collated and issues identified to inform the study recommendations.

Development of Hazard/Risk Profiles and Matrix

For each sector, a review assessing the existing evidence on health and safety was completed. To streamline the large number of individual sectors to a manageable level, the review of sectors took into account information pertaining to the breakdown of inter-related groupings previously outlined in Table 1. This reduced the 22 sectors to a more modest collection of 12 sectors.

The review took account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of how often workers are exposed to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

The data underpinning these assessments were derived from earlier components of this study:

- National Coronial Information System - fatality data
- Safe Work Australia - workers compensation data
- Industry knowledge - qualitative feedback and existing understandings

Information within the sectoral profiles, included the identification of specific hazards based on the data. These were then accorded a severity, frequency of exposure and overall risk rating. The severity rating was based on the human impact of the most severe injury or illness caused by that hazard. Each identified hazard was provided a rating ranging from 1 to 5, where 5 indicates a fatality and 1, the lowest severity.

The frequency rating takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 being the highest and 1, the lowest exposure.

The overall risk rating (scale 1 to 5), was then derived from both the severity of the consequence and frequency of exposure to the hazard. In all cases where deaths have resulted, the highest rating was applied due to the potential for catastrophic outcome, i.e. 5. Evidence to support ratings was based on the following items (Table 7) and documented in the risk rating column. In addition, provision was made to highlight some major associated risks that impact on each hazard with a free text field.

Table 7: Classification of reference items underpinning the risk rating

Rating	Reference Item
1	Fatalities registered in sector during current study period 2014-15 to 2018-19
2	Fatalities registered in sector during earlier period 2001-2013/14
3	Fatalities registered in other sectors during current study period 2014-15 to 2018-19
4	Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2017-18
5	Industry knowledge

Information from the individual sectoral reports, was then used to define the overlap for hazards across all of the participating commodities. This included the identification of specific hazards, the nature of the risk they imposed and then an acknowledgement of which industries they did and did not pose a risk in. To allow the matrix to be more user-friendly and to limit the potentially extensive number of individual hazards, some issues were grouped (like with like). For example: electrical powerlines and systems; powered and non-powered hand tools; fuels and fertilisers; wool/hay/cotton bales; utes/cars/trucks/SSVs; mobile plant and attachments.

Results

Fatality Data

A total of 344 agricultural and 16 fishery fatalities (n=360) were identified for the five year period from coronial records. Of the 344 agricultural cases, 223 (65%) could be definitively linked to an ANZSIC code related to one of the industries represented by RSHA partners. Overall, 193(87%) of these had been formally closed by a coroner, with the balance of cases 30 (13%), remaining under further investigation “open”. For the fisheries data, all 16 cases had been closed, were work-related and could be directly linked to one of the relevant ANZSIC codes.

Fatality data for the relevant ANZSIC code(s) are presented in Table 8 for all agents of injury where five or more cases have occurred. This process is an ethical requirement of access to the NCIS data set to ensure the anonymity of case information. Agents with fewer than five cases are denoted with an asterisk. Details include the total number of cases, the proportion of cases that have been finalised and “closed” by a coroner, the relative proportion of incidents that were work related and the proportion of incidents involving persons older than 50 years of age. For sectors with fewer than five cases for any given agent of injury, data are listed in order of magnitude in the “Agents” column. Please note there were no recorded fatal cases in the aquaculture, eggs or shearing sectors in the period.

For the agricultural sectors - quads (16% of total), tractors (13%), mobile plant (9%), utes (6%) and motorbikes (6%) are common agents, accounting for just under half (48%) of all fatal incidents. For commercial wild-catch fishing and aquaculture, unsurprisingly drowning is the major issue, with all fatalities limited to the wild-catch sector. Based on the estimate of \$2 million per case (Lower & Peachey, 2019; Lower & Pollock, 2017), the overall conservative cost of these fatal incidents is approximately \$446 million.

Table 8: Fatal incidents, work-relatedness and agents (2014-15 to 2018-19) in selected sectors

Sector	No. Deaths	Closed Cases (%)	Work related n (%)	> 50 Years (%)	Agents
Beef	84	73 (87%)	63 (75%)	49 (58%)	Quads (16), cattle (8), motorbikes (8), helicopter (7), ute (6), tree (5), mobile plant (forklift, grain auger, mobile stock feeder, post driver), horse, car, gyrocopter, SSV, tractor, aeroplane, truck, vehicle (NEC), fuel, animal dip, stock yards, dam, powerline, shed, fire, firearm, pump, stump, water tank
Chicken Meat	*	* (100%)	* (100%)	* (25%)	Forklift, tractor, truck
Cotton	7	6 (86%)	6 (86%)	0 (0%)	Ute, aeroplane, tractor, trailer, water tank
Dairy	20	18 (90%)	17 (85%)	14 (70%)	Tractor (7), quad, motorbike, cattle, truck, hay bale, pump, shed, mobile plant (spreader), grinder, ladder
Export Fodder	*	* (100%)	* (100%)	* (100%)	Mobile plant, hay baler, quad, hay bale
Grain	16	13 (81%)	15 (94%)	6 (38%)	Mobile plant (field bin, chaser bin, header, planter, slasher), tractor, silo, powerline, aeroplane, helicopter, shed, truck
Horse	9	6 (67%)	6 (67%)	* (33%)	Horse (5), tractor, SSV, horse trailer, hay baler
Mixed Farming #	21	19 (90%)	16 (76%)	13 (62%)	Tractor (5), quad, mobile plant (bobcat, slasher, mobile plant NEC), trailer, snake, silo, tyre, firearm, tree, water storage, horse, lightning
Mixed Livestock^	8	6 (75%)	7 (88%)	5 (63%)	Quad, tractor, animal (NEC), hay bale
Pork	*	* (100%)	* (100%)	* (0%)	Farm structure
Sheep	33	27 (82%)	26 (79%)	21 (64%)	Quad (7), tractor (5), ute, motorbike, water tank, SSV, trailer, aeroplane, mobile plant (field bin), portable loading ramp, lightning, rope, sheep, water
Wild-catch	16	16 (100%)	16 (100%)	* (25%)	Capsize (11), fell overboard, blood poisoning, envenomation
TOTAL	223	193 (87%)	181 (81%)	120 (54%)	Quad (34), tractor (26), mobile plant (19) ute (13), motorbike (13), boat capsize (11), horse (10), cattle (9), helicopter (8), dam (7), SSV (6), trailer (6), tree (6), water tank (6), aeroplane (5), farm structure, truck, car, fell overboard, gyrocopter, hay bale, powerlines, dam, firearm, lightning/storm, pump, shed, silo, animal other NEC, animal dip, blood poisoning, deer, dog, envenomation, fence (electric), fire/smoke, fuel, grinder, ladder, portable loading ramp, rope, sheep, snake, stock yards, stump, tyre, vehicle NEC, water, water storage NEC

NEC - Not Elsewhere Classified

No deaths in aquaculture, egg production and shearing sectors

*Case numbers <5

#Mixed Farming = cropping & livestock (sheep/cattle)

^Mixed Livestock = sheep & cattle production.

The leading activities being undertaken at the time of the fatal incidents for each of the sectors, are outlined in Table 9. For sectors with fewer than five cases for any given specified activity, data are listed in order of magnitude of occurrence.

Table 9: Fatal cases in the agriculture and fisheries sectors (2014-15 to 2018-19)

Sector	Activity
Beef	Mustering (23), travel while inspecting stock (15), feed/water stock (7), loading/unloading stock, travel while working, working with stock, spraying, transporting stock, fencing, clearing trees, machinery maintenance, vehicle maintenance, equipment maintenance, farm structure maintenance, fire-fighting, pest control
Chicken Meat	Loading/unloading stock, loading manure, machinery maintenance
Cotton	Irrigation, farm structure maintenance, vehicle maintenance, spraying, travel while working
Dairy	Feed/water stock, travel while inspecting stock, building maintenance, hay/fodder making, mustering, machinery maintenance, milking, spraying
Export Fodder	Hay/fodder making, ground preparation, travel while inspecting contractor
Grain	Loading/unloading grain, harvesting, spraying, planting, fertilising, machinery maintenance, building maintenance, aerial baiting
Horse	Working with stock (6), feed/water stock, travel while inspecting stock, hay/fodder making
Mixed Farming#	Machinery maintenance (6), harvesting, pest control, working with stock, hay/fodder making, fencing, farm structure maintenance, fertilising, slashing
Mixed Livestock^	Travel while inspecting stock, Feed/water stock, pest control
Pork	Feed/water stock
Sheep	Mustering (8), feed/water stock (6), travel while inspecting stock, farm structure maintenance, machinery maintenance, working with stock, earthmoving, loading/unloading wool bales, fire-fighting
Wild-catch	Trawling (12), setting or pulling traps, winching nets, crewing boat supporting diver
TOTAL	Mustering (33), travel while inspecting stock (27), feed/water stock (21), machinery maintenance (15), trawling (12), working with stock (10), spraying (9), building maintenance (6) hay/fodder making (6), farm structure maintenance (5), loading/unloading grain (5) pest control (5), fire-fighting, harvesting, loading/unloading stock, clearing trees, travel while working, earth moving, equipment maintenance, fencing, fertilising, irrigation, planting, setting or pulling traps, vehicle maintenance, aerial baiting, crewing boat supporting diver, ground preparation, loading manure, loading/unloading wool bales, milking, slashing, transporting stock, travel while inspecting contractor, winching nets

#Mixed Farming = cropping & livestock (sheep/cattle)

^Mixed Livestock = sheep & cattle production

Key Points - Fatality Data

- a. Not all sectors incurred fatalities during the five-year period examined.
- b. Participating agricultural sectors were linked to 65% and fisheries sectors to 100% of all fatal cases in the five-year period.
- c. The majority of deaths in the agriculture sector are work-related (81%), with all in the fishing sector being work-related. Work-related deaths dominate the data.
- d. Quads (16% of total), tractors (13%), mobile plant (9%), utes (6%) and motorbikes (6%) are common fatal agents across a number of agricultural sectors. These five agents account for just under half (48%) of all fatal incidents. A small number of agents are responsible for a disproportionate burden of the deaths, providing a key focus for prevention.
- e. For the commercial wild-catch fishing sector, unsurprisingly drowning is the major issue, predominantly occurring in the trawling ANZSIC sub-category. All incidents involved boats (mobile plant).
- f. Mustering (16% of all cases), is the number one activity being undertaken when fatalities occur in the agricultural sectors. Other significant activities include travel while inspecting stock (13%), feeding and watering stock (10%), machinery maintenance (9%) and working with stock (5%). As such, these five activities account for over 50% of fatal incidents and when matched against the key agents (listed above), strengthens the focus for preventative approaches in these sectors.
- g. The estimated cost of these fatal incidents is approximately \$446 million in the five year period (~\$90 million/annum). While likely an underestimate, there remains significant scope to reduce the financial implications of fatal injuries on the agricultural and fisheries sectors.
- h. The age groups most commonly involved in fatal incidents in agriculture are those over 50 years (56%), while fisheries incidents involved a younger cohort (75%). These figures are indicative of the sectors, with agriculture having a median of 56 years and the fishing sector 43 years (Australian Government, 2020).

Workers Compensation Data

The number of short term (0-4 days) and serious claims (5+ days) for each of the sectors based on the agency of injury, are outlined in Table 10. Additionally, data on the costs associated with these claims are presented. These data indicate a relatively consistent pattern across the sectors, with the median short term (0-4 day) claims falling within a range of \$550-\$1,100 each. Meanwhile, the median for serious claims (5+ days), ranges from just over \$7,000-\$15,500. The overwhelming burden of costs, are associated with the serious claims, accounting for well over 90% in most sectors.

Table 10: Number and costs associated with workers compensation claims (2013-14 to 2017-18p) in agriculture and fisheries sectors

Sector	No. Short (0-4 day) claims (Mean)	No. Serious (5+day) claims (Mean)	Cost Short (0-4 day) claims (\$Median)	Cost Serious (5+ day) claims (\$Median)	Total Cost	% of cost in serious claims
Aqua.	685 (135)	420 (85)	1,482,700 (500)	10,712,200 (7,400)	12,194,900	88%
Beef	1,870 (375)	2,270 (455)	6,418,600 (800)	70,679,200 (9,750)	77,097,800	92%
Chicken Meat	530 (110)	420 (85)	3,365,000 (700)	12,700,000 (8,200)	16,065,000	79%
Cotton	150 (30)	200 (40)	541,300 (800)	8,139,200 (12,220)	8,680,500	94%
Dairy	615 (125)	1195 (240)	166,470 (760)	43,488,800 (10,960)	43,665,000	96%
Eggs	350 (70)	335 (65)	1,065,300 (600)	10,902,500 (7,500)	11,967,700	91%
Export Fodder*	250 (50)	290 (60)	900,000 (700)	13,370,000 (11,100)	14,270,000	94%
Grain	265 (55)	430 (85)	998,000 (800)	15,364,000 (15,500)	16,362,300	94%
Horse	870 (175)	650 (130)	1,792,000 (600)	16,125,000 (11,800)	17,917,200	90%
Mixed Farming	905 (180)	1370 (275)	3,815,700 (880)	58,040,800 (12,100)	61,856,500	94%
Mixed Livestock	715 (145)	735 (150)	3,119,600 (920)	34,009,700 (11,740)	37,129,300	92%
Pork	540 (110)	415 (85)	771,100 (540)	12,498,300 (7,020)	13,269,400	94%
Shearing	320 (65)	965 (195)	1,436,400 (720)	40,660,300 (11,340)	42,096,700	97%
Sheep	135 (25)	370 (75)	405,000 (760)	12,350,600 (14,380)	12,755,600	97%
Wild-catch	90 (20)	250 (50)	472,700 (1,100)	8,313,800 (18,550)	8,786,500	95%
TOTAL					395,000,000	96%

p - denotes preliminary data for 2017-18

#Note - all figures rounded

*These data represent figures for all Other Crop Growing (n.e.c.) - fodder is one group within this coding, with other examples being peanuts, flax, lavender, hops etc.

Information on the mechanisms involved in the compensable claims, reflect the action, exposure or event that best describes the most serious injury or disease. Details are presented in Table 11 for individual sectors along with the aggregated data for agriculture (Agric.) and wild-catch fisheries/aquaculture (F&A.). To facilitate ease of interpretation, the variables have also been colour coded.

Over 70% of all incidents involved either body stressing, being hit by a moving object or falls, trips and slips. Within the agricultural sectors there was some differentiation between the large animal based sectors and those working with cotton, cropping, fodder or poultry (eggs and chicken meat). Shearing was also notable for the involvement of body stressing as the main mechanism. For wild-catch fishing and aquaculture, body stressing was the leading mechanism, with being hit by moving objects also prevalent. There was some variation with the wild-catch sub-component having a higher proportion of cases involving hitting objects with a part of the body.

Table 11: Mechanism of injury for serious claims (5+days) in the agriculture and fisheries sectors (2013-14 to 2017-18p)

MECHANISM BY INDUSTRY SECTOR																	
RANKING 5+ DAYS	Aqua.	Beef	Chicken Meat	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild- catch	Agric. Total	F&A. Total
1	39%	35%	42%	28%	40%	33%	31%	26%	60%	32%	26%	34%	42%	30%	29%	32%	36%
2	25%	27%	21%	23%	22%	31%	31%	24%	26%	25%	23%	25%	33%	26%	27%	22%	23%
3	17%	19%	20%	23%	18%	22%	26%	24%	7%	21%	22%	18%	11%	19%	19%	21%	21%
4	8%	12%	10%	15%	11%	9%	10%	12%	3%	12%	20%	11%	7%	15%	14%	15%	10%
5	4%	6%	2%	11%	7%	5%	1%	10%	2%	8%	7%	9%	5%	11%	7%	8%	5%
6	2%	1%	1%		2%		1%	4%	1%	1%	1%	1%	2%		1%	1%	2%
7	2%		1%						1%	1%	1%	1%			1%	1%	2%
8	2%		1%								1%	1%			1%	0%	1%
9	1%		1%													0%	1%
10	1%		1%													0%	1%

p - denotes preliminary data for 2017-18

*All figures rounded - may exceed 100%

Colour Key	Mechanism description
	Being hit by moving object - Contacted by an animal/fish, vehicle, machinery, runovers
	Body stressing - Lifting, carrying, moving objects
	Falls, trips & slips - Includes falls from heights and on same level
	Vehicle incidents - Involvement as operator/passenger of car, truck, tractor, forklift, plane, etc.
	Hitting objects with a part of the body - Walking into/cutting from an object, hit with hand tool (e.g. hammer), knife cut
	Biological factors - Zoonotic illness e.g. Q Fever, leptospirosis
	Heat, electricity & other environmental factors - Hot water, welding flash, electrical current, drowning/immersion
	Chemicals & other factors - Acids, dermatitis, pesticides/herbicides, poisonous marine bites/stings, spiders, dust/fibre inhalation
	Mental stress - Traumatic event e.g. witnessing fatal incident, work pressure, harassment
	Sound & pressure - Noise from equipment, pressure when diving

The agency of injury data identify the object, substance or circumstance directly involved in inflicting the most serious injury or disease. Results are presented in Table 12 for individual sectors along with the aggregated data for agriculture (Agric.) and fisheries/aquaculture (F&A.). To facilitate ease of interpretation, the variables have also been colour coded.

There was a greater diversity of agencies involved in incidents across the participating sectors, than was the case with the mechanism data. Within the agricultural sectors, animal, human and biological agencies accounted for over one-third of all cases. Again, this pattern was particularly evident for the large animal based sectors. By way of contrast, those agricultural sectors involving cropping, cotton and fodder, had greater involvement of mobile plant and transport. Poultry (eggs and chicken meat) both had a more significant profile involving non-powered hand tools and equipment, with neither animal, human and biological or mobile plant and transport accounting for more than 10% of cases. The impost of shearing plant (within the machinery and fixed plant category), is also clearly discernible for the shearing sector.

For wild-catch fishing and aquaculture, the pattern of mechanisms involved was relatively similar. However, it is worth highlighting that almost half of the wild-catch cases (41%), involved non-powered hand tools and equipment, compared to 29% in the aquaculture sub-component. Similar proportions of incidents involved environmental, material and substance factors across wild-catch fisheries and aquaculture, although the aquaculture grouping had 14% of incidents that involved mobile plant and transport.

There were an extremely small proportion of cases involving sound and pressure, mental stress, chemicals, heat/electricity and biological mechanisms in both agriculture and fisheries.

Table 12: Agency of injury for serious claims (5+days) in the agriculture and fisheries sectors (2013-14 to 2017-18p)

AGENCY BY INDUSTRY SECTOR																	
RANKING 5+ DAYS	Aqua.	Beef	Chicken Meat	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild- catch	Agric. Total	F&A. Total
1	29%	35%	32%	24%	36%	30%	23%	23%	63%	23%	28%	35%	46%	32%	41%	33%	33%
2	18%	22%	16%	24%	19%	24%	18%	19%	11%	20%	21%	16%	23%	18%	16%	17%	17%
3	14%	19%	15%	16%	16%	13%	18%	19%	7%	19%	18%	15%	11%	15%	15%	15%	13%
4	13%	9%	13%	14%	11%	12%	16%	16%	6%	13%	10%	13%	8%	10%	9%	11%	12%
5	10%	7%	11%	11%	10%	9%	12%	10%	6%	12%	10%	11%	7%	8%	9%	9%	9%
6	10%	6%	8%	5%	5%	6%	7%	9%	5%	5%	9%	5%	4%	8%	5%	7%	8%
7	5%	1%	4%	3%	2%	5%	5%	5%	1%	5%	3%	4%	2%	6%	3%	6%	4%
8	2%	1%	2%	3%	1%	1%	1%		1%	2%	1%	1%	1%	3%	2%	1%	2%
9																<1%	<1%

p - denotes preliminary data for 2017-18

*All figures rounded - may exceed 100%

Colour Key	Agency description
	Animal, human & biological - Livestock/fish, fatigue, zoonosis
	Mobile Plant & Transport - Tractors, boats, quads, utes, motorbikes,
	Environmental - Water (ocean, dam, creek, irrigation channel etc.), fencing, trees, embankment, hole in ground, steps/walkways
	Material & Substances - Hay/wool/cotton bales, trees (felled), stockfeed, fire, hot water
	Non-powered hand tools, appliances and equipment - Hammers, shovels, knives, ladders
	Machinery & Fixed Plant - Irrigation pumps, forklifts, engines, conveyor belts, shearing plant, grain augers
	Other and unspecified agencies
	Chemicals - Animal husbandry, diesel, detergents, herbicides and pesticides
	Powered equipment, tools and appliances - Angle grinders, chainsaws, drills, oxy-acetylene, firearms

Key Points - Workers Compensation Data

- a. There is a sizeable number of compensable injuries across all of the sectors, totalling \$395 million (agriculture \$375M and fisheries \$20M) in the five-year period (mean \$79 million). All sectors would benefit financially from effective injury prevention action.
- b. Serious claims involving 5+ days off work impose the greatest burden, accounting for over 90% of costs.
- c. Approximately 70% of claims across nearly all sectors involve body stressing (e.g. manual handling), being hit by moving objects (e.g. animals or vehicles) and falls, trips and slips.
- d. The distribution of these three mechanisms, is relatively equal across sectors (~20-25% each) and provide a target for interventions.
- e. Vehicle incidents are also a reasonable contributor and are more prevalent in some sectors.
- f. Body stressing is more frequently associated with industries where manual handling is an ingrained component of work systems (e.g. shearing, egg production, aquaculture and wild-catch).
- g. Being hit by moving objects is more common in those sectors with exposure to large animals. Similar findings are present for the agency of injury, with animals, human and biological factors dominating the data in these sectors (beef, dairy, horse, mixed livestock, pork and sheep).
- h. The involvement of non-powered hand tools and equipment as an agency of injury in the egg and chicken meat sectors is an outlier in relation to the other agriculturally based sectors, where they rank much lower (if at all).
- i. The shearing sector is the only one in which machinery and fixed plant exceeds 10% of cases (23%), indicative of the significant contribution of shearing plant in this area.
- j. The higher prevalence of cases involving hitting objects with a part of the body (mechanism) and non-powered hand tools and equipment (agency) in wild-catch fishing, may be related to the stability of the working platform (i.e. boat). This may also play a role in some of the aquaculture incidents where non-powered hand tools are also the leading agency.
- k. Chemical related incidents accounted for <1% of cases in both agriculture and fisheries.

Zoonoses

Reportable case numbers for the past five years are presented in Table 13, with Q Fever accounting for almost 80% and leptospirosis 20% of registered cases (Australian Government Department of Health, 2020). However, while the figures presented provide a useful indicator for the burden they impose on a broad scale, further detailed information

regarding the potential sources of infection and whether these were related to the agricultural sector, are not available in this register. Although some states (NSW, Qld, Vic, SA) undertake enhanced surveillance that assesses the likely source of infection, these data are held internally by the respective Health Departments. Similarly, while other agents that may have an impact in agricultural production such as *Cryptosporidium* (dairy), *Salmonellosis* (poultry - eggs/chicken meat) and chlamydia (horse breeding), are included in the surveillance system, linkage of cases to specific sectors cannot be made.

Over the same time period there have been no reported cases of anthrax, Australian bat lyssavirus and Lyssavirus (NEC), with only two cases of Tularemia (acquired from possums). There has also been a total of 87 cases of Ornithosis (sometimes referred to as psittacosis or colloquially 'parrot fever'). Whilst farmers (especially those working within the poultry sector) are at increased risk, human cases are very rare in commercial poultry farms in Australia - the major risk groups are bird owners and/or breeders, plus pet shop owners (NSW Government, 2018).

Table 13: Number of zoonotic cases in Australia (2016-2020)

	2016	2017	2018	2019	2020 (YTD)*	Total (%)
Disease						
<i>Brucellosis</i>	18	19	28	9	12	86 (2.8)
<i>Leptospirosis</i>	130	146	142	85	57	560 (18.5)
<i>Q Fever</i>	560	478	513	563	252	2366 (78.4)
TOTAL	708	643	683	657	286	2977

*As at 30/6/20

Source: National Notifiable Diseases Surveillance System (Australian Government Department of Health, 2020)

In relation to Q Fever and leptospirosis, there is consensus that the notified cases under-represent the true burden of the issue due to asymptomatic infections and the general nature of symptoms (flu-like illness) (Gidding et al., 2020; Lau, Townell, Stephenson, van den Berg, & Craig, 2018). A large recent national seroprevalence study of Q Fever in Australia, which identifies past exposure, indicated that 5.6% of the population had previously been infected (Gidding et al., 2020). While, the development of Q Fever has long been believed to be a largely rural phenomena, this study found no statistically significant difference in patterns in urban (5.5% [CI 4.1-6.9]) and rural populations (6.0% [CI 4.0-8.0]). While further work is required to clarify these findings, there is little doubt that Q Fever and leptospirosis remain key zoonotic concerns for those in the agricultural sectors.

It has been reported that topically acquired zoonoses are vastly under-reported worldwide (Haenen et al., 2013) and there is no reason to believe that the situation is any different in Australia. This has been attributed partly to not recognising that fish can be the source of a zoonotic infection, and secondly as zoonoses derived from fish are non-notifiable (Haenen et al., 2013). For Australia, this is the case with all of the bacterial infections listed in Table 13, with the exception of *Salmonellosis* (Australian Government Department of Health, 2020). While there are around 15,000 cases of *Salmonellosis* infection reported annually in Australia, no details are publicly available on the actual source infection, meaning these data have limited utility in being able to determine commercial fishing-related cases.

Key Points - Zoonoses

- a. Q Fever is the major zoonotic illness impacting on the agricultural sector, with leptospirosis also imposing a significant burden. However, detailed information regarding the potential sources of infection and whether these were related to the agricultural sector, are not available
- b. Both Q Fever and leptospirosis are under-estimated in official notifications.
- c. Other infectious agents such as *Cryptosporidium* (dairy), *Salmonellosis* (poultry - eggs/chicken meat) and chlamydia (horse breeding) are also present.
- d. Bacterial infections (skin) in the fishing sector common however linkage with the official data are difficult to ascertain.

Mental Health & Wellbeing

There is a proliferation of new evidence and a resulting emphasis on improving mental health and wellbeing (MHW) across the entire Australian population. Although data specific to the agricultural and fisheries sectors are difficult to ascertain, the broader national picture indicates that over 20% of the population (4.8 million people), had a mental or behavioural condition in 2017–18 (Australian Bureau of Statistics, 2018). Tragically, approximately 3,000 people die from suicide each year in Australia. Meanwhile, the National Mental Health Commission has estimated costs associated with mental health approach \$60 billion per annum (National Mental Health Commission, 2016). More specifically in a workplace context, it has been estimated that mental health issues cost employers around \$12.8 billion in 2014-15 (Mental Health Australia & KPMG, 2018). Whichever way the issue is assessed, be it from a personal, family, financial or community perspective, the implications of poor MHW are broad reaching and considerable.

Based on the feedback received from consultations conducted and with reference to recent literature (n=40), there are several common issues/themes that repeatedly featured in relation to mental health and wellbeing (MHW).

1. MHW is an issue of concern

- a. There is wide scale support for issues addressing MHW from all stakeholders.
- b. The issue is seen as being societal in nature, rather than a specific rural, agricultural or fisheries concern. However, it is acknowledged that there are unique contexts for farmers and fishers that have an impact on MHW.
- c. Farmers are known to have worse MHW outcomes (completed suicides), than other cohorts, yet have a similar incidence of mental health conditions (Bishop, Ransom, Laverty, & Gale, 2017; Farmer et al., 2020). This is potentially related to increased access to firearms in farming communities (Kennedy, Adams, Dwyer, Rahman, & Brumby, 2020).
- d. Some RDCs see involvement in MHW initiatives as imperative (general awareness and/or service access/early intervention), whilst others acknowledge the specific skill-set required and may prefer to defer action to organisations/individuals with expertise in this area.

2. The evidence-base for research and extension requires improvement

- a. There is an expanding body of descriptive studies that are describing the nature and scope of the mental health issues for farmers and fishers (Austin et al., 2018; Bishop et al., 2017; Kennedy et al., 2020; Kennedy, Brumby, Versace, & Brumby-Rendell, 2020; Perceval, Reddy, Ross, Joiner, & Kolves, 2020; Powell et al., 2019).
- b. From a research perspective, the quality of the current evidence-base to guide interventions is low. The National Health and Medical Research Council has a hierarchy for the level of evidence (see Table 14). Studies predominantly meet Level IV criteria, with others not meeting this benchmark and being based on clinical experience and expert opinion.
- c. Of the 41 papers identified through the literature review and the additional grey literature based on recommendations from stakeholders, there was only one systematic review of risk factors impacting on farmers MHW (Yazd, Wheeler, & Zuo, 2019).
- d. There is an increasing emphasis on MHW within the sustainability frameworks and reporting that several of the RDC's are involved with.

Table 14: NHMRC Levels of Evidence for interventions

Level	Intervention
I	A systematic review of Level II studies
II	A randomised controlled trial
III-1	A pseudorandomised controlled trial (i.e. alternate allocation of some other method)
III-2	A comparative study with concurrent controls: • Non-randomised, experimental trial • Cohort study • Case-control study • Interrupted time series with a control group
III-3	A comparative study without concurrent controls: • Historical control study • Two or more single arm study • Interrupted time series without a parallel control group
IV	Case studies with either post-test or pre-test/post-test outcomes

3. Current investment in MHW is significant but disjointed

- a. Whilst there have been considerable efforts and investments at a national and state level, there is a pervading concern that programs to assist with MHW are not hitting the target for farmers/fishers and more broadly rural communities. This again highlights the contextual issues for farmers and fishers previously raised.
- b. Major funding investments are being made from national and state agencies. However, there is a lack of co-ordination resulting in a piecemeal approach (and competitiveness between providers).
- c. Some larger agencies are rolling out standardised “one size fits all” programs that purportedly have little rural context/relevance. Meanwhile, smaller players (that may have rural relevance), are finding it difficult to get traction and secure funding against these larger (predominantly urban) agencies.

- d. There is no national research network that conjointly bids on projects as a united front. However, one is in the formative stages of discussion/development.

4. *The MHW services currently provided have staffing difficulties and questionable relevance to farmers/fishers*

- a. Many services are being duplicated with drought, bushfire and COVID-19 initiatives all being funded from separate allocations. This piecemeal funding is the norm and "fuels the merry go round of staff". In turn, this decreases efficiency and does not add quantum in terms of value or skills.
- b. Relatedly, a national study has indicated that 46% of farmers reported poor access to mental health services (Schirmer, Yabsley, Mylek, & Peel, 2016).
- c. Furthermore, even where services are available, these are often perceived as not being fit for purpose for rural/farmers/fishers (Perceval, Kőlves, Ross, Reddy, & De Leo, 2019).
- d. There was a pervading view (and some low level evidence), that programs needed to be based on local contexts and build from the community-level up (Farmer et al., 2020; Perceval et al., 2020; Powell et al., 2019).
- e. Partnership approaches (inclusive of community organisations and funding agencies), were seen as essential within the literature and in stakeholder consultation to ensure the scope and scale of potential interventions (and accompanying research) were effective.

5. *Numerous factors impact on MHW*

- a. There is a diversity of factors that work in a cumulative fashion and lead to reductions in MHW. These include high levels of uncertainty and lack of control over circumstances involving - drought, fire, flood, commodity prices, structural adjustments across sectors (e.g. consolidation of businesses), animal welfare concerns, increased regulatory compliance requirements (e.g. water access, changes to management arrangements, food safety, biosecurity, WHS), pressures exerted by major retailers on production systems (e.g. free range), family interactions, alcohol and other drug issues, finance (banking), stigma, working hours/conditions and social isolation.
- b. With regards to social isolation, whilst there is a movement toward increased business efficiency, this may reduce the requirement for staff. This could inadvertently increase social isolation further impacting on MHW.
- c. A limitation of the data available is the contribution that fatigue plays in relation to subsequent poor MHW and injury. It is not specified in the fatality data unless mentioned in reports and is a category within the workers compensation information - but how widely that is applied cannot be determined. Despite the data limitations, fatigue was consistently highlighted by RDC stakeholder representatives as an area of concern.
- d. There is a modest number of existing intervention and research programs that seek to address rural communities and/or farmers and fishers. A brief synopsis of those that have been identified, is provided as Appendix 4. Undoubtedly, there will be a larger number of programs that are in operation, however these programs are illustrative of some of the broader approaches currently in operation. For example, no programs from the big players such as Beyond Blue,

Black Dog Institute, Headspace, SANE Australia or the state government based services, are listed.

6. *MHW and rural research*

- a. The array of issues outlined above indicates the complexity of effectively addressing MHW. While not focusing specifically on farmers and fishers, the acknowledgement that rural populations have persistently poorer health outcomes, has prompted the recent development of a framework to address this issue for rural populations. The recent launching of the Orange Declaration in 2019, focused on identifying the 10 critical problems with and solutions to rural mental health research in Australia (Perkins, Farmer, Salvador-Carulla, Dalton, & Luscombe, 2019). These are described in Table 15 and align with many of the issues raised in this report.

Table 15: The Orange Declaration. Ten problems and ten solutions for rural and remote mental health research in Australia (Perkins et al., 2019)

	Problem	Evidence themes	Solution
1	Rural communities are different from cities and are not homogenous	Contextual variance - one size does not fit all	Whole of community, place-based approaches are promising
2	The rural mental health system is not working	Consistently poor rural health outcomes	New service models tailored to context must be considered
3	Top down service models are based on urban assumptions	Connecting policy, people and place	Co-designed bottom-up processes should be pursued
4	Services are not based on needs	Service versus people-centred approaches	Holistic and integrated care models need testing
5	Funding models are misaligned	Funding and investment	New better aligned funding models are needed
6	Fragmentation and competition hinder service provision, decreases robustness	System level fragmentation and service instability	Whole of community approaches are needed
7	Structural inequity in mental health service provision is amplified in rural areas	Care provision - scope, scale and emphasis	Prevention and early intervention must be considered
8	The rural mental health workforce is stretched beyond capacity and capability	Workforce capacity, capability and sustainability	New rural health workforce models are needed
9	Telehealth alone is not the answer	Technology - component or solution	Digital technology contributes now and can do more as part of new systems
10	Data sets are incomplete, disjointed and limited	Data, research, evaluation and organisational continuous learning	Enhance data collection, monitoring, linkage, analysis and planning

- b. More recently (January 2020), a consortium of partners (whom were involved with developing the Orange Declaration), have released a major report that summarises insights from research undertaken to understand how to improve help for rural Australians (Farmer et al., 2020). This is a key document which should provide a starting point for any potential involvement in MHW by the RSHA. A component of this report focuses on identification of potential areas for research investment, with an excerpt from the report presented below.

Suggested investments are:

I. Advocacy: to highlight a distinctive problem, catalyse a movement specifically focused on improving national rural mental health, liaise with policy and practice to scale-up implementation of evidence-informed innovations, work with agencies to address:

Gaps in data, including:

- Routine demographic analysis by ABS remoteness categories
- A wider range of consumer experience data e.g. about service accessibility.
- Mental Health Atlas data about services that can be benchmarked.
- Long-term tracking of mental health effects of climate events/change.
- Activity of mental health NGOs, online and telehealth providers.

Gaps in research evidence, including:

- Impacts of emergent mental health initiatives and of scaling-up these initiatives.
- Long-term tracking of multiple social disadvantage and mental health.
- Qualitative mental health/illness and service experiences across Australia.
- Service collaboration incentives and measures.
- Online and telehealth use and impacts.
- Accessibility of appropriate social supports.

II. A clearing space: to collect and share evidence about impactful initiatives for wider implementation, providing toolkits and specialised consultancy and training in implementation.

III. Capacity building: Primary Health Networks (PHNs) and local government would be the main targets, with PHNs because they are service commissioning agencies and local government as it is located in rural communities with a remit across business and community organisations. Capacity-building would target: resilience-building in/for communities to enable people to deal with change; collaboration methods to drive local co-design and partnership; and in implementing evidence-based innovations, using co-design to achieve place-based solutions.

Recommendations for investment in rural health research in Australia (pg7-8) (Farmer et al., 2020)

7. Potential areas for investment

In addition to linkage with and/or supporting existing programs of work, other suggestions that were raised by respondents included:

- Building mentoring capacity in rural areas (maybe use agronomists/fish scientists etc.), as part of a young farmer/fisher business program.
- Assessing the financial implications of poor mental health in the agriculture/fishing sectors. While there is work done more broadly on this issue in corporate

businesses, these do not replicate the context that farmers/fishers work in. If robust estimates of costs could be made this may incentivise farmers/fishers to give MHW a greater priority.

- Determining the impact on-going uncertainties (e.g. drought, fire, regulatory change, pandemic) might be having on farmers/fishers decision making and their capacity to make decisions and undertake long term thinking (e.g. options to be more resilient). This links neatly with some of the existing work around regenerative farming and could equally be applied to the fisheries sector.

Key Points - Mental Health & Wellbeing

- MHW is seen as an important issue by all RDC stakeholders, however there is some variation in how this should be addressed
- The existing quality of evidence underpinning interventions for farmers and fishers, requires attention.
- There are major financial investments being made in MHW, however these are significantly fragmented.
- Access to MHW services is an issue of concern.
- The MHW workforce are under critical pressures.
- Where access is present, the appropriateness of services has been questioned.
- There is a strong emphasis on locally contextualised and community-driven approaches to address MHW. These efforts require commitment to a partnership approach.

Summary of cross sectoral overlaps

The aim of this project was to facilitate cross-sectoral RD&E to minimise the negative impacts associated with WHS issues. The central output is the design of a matrix outlining the commonalities of injuries, deaths and risks across rural sectors. This evidence-based information will then be used by the RSHA to make informed collaborative RD&E investment decisions, where investment can have both human and economic impact. This discussion focuses on the development of the individual hazard and risk profiles for each sector, plus the overlaps across sectors (the matrix).

The risk profiles that resulted from analysis of the data and supported by feedback from stakeholders, are presented as separate assessments for each of the sectors (Appendix 5-16). As indicated for the fatal cases, the five agents of tractors, quads, ute-car-truck-SSV and motorbike accounted for around half of all fatalities in the agriculture sector. Within the fisheries sector, boat related capsizes and falls from boat dominated the pattern. Over 70% of all serious workers compensation claims in both agriculture and fisheries, involved either body stressing, being hit by a moving object or falls, trips and slips. Although the leading agency of serious claims were animals and non-powered hand tools in agriculture and fisheries respectively, both had similar proportions of mobile plant and transport related claims. Building on this information, the matrix was developed and consisted of 34 potential hazards across all of the sectors. The full matrix is presented as Appendix 17.

In summarising the matrix (Table 16), of the total 34 identified hazards, 21 had potential for a fatal outcome and the remainder injury. While separate data are reported for mixed farming, mixed livestock and shearing in Table 12, these have been aggregated with the relevant sector e.g. mixed farming with beef, sheep and grain production; mixed livestock with beef and sheep production; and, shearing with sheep production. This resulted in 12 sectors being delineated, as outlined earlier in Table 1. Hence, Table 16 describes the number of sectors which had each hazard identified as a risk (with the maximum being 12), as is the number of deaths relevant to each hazard in the five-year timeframe under examination in participating sectors (2014-15 to 2018-19).

Table 16: Listing of hazards across sectors based on their potential for fatality or serious injury/illness, number of sectors in which hazards were present and deaths in the period

Potential fatality			Potential serious injury/illness	
Agent	No. Sectors	Deaths	Agent	No. Sectors
Ute, Car, Truck, SSV	12	26	Bending, twisting, lifting	12
Tractor	12	26	Hand tools (powered & non-powered)#	12
Mobile plant & attachments (bobcat, forklift, slasher, seeder)	12	19	Heat#	12
Structures	12	7	Zoonotic infection*	12
Electrical powerlines/systems	12	6	Noise	12
Water (dams, rivers, channels, water tanks)	12	4	Insects, particles (foreign bodies in eye)	12
Confined spaces	12	4	Machinery fires#	12
Fixed plant & machinery (pumps, overhead gear, grain auger)	12	3	Organic dusts	11
Fuels/fertilisers	12	1	UV solar radiation*	10
Quad	9	34	Oxy-acetylene	9
Silos	9	3	Repetitive tasks	8
Pesticide exposure	9	0	Animal husbandry chemicals	7
Livestock & Fish	8	11	Needle stick injury	7
Motorbike	8	13		
Trees	8	6		
Hay/Cotton/Wool bales	7	3		
Horses	6	10		
Firearms	6	2		
Tyres	6	1		
Aeroplanes, helicopters, gyrocopters	4	16		
Open waters (ocean)	2	14		

*Classed as non-fatal agents although they may have longer term health consequences

Can also have fatal outcomes

Overall, there were 16 hazards identified as common to all sectors, with those more likely to result in a fatal outcome involving (tractor, ute-car-truck-SSV, water, mobile plant, fixed plant, fuels/fertiliser, electrical powerlines/systems, structures - falls, confined spaces) and non-fatals involving (zoonoses, bending/twisting/lifting, hand tools, noise, insect/particles, machinery fires and heat).

Of the major fatal hazards common to all sectors (tractors, ute-car-truck-SSV, water, mobile plant, fixed plant, fuels/fertiliser, electrical powerlines/systems, falls from structures, confined spaces) in the most recent five-year recording period (2014-15 to 2018-19), there were:

- Nine sectors in which tractor fatalities occurred, accounting for 26 deaths (runovers 14, rollovers 7, maintenance 5)
- Eight sectors in which mobile plant (excluding tractors/quads) fatalities occurred, accounting for 19 deaths (feed/water livestock 5, harvesting, sowing, maintenance, loading/unloading, fencing)
- Eight sectors in which ute-car-truck-SSV fatalities occurred, accounting for 26 deaths (utes 13, car / truck 7, SSV 6)
- Three sectors in which water-related fatalities occurred, accounting for 18 deaths (14 at sea)
- Four sectors in which electrical related fatalities occurred, accounting for 6 deaths.
- Two sectors in which confined space fatalities occurred, accounting for a small number of deaths (<5)
- Two sectors in which fixed plant fatalities occurred, accounting for a small number of deaths (<5)
- Three sectors in which falls from structures occurred, accounting for a small number of deaths (<5)
- One sector in which fuels/fertilisers were associated with a small number of deaths (<5).

The seven non-fatal hazards common to all sectors were: zoonoses, bending/twisting/lifting, hand tools, noise, insect/particles, machinery fires and heat. In assessing the workers compensation data, there is a relatively consistent pattern of mechanisms involving either being hit by moving objects, body stressing (manual handling etc.), vehicles, plus falls, trips and slips across sectors. When matched alongside the agency of injury, there is some evidence of variation with cropping sectors (grain, cotton, fodder), more likely to have mobile plant as the leading agency, while the large animal sectors (beef, dairy, horses, pork, sheep), were more likely to involve animal, human or biological agencies. Meanwhile the fishery and poultry (eggs and chicken meat) sectors, clearly had non-powered hand tools as an elevated risk. The shearing sector was the only one with an enhanced risk for fixed plant (noting that fixed plant was also one of the nine common fatal hazards across all sectors).

Further, there were an additional eight hazards that were identified as being present in at least 75% (n=9-11) of the sectors involved in the project. These included quads (nine sectors - 34 deaths); livestock/fish (nine sectors - 24 deaths: horse 10, cattle 9); trees (nine sectors - 6 deaths); silos (ten sectors - 3 deaths); pesticides (ten sectors - no deaths); repetitive tasks (nine sectors - no deaths); oxy-acetylene (ten sectors - no deaths); and UV solar radiation (ten sectors - no deaths).

From an economic perspective, the total estimated cost of all injury (fatal and non-fatal) for participating sectors, was over \$840M (annual mean \$168M). Of this sum, fatal incidents accounted for \$446M (annual mean \$90M) and workers compensation claims \$395M (annual mean \$79M) in the period. Data for the agricultural sectors revealed a fatality estimate of \$414M (annual mean \$83M) and workers compensation claims of \$375M (annual mean \$75M). Meanwhile the data for the fisheries sector, estimated the fatality costs at \$32M (annual mean \$7M) and workers compensation at \$20M (annual mean \$4M). Notwithstanding this considerable financial impost, it is worth noting that these figures will markedly under-estimate the true burden. For example, the fatality model does not consider the major social costs associated with these events, meanwhile only around 50% of the total workforce in agriculture/fisheries, are entitled to claim workers compensation as self-employed owner-operators (which constitute a large portion of these sectors), are not

covered under the workers compensation system (Safe Work Australia, 2013). Even if just focusing on non-fatal injuries and apportioning a similar cost of these injuries to owner-operators (i.e. an additional \$395M), the real cost will easily exceed \$1 Billion for the period (annual mean \$200M+).

Whilst some farmers-fishers will have payments resulting from income protection policies, this will not be universal. Even where they exist, such policies may not be adequate to cover the costs associated with medical treatment and hiring of staff to undertake farm/marine work in lieu of the injured person etc. Consequently, much of this “uncalculated” financial burden, will likely be covered by out of pocket payments made by self-employed (owner-operator) farmers and fishers.

MHW was identified as a concern across all sectors, however significant involvement in this field is complex. Currently, there is major fragmentation of services and the quality of evidence underpinning interventions requires further work. Despite large scale investments, largely though not exclusively by Federal and State governments, it is difficult to ascertain a key component of the MHW area where the RSHA could invest to get a sound outcome and return on investment. In a similar manner, the research environment within the MHW area is currently disjointed. The best placed information is currently suggestive that preventive and intervention services for MHW need to be locally contextualised and built from the ground up. If this were to be undertaken across all of the participating sectors, this would require investment beyond the scope of the RSHA resource capacity.

Existing inputs by commodity sectors predominantly focus on normalising the issue of mental health, reducing associated stigma and accessing relevant local services. All of these are worthy and appropriate approaches that individual sectors should continue with their levy payers. However, if the RSHA chooses to invest in MHW, it is suggested that this should be done in partnership with existing agencies, so that any investments can genuinely add value to the outcome. Furthermore, the scope of such work would by necessity need to be tightly focused. Consideration could be given to further examination of one of the three suggestions described in the results - (a) increasing mentoring capacity of aligned service providers (agronomists/fish scientists etc.) and industry members (sector body representatives); (b) honing in on financial implications of poor MHW in farmers/fishers with a view to incentivise action; and, (c) examining decision-making in light of on-going uncertainties (resilience).

Fatigue and its relationship to injury and MHW was an issue raised by stakeholders. The precise relationship between fatigue and these issues is difficult to ascertain based on the existing data that are available. For example, fatigue is only very rarely mentioned in coronial reports and for all intents and purposes, is not captured in the workers compensation data (it would be included as a mechanism - Animal, human & biological). Regardless, it is highly evident from anecdotal observations and feedback by stakeholders that fatigue is a contributing factor. Such assumptions also clearly parallel findings in other sectors and from physiological trials (Lilley et al.; Nielsen et al., 2019; Tsai, Chou, Tsai, Yen, & Niu, 2019). Notwithstanding this relationship, to date research and interventions within the agricultural and fishery sectors have not addressed risks associated with fatigue in a systematic or comprehensive manner. Indeed, fatigue management has the attributes of a classic “wicked problem” (i.e. an issue highly resistant to resolution) (Australian Public Service Commission, 2018). Consequently, any discussion of hazards and risks is somewhat incomplete without addressing this issue and provides a major opportunity for the RSHA to make a genuine difference to the safety environment within the Australian agricultural and fishery sectors.

Across most sectors there were new work systems and approaches being developed that will potentially have an impact on WHS into the future. These included the refinement of existing technologies e.g. use of drones, robotics, autonomous vehicles for specific tasks (e.g. spraying) and automation of pumping/irrigation systems. There are also new initiatives involving changes to feeding / cleaning systems (e.g. chicken meat, eggs, pork, dairy), storage systems (e.g. increases in on-farm grain storage), automated grading systems for produce (e.g. eggs, fish) and animal welfare (mulesing, cage vs free range, diagnostic testing) that are in process. These areas may offer an opportunity for research investment to assist in identifying the WHS factors associated with the development and adoption of such approaches/technology. Furthermore, the inclusion of potential cost-benefit analyses resulting from such modifications to existing systems/practices, could assist in prompting increased adoption of “safer” work systems.

Historically, the introduction of new technologies has generally had positive ramifications for industries e.g. development of solar pumps has dramatically reduced deaths/injury resulting from falls when climbing windmills for service/repair work and water activated EPIRB alerts assist in locating fishing vessels to enhance the timeliness of search and rescue operations. However, such positive outcomes are not always demonstrated e.g. the introduction of quads (which were developed as a recreational vehicle), now sees them as the leading cause of fatality on Australian farms. As outlined above, there are numerous technological adaptations that are being implemented across the agricultural and fishing sectors, however safeguards around potential health and safety ramifications are not easily identified or necessarily shared in a timely manner across sectors. The establishment of a group to identify and address possible WHS ramifications, especially in areas that are common across sectors e.g. mobile plant, could have far reaching positive impacts. Such a proposition is not unfamiliar for Australian farmers and fishers, as the Australian Pesticides and Veterinary Medicines Authority (APVMA), fulfils a similar (though statutory) role by providing independent analysis and approval for new chemical products being introduced and used in Australia. While the scope of such a group would by necessity be limited (and not in the realm of the APVMA), it could provide a preliminary stepping-stone to establish a systematic process to reduce injury. By ensuring to the extent possible that WHS considerations have been addressed prior to widescale release of equipment modifications/technologies (safety by design), this would enhance efficiencies for farmers and fishers by optimising safety from the initial uptake point. Similarly, such precedents also exist on a global scale within the mining sector e.g. the Earth Moving Equipment Safety Round Table (EMESRT), engages with key mining industry Original Equipment Manufacturers to advance the design of equipment to improve safety (EMESRT, 2008).

Implications

This scoping study has identified a large array of hazards and risks with potentially fatal outcomes and/or serious injury consequences within the participating sectors. While there are undoubtedly individual variations across the sectors, as a general rule the sectors are more similar to each other than not. Of the 34 broad hazard groupings identified, almost half of these (n=16) were common across all of the participating sectors, with a further nine hazards being common to at least 75% of sectors (i.e. 25 of the 34 hazards were present in over three quarters of all sectors).

These findings provide support for a cross-sectoral co-investment approach that addresses issues which the sectors have in common. Such an approach has the potential to limit duplication, attain a broader coverage across agricultural and fishery sectors and provide some economies of scale that increase return on investment for the participating RDC's.

Recommendations

The aim of this project was to facilitate cross-sectoral RD&E to minimise the negative impacts associated with WHS issues. There is a large array of hazards and risks with potentially fatal outcomes and/or serious injury consequences within the participating sectors. While there are undoubtedly individual variations across the sectors, as a general rule the sectors are more similar to each other than not. The following recommendations are in accordance with the RSHA objective of using evidence-based information to make informed collaborative RD&E investment decisions, where investment can have both human and economic impact.

Recommendation 1: Initiate a cross-sectoral implementation program addressing five key risks. Fatalities - from mobile plant, vehicles and electrical hazards: Serious Injury - from manual handling, along with slips, trips and falls.

These hazards are universal across all sectors and impose a disproportionate burden. Mobile plant - which is inclusive of boats, tractors, quads, bobcats, forklifts, harvesters etc., results in 42% of all deaths in the participating sectors. Meanwhile, vehicles (utes, cars, trucks, SSV, trailers, aircraft and motorbikes), account for a further 25% of deaths. Electrical hazards are well recognised as a risk and while modest in their contribution to the overall burden in this dataset (n=6 fatalities), could provide a conduit through which to implement an effective intervention program. While there are other hazards that are universal across all sectors (or nearly all sectors), notwithstanding the catastrophic consequences for individuals, families and businesses, they are relatively rare events e.g. the next leading agent of death after vehicles is water (n=18; 8% of all deaths in three sectors).

The attention to fatalities should be accompanied by addressing those issues that result in serious injury and have a high burden in workers compensation, inclusive of manual handling and slips, trips & falls. The program would be strongly extension focused (i.e. assisting farmers/fishers to implement safety actions/systems). Although there are numerous barriers that have been highlighted in the literature, there are also clearly defined solutions that not only draw on the hierarchy of controls, but also have some existing traction with agricultural and fishing sectors (Franklin et al., 2015). These could form the basis of further work with farmers and fishers to optimise mechanisms that support enhanced WHS practice.

This program of work would be supported by the refinement/development of approaches that are directed at implementation (i.e. extension). Underpinning the project should be a specific research component assessing the impact of the project on fatality/workers compensation data, economic cost-benefits and structural changes (i.e. changes in safety actions/systems) across sectors. These are long term actions that will require sustained inputs to attain the desired outcomes. Further, given the behavioural change aspects required with some of the interventions, a realistic time period for successful action would be 5-10 years as a minimum.

Addressing these five risks would:

- (a) Target high risk fatal and serious injury compensation hazards across all sectors, with the potential to target specific population groups in different sectors where necessary e.g. older or younger cohorts, contractors.
- (b) Optimize safety impacts at farm/boat level.
- (c) Further describe changes in practices/system that enhance safety.

- (d) Provide a measure of cost-benefits by sector to further incentivise the adoption of safety measures/systems.
- (e) By including electrical hazards, it provides an exemplar and point of leverage into WHS where people are:
 - i. Already acutely aware/familiar of the dangers posed by the hazard.
 - ii. Are exposed to the hazard virtually every day and yet generally treat electricity with due caution because it is a “known” hazard - reflected in the relatively small number of fatal (n=6) and proportion of workers compensation cases (<2%) across all sectors.
 - iii. Would be well supported by linkage to electricity and Work Health and Safety agencies (i.e. potential for partnerships on program).
 - iv. There are existing practical controls available that are not onerous to implement (i.e. controls are seen as practical by farmers/fishers).
- (f) Provides an opportunity for co-investment with other agencies/partners e.g. Australian Maritime Safety Authority, Farmsafe Australia, state based Primary Industry organisations, Energy Authorities and Work Health and Safety Authorities. For example, the RSHA may wish to focus on the research and evaluative components of such a program, while funding for design and implementation of content are funded through alternate sources. Such an approach would add value to the initiatives, while also enhancing the robustness of the science and evidence-base underpinning investment decisions about what does and does not work to reduce injury.
- (g) The cross sectoral focus on specific issues, does not preclude individual sectors also targeting additional and/or unique risks that they may encounter. For example, the inclusion of non-powered hand tools as a source of injury in the aquaculture, poultry (egg and chicken meat), plus the wild-catch fishing sectors, appears highly relevant. As does work around animal handling for those sectors with larger stock.

Recommendation 2: Maintain a watching brief on Mental Health and Wellbeing (MHW) initiatives and seek suitable partnership arrangements where feasible

A watching brief on MHW issues should be maintained to ascertain developments and potential opportunity for co-investment in relation to enhancing rural mental health research. On-going liaison with the group managing the “Orange Declaration” would be a useful starting point. To maximize outcomes and enhance return on investment, any future programs need robust evaluation and should be undertaken as a partnership with an existing agency working in the field.

- (a) Actions targeting MHW already underway by respective RDCs, should be continued and included as an agenda item at RSHA meetings to facilitate learnings from these activities.

Recommendation 3: Establish an expert panel to assist with the provision of advice on future Work Health & Safety technology developments

Attention be directed to assist in identifying WHS factors associated with the development and adoption of new production approaches/technology. It is proposed that a small panel of experts with suitable expertise (automation, robotics, agronomist/aquaculturist, work health and safety), be established under the auspices of the RSHA partners. The role of this panel would be to assess new approaches/technologies in relation to potential WHS implications. RSHA partners could submit particular issues to this panel for review and they could report independently to partners. The panel may meet only 2-3 times per year and provide a highly cost-efficient mechanism upon which to gauge future WHS issues of relevance to the sectors. Additionally, the panel should also have the capacity to co-opt persons with high-level expertise for specific issues if deemed necessary.

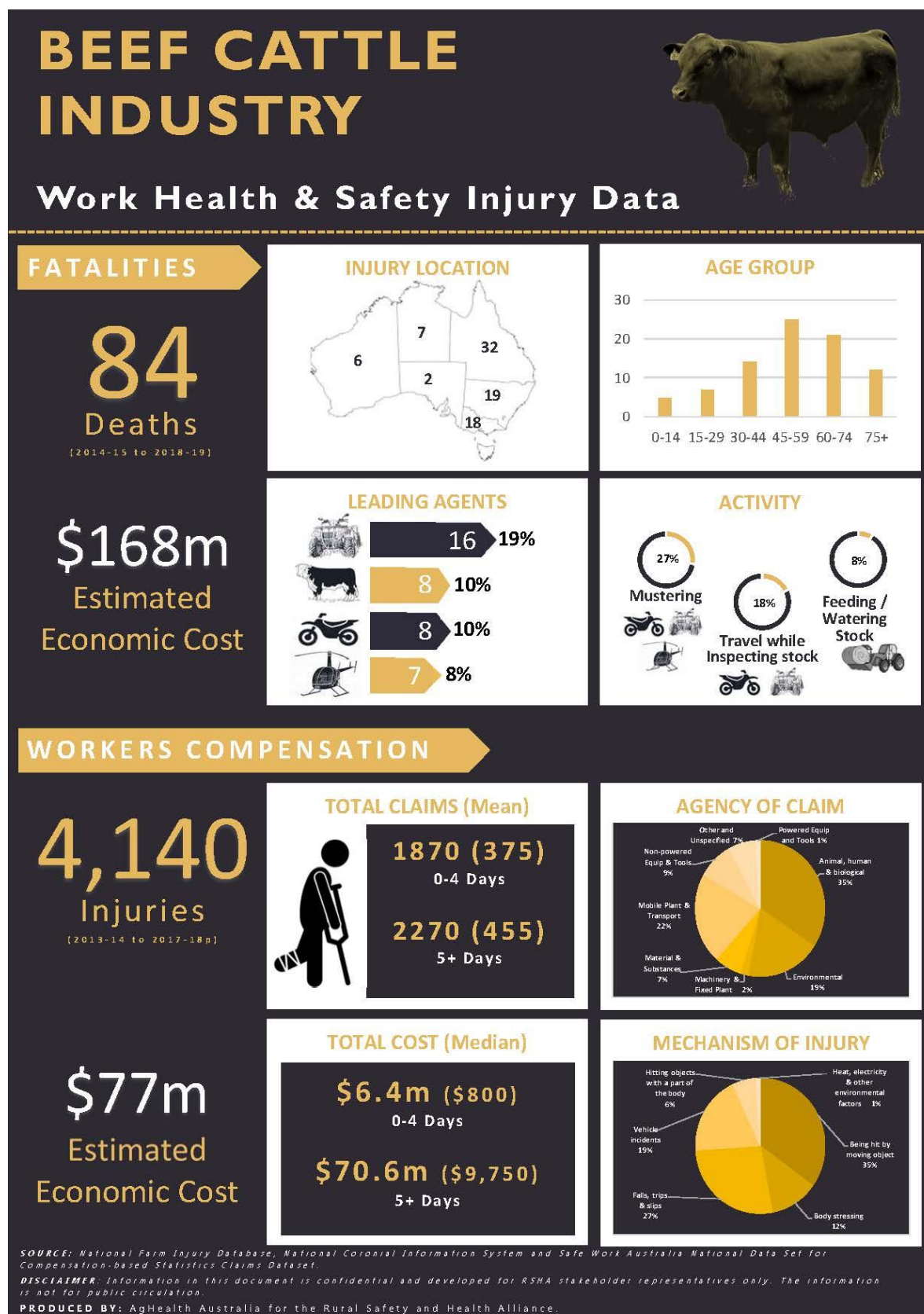
Subject to the success of the panel in the initial instance, a further extension of this approach could include the assessment of cost-benefits and the determination of behavioural economic factors that may enhance adoption. This would require the inputs of an agricultural and/or health economist to provide some estimation of cost-benefit (or similar), plus inputs from a behavioural economist.

Recommendation 4: Initiate a program of work to assess and reduce the negative impacts of fatigue on WHS in the agriculture and fisheries sectors

Further research on the contribution and role of fatigue, along with examination of approaches to ameliorate the risks, are required across all sectors. It is well established that fatigue increases injury risk (Lilley et al., 2015), however little is known of approaches to address these risks within agricultural and fishery sectors. It is proposed that specific options that may minimise the impacts of fatigue are identified with each RSHA partner. These should then be mapped against the known controls that have been defined/raised in the literature to assess their validity. Where a solid match is identified, pilot program(s) that incorporate a robust evaluation framework to objectively quantify the impact on fatigue and also qualitatively assess the “acceptability” of these measures to farmers/fishers, should then be undertaken. Drawing on the lessons learnt, which could be shared across RSHA partner sectors, broader extension programs may be developed.

Appendices

Appendix 1 - Infographic Example



Appendix 2 - Stakeholder Guide Questions

1. What is it that you think your commodity sector wants out of the project?
2. Hopefully you have had a chance to have a look at the snapshot we sent you with the fatality and Workers Compensation information in it. Is there anything specifically in this information that stood out for you or that you would like to raise?
3. In general terms, from what you understand about the producers in your sector – on a scale of 1-10 (with 1 being low [not interested] to 10 being high [critical]), how serious are producers about reducing incidents that lead to injuries (Seriousness)?

1 2 3 4 5 6 7 8 9 10

What prompted you to allocate that score?

4. (a) If you had to rank your sector (using the same 1-10 scale) - Do you think most owners/operators see *themselves*, as being at risk (Susceptibility)? (Seriousness + Susceptibility = Threat)

1 2 3 4 5 6 7 8 9 10

(b) Similarly, what about the owner/operators perceptions of risk in relation to *employees / family members*?

1 2 3 4 5 6 7 8 9 10

(c) What prompted you to allocate those scores?

5. Are there any issues that you are aware of for your commodity (or more broadly across ag/fisheries), that are acting as barrier(s) to change the pattern of injuries that we are seeing in this information?
6. From a sector viewpoint do you think these barriers tend to overshadow the potential benefits? If yes, what could be done to strengthen the perception of benefits and reduce or overcome barriers (Benefits / Cues to Action)?
7. On the same 1-10 scale, how much self-confidence do you think that owner/operators in the sector (in general), have that they make changes to reduce injury and improve wellbeing (Self-Efficacy)?

1 2 3 4 5 6 7 8 9 10

8. What is the future of production likely to look like for your sector - what things are changing and how? Is there new technology being used? Are safety implications being considered as part of these changes?
9. What specific pressures are being exerted on producers - (e.g. drought, commodity pricing, increased regulations, ageing) and what kinds of issues are you seeing arise from these?
10. Have you heard or are aware of any approaches that have been able to assist producers with managing these issues (inclusive of mental health issues)?

Are there any other issues you would like to raise in relation to the issues we have discussed today?

Appendix 3 - Agency Consultation

Name	Agency/Organisation	Sector
Tanya Adams	Taylor Health and Safety	Fish
Wayne Baker	Safe Systems Engineering	Dairy
Andrew Barrett	Rural Safety & Health Alliance	
Darren Black	Oz Help	MH
Lara Bishop	Royal Flying Doctor Service	MH
Pauline Brightling	Harris Park Group	Dairy
Rachael Bryant	Australian Pork Ltd	Pork
Tessa Caton	NSW Centre for Rural & Remote Health (University of Newcastle)	MH
Raymond Chia	Australian Eggs	Eggs
Helena Clayton	University of Canberra	MH
Hazel Dalton	NSW Centre for Rural & Remote Health (University of Newcastle)	MH
Stephen Feighan	Australian Wool Innovation	Sheep
Michelle Ford	Meat and Livestock Australia	Beef
Fergus Gardiner	Royal Flying Doctor Service	MH
Michelle Grech	Australian Maritime Safety Authority	Fish
Pat Guerin	Balco Australia	Fodder
Maxie Hanft	Grains RDC	Grains
Julian Harrington	Tasmanian Seafood Industry Council	Fish
Tony Heggarty	Beef Producer (NSW Farmers)	Beef
Rachel Holloway	Cotton RDC	Cotton
Chris Izzo	Fisheries RDC	Fish
Annette Jakob	Compass Health & Safety	Dairy
Alison Kennedy	National Farmers Health Centre (Deakin University)	MH
Rick Kowitz	Cotton Australia	Cotton
Gracia Kusuma	NSW Farmers	MH
Jane Littlejohn	Australian Wool Innovation	Sheep
Jo Marshall	Seafood Industry Australia	Fish
Peter Massey	Hunter New England Health	Zoonoses
Annelies McGraw	Thoroughbreds RD&E (AgriFutures Australia)	Horse
Kirsty McKee	AgriFutures Australia	
Meg Perceval	Oz Help	MH
NSW representative	Beef Producer	Beef
VIC representative	Beef Producer	Beef
WA representative	Beef Producer	Beef
David Perkins	NSW Centre for Rural & Remote Health (University of Newcastle)	MH
Jenny Permezel	Oz Help	MH
QLD representative	Beef Producer	Beef
Sally Roberts	Dairy Australia	Dairy
Jacki Shirmer	University of Canberra	MH
Paul Sloman	Cotton Australia	Cotton
Lucinda Stanley	Rice, Export Fodder, Ginger RD&E (AgriFutures Australia)	Fodder
Jon Temby	Axento Safety	Dairy
Georgina Townsend	Chicken Meat RD&E (AgriFutures Australia)	Poultry
Kathryn Young	Rural Safety & Health Alliance	

Appendix 4 - Mental Health & Wellbeing

Program	Agency	Approach
Are you bogged mate?	Mary O'Brien	Is a web based platform targeting farmers. It draws on the analogy of mental health issues making an individual feel bogged. Resource materials and case studies are provided, along with access to social media platforms. Face to face training is also available.
ifarmwell	UniSA	Is a web based platform that is targeting farmers and aims to assist them cope with life's challenges. Shares information on practical ways of coping with difficult circumstances, thoughts and feelings (especially worries about things that can't be controlled).
CARE Wellbeing - Connect Ask Refer Encourage program	OzHelp	The CARE Wellbeing and Suicide Prevention training (formerly SCARF) was designed specifically for a rural and farming audience, but has also been delivered more broadly. CARE is a 2-4 hour training program that aims to improve health and reduce suicide. Currently working on a program with Qld farmers.
National Workplace Initiative	Mentally Healthy Workplace Alliance	Funded by the National Mental Health Commission in the 2019-20 budget (\$11.5M), there are 15 partners in the Alliance. One aim is to create an evidence-based framework for workplace mental health strategies.
Plant a seed for safety project	Alex Thomas	Includes web based and social media platforms. Focuses on the role of women in changing attitudes and behaviours in men across a range of safety and health issues
Primary Producer Knowledge Network	National Farmer Health Centre (Deakin University)	This is a new initiative funded by Worksafe Victoria with a focus on preventing poor MHW in farmers.
Stay Afloat	Seafood Industry Australia & Tasmanian Seafood Industry	The Tasmanian Seafood Industry Council (TSIC) initiated the Stay Afloat program as a small pilot utilising locally based advocates. In collaboration with Seafood Industry Australia, a nationwide pilot using a similar methodology has recently been commenced. Funded by the Federal

	Council (TSIC)	Department of Health three trial sites in Darwin, Lakes Entrance and Newcastle are being used. Program is focused on early intervention and provides a fisher-friendly mental health support network.
RAMHP - Rural Adversity Mental Health Program	NSW Centre for Rural & Remote Health (University of Newcastle)	Is a NSW program providing advice on appropriate services in local areas, conducting education programs for communities and worksites on recognising someone experiencing a mental health issue and raise awareness about preventive approaches and how to find help when needed
Ripple Effect	National Farmer Health Centre (Deakin University)	Targets rural communities with a specific focus on farmers aged 30-60 years. The program aims to address stigma and enhance mental health literacy.
Regenerative Farming	Centre for Research and Action in Public Health, Health Research Institute, (University of Canberra)	Building on the Regional Wellbeing survey, this approach is utilising regenerative farming as a model to examine impacts on MHW.
Rural Minds	Rural & Remote Mental Health	Deliver early intervention and prevention based mental health programs Australia-wide.
Sustainable Fishing Families	National Farmer Health Centre (Deakin University)	Conducted a national survey of health, safety and wellbeing in the professional fishing (wild-catch) industry. Also implemented a pilot program tailored specifically for fishing families that was inclusive of MHW.
Sober in the country	Shanna Whan	Is a registered charity with a strong advocacy focus and has a web based platform. Aims to assist rural and remote Australians that have fallen through the cracks of overcoming addiction in permanent isolation.

Appendix 5 - Injury Profile: Aquaculture

This review assesses existing evidence on human health and safety in the sector.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of how often workers are exposed to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

The first component is the summary of WHS hazards and risks for your sector.

SECTION 1

The **Severity Rating** is based on the human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates a fatality and 1 (■□□□□), the lowest severity.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity of the consequence and frequency of exposure to the hazard ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (⚠⚠⚠⚠⚠). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2017-18
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

AQUACULTURE INDUSTRY SUMMARY

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Open & closed waters	Workers	Death/Serious injury resulting from boat capsize, falls from boat, entanglement, diving/scuba (drowning/near drowning)	■■■■■	■■■□□	☠☠☠☠☠ (2,3,5)	Environmental conditions
2. Fish / seafood	Workers, Bystanders	Death/Injury resulting from stings, bites, puncture wounds, infection	■■■■■	■■■■■	☠☠☠☠☠ (2,4,5)	
3. Mobile plant (e.g. forklifts, tractor, mower)	Operators, Workers, Bystanders	Death/Serious injury resulting from runovers, rollovers, falls from, machinery maintenance	■■■■■	■■■□□	☠☠☠☠☠ (2,3,4,5)	Maintenance, guarding
4. Fixed boat plant (motors, pumps, pulleys, winches, conveyor belts, crane)	Workers	Death/Serious injury resulting from contact with winches etc. (amputations)	■■■■■	■■■□□	☠☠☠☠☠ (2,3,4,5)	Guarding, electrocution
5. Electrical systems (boat)	Workers, Bystanders	Death/Serious injury resulting from contact with non-compliant electrical systems	■■■■■	■■□□□	☠☠☠☠☠ (2,3,4,5)	DIY electrical repairs
6. Electrical powerlines and systems (land based)	Workers, Bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■■■■■	☠☠☠☠☠ (2,3,4,5)	Aerator pumps, DIY electrical repairs
7. Hand tools (powered)	Workers	Death/Serious injury resulting from contact with angle grinders, drills etc. (e.g. fractures, lacerations, contusions)	■■■■■	■■■□□	☠☠☠☠☠ (3,4,5)	Guarding, tool maintenance
8. Firearm	Workers Bystanders	Death/Serious injury resulting from gunshot wound	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	Storage

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
9. Silos	Workers, bystanders	Death/Serious injury resulting from falls from height, silo collapse, grain suffocation	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Children
10. Confined spaces	Workers, Bystanders	Death/Serious injury resulting from toxic gas/oxygen deprivation (snap freezers)	■■■■■	■□□□□	☠☠☠☠☠ (3,5)	Lack of entry permit planning/rescue procedure
11. Quad (ATV)	Operators, Passengers	Death/Serious injury resulting from crash, rollovers, falling from	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	Limited use in aquaculture, older persons, young risk takers
12. Fuels (diesel)	Workers Bystanders	Death/Serious injury resulting from fire, explosion or leakage (e.g. burns)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Dermatitis, environmental
13. Zoonotic infection	Workers	Illness resulting from Q fever	■■■□□	■■□□□	☠☠☠☠ (4,5)	Hygiene diligence
14. Hand tools (non-powered)	Workers	Injury resulting from contact with knives, chisels, gaffs etc. (e.g. fractures, lacerations, contusions)	■■□□□	■■■■■	☠☠☠ (3,4,5)	Boat stability/swell etc.
15. Bending, twisting, lifting,	Workers	Musculoskeletal injury resulting from lifting bait boxes and manual handling (e.g. back sprain / strain)	■■□□□	■■■■■	☠☠☠ (4,5)	
16. Frequent repetitive tasks e.g. Oyster shucking, cleaning, retrieving gear	Workers	Repetitive strain injury	■■□□□	■■■■■	☠☠☠ (4,5)	

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
17. Structures	Workers	Death/Serious injury resulting from slips, trips and falls (e.g. deck, ladders, platforms, walkways)	■■■■■	■■■□□	☠☠☠ (3,4,5)	Boat stability/ swell etc.
18. Noise	Operators, Workers	Noise injury resulting in high frequency hearing loss (engine rooms, forklifts, tractors)	■■□□□	■■■■■	☠☠☠ (4,5)	Aging
19. Oxy-acetylene	Operators	Burns resulting from contact and flash burns	■■■□□	■□□□□	☠☠☠ (2,4,5)	Aquaculture construction
20. Dust, insects, particles (angle grinding etc.)	Workers	Foreign body in eye and respiratory effects	■■□□□	■■■■■	☠☠ (4,5)	
21. UV solar radiation	Workers,	Sunburn, skin cancer, dehydration	■■□□□	■■■■■	☠☠ (4,5)	
22. Chemicals	Workers, bystanders	Skin, eye and respiratory reactions resulting from use of disinfectants (sodium metabisulphite)	■■□□□	■■□□□	☠ (4,5)	
23. Heat	Workers	Heat stress, dehydration	■■■□□	■■■□□	☠☠ (4,5)	Water intake

Appendix 6 - Injury Profile: Beef Production

This review assesses existing evidence on human health and safety in the sector.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of how often workers are exposed to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

The first component is the summary of WHS hazards and risks for your sector.

SECTION 1

The **Severity Rating** is based on the human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates a fatality and 1 (■□□□□), the lowest severity.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity of the consequence and frequency of exposure to the hazard ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (⚠⚠⚠⚠⚠). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2017-18
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

BEEF INDUSTRY SUMMARY

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Quad (ATV)	Operators, bystanders, passengers	Death/Serious injury resulting from crash, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Older farmers, young risk takers
2. Ute, Car, Truck	Operators, bystanders, passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, seatbelts
3. Aeroplanes, helicopters and gyrocopters	Operators	Death/Serious injury resulting from crashes	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,5)	Contact with powerlines, , lack of line markings
4. Livestock (Cattle / Bulls)	Workers, bystanders	Death/Serious injury resulting from crush, trampling & horn gouging	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Older farmers, yard facilities
5. Motorbike	Operators, passengers	Death/Serious injury (head, spinal & lower limb fractures) resulting from crashes	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Helmets, young risk takers
6. Trees	Workers, bystanders	Death/Serious injury resulting from felling/lopping trees and chainsaw lacerations	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	
7. Horses	Workers, bystanders	Death/Serious injury (head, spinal & crush injury) resulting from falls and kicks/trampling	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Helmets, females, handling facilities

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
8. Mobile plant and attachments (forklifts, grain augers, dozers, bobcats, slashers, mulchers, spreaders etc.)	Operators, workers, bystanders	Death/Serious injury resulting from runovers, rollovers, unguarded PTO/belt drives/pulleys (amputations), falls from, machinery maintenance, clearing blockages	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
9. Tractor	Operators, bystanders, passengers	Death/Serious injury resulting from runovers, rollovers, falling from, entanglement in attachments, hydraulic failures	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
10. SSV	Operators, bystanders, passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■■■■■	■■□□□	☠☠☠☠☠ (1,3,4,5)	Maintenance, seatbelts
11. Water (dams, rivers, creeks, irrigation channels, water tanks etc.)	Children	Death/Serious injury resulting from drowning/near drowning	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,5)	High prevalence 0-4 years old, supervision, fencing
12. Structures	Workers, Bystanders	Death/Serious injury resulting from slips, trips and falls from and/or collapse of structures (e.g. sheds, ladders, platforms, walkways, walls)	■■■■■	■■□□□	☠☠☠☠☠ (2,3,4,5)	Maintenance
13. Fuels & fertilisers (diesel, unleaded, urea etc.)	Workers, bystanders	Death/Serious injury resulting from explosion or leakage (asphyxiation, burns - skin, eyes, internal)	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	Dermatitis, grassfire
14. Fixed plant (pumps etc.)	Workers	Death/Serious injury resulting from contact with PTO/belt drives (amputations)	■■■■■	■■□□□	☠☠☠☠☠ (1,2,3,4,5)	Guarding, electrocution

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
15. Electrical powerlines and systems	Workers, bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	Moving tall objects, DIY electrical repairs
16. Confined spaces	Workers, bystanders	Death/Serious injury resulting from toxic gas/oxygen deprivation	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,5)	Lack of entry permit planning/rescue procedure
17. Hay bales	Workers, bystanders	Death/Serious injury resulting from falling bales	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	Children, manual handling, stability of stack
18. Silos	Workers, bystanders	Death/Serious injury resulting from falls from height, silo collapse, grain suffocation	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	Children
19. Firearm	Workers, bystanders	Death/Serious injury resulting from gunshot wound	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	Storage, pest control
20. Tyres	Workers, bystanders	Death/Serious injury resulting from tyre repair	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	Manual handling, tyre cage
21. Hand tools (non-powered and powered)	Workers	Death/Serious injury resulting from contact (e.g. fractures, lacerations, contusions)	■■■■■	■■■■■□	☠☠☠☠☠ (3,4,5)	Tool maintenance, guarding
22. Pesticide exposure (includes insecticides, herbicides, fungicides etc.)	Workers, Bystanders	Acute toxicity during mixing/spraying/usage depending on specific chemical (e.g. paraquat for weed control etc).	■■□□□	■■□□□	☠☠☠☠☠ (4,5)	Mixing facilities, PPE, application equipment
23. Zoonotic infection	Workers, bystanders	Illness resulting from Q Fever, Leptospirosis, brucellosis infection.	■■■□□	■■■■■□	☠☠☠☠ (4,5)	Hygiene diligence, vaccination (QVax, 7 in 1)

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
24. Needle stick	Workers	Illness or infection resulting from needle stick injury (e.g. 5 in 1)	■■■■■	■■■■■	☠☠ (4,5)	Hygiene diligence, handling facilities
25. Bending, twisting, lifting	Workers	Musculoskeletal injury resulting from manual handling (e.g. back sprain / strain)	■■■■■	■■■■■	☠☠☠ (4,5)	
26. Noise	Operators, workers, bystanders	Noise injury resulting in high frequency hearing loss	■■■■■	■■■■■	☠☠☠ (4,5)	
27. Oxy-acetylene	Operators	Burns resulting from contact and flash burns	■■■■■	■■■■■	☠☠☠ (2,4,5)	Explosion and fire
28. Dust, insects, particles (angle grinding etc.)	Workers	Foreign body in eye	■■■■■	■■■■■	☠☠ (4,5)	
29. UV solar radiation	Workers, bystanders	Sunburn, skin cancer, dehydration	■■■■■	■■■■■	☠☠ (4,5)	
30. Organic dust	Workers, bystanders	Respiratory effects - asthma, Toxic organic dust syndrome (TODS)	■■■■■	■■■■■	☠☠ (4,5)	Impacted by pre-existing conditions
31. Heat	Workers	Heat stress, dehydration	■■■■■	■■■■■	☠☠ (4,5)	
32. Machinery fires (tractors, forklifts etc.)	Workers	Burns related injury from fire and fire fighting	■■■■■	■■■■■	☠ (4,5)	Fire extinguisher availability
33. Animal husbandry chemicals	Workers	Exposure to agvet medications resulting in skin, eye, respiratory conditions etc.	■■■■■	■■■■■	☠ (4,5)	Handling facilities

Appendix 7 - Injury Profile: Chicken Meat Production

This review assesses existing evidence on human health and safety in the sector and is limited to on-farm chicken meat production.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of how often workers are exposed to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

The first component is the summary of WHS hazards and risks for your sector.

SECTION 1

The **Severity Rating** is based on the human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates a fatality and 1 (■□□□□), the lowest severity.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity of the consequence and frequency of exposure to the hazard ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (☠☠☠☠☠). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2017-18
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

CHICKEN MEAT PRODUCTION INDUSTRY PROFILE

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Mobile plant and attachments (bobcats, forklifts etc.)	Operators, Workers, Bystanders	Death/Serious injury resulting from runovers, rollovers, unguarded PTO/conveyor belt drives/pulleys (amputations), falls from, machinery maintenance	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
2. Fixed plant (conveyor belts, grain augers, pumps, ventilation fans etc.)	Workers	Death/Serious injury resulting from contact with PTO/belt drives (amputations)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Guarding, electrocution
3. Electrical powerlines and systems	Workers, Bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■■■■■	☠☠☠☠☠ (2,3,4,5)	Moving tall objects, DIY electrical repairs
4. Silos	Workers, Bystanders	Death/Serious injury resulting from falls from height, silo collapse, grain suffocation	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Children
5. Structures	Workers, Bystanders	Death/Serious injury resulting from slips, trips and falls from and/or collapse of structures (e.g. sheds, ladders, platforms, walkways, walls)	■■■■■	■■■■■	☠☠☠☠☠ (2,3,4,5)	Maintenance
6. Tractor	Operators, Bystanders, Passengers	Death/Serious injury resulting from runovers, rollovers, falling from, entanglement in attachments, hydraulic failures	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
7. Ute, Car, Truck, SSV	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, seatbelts

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
8. Confined spaces	Workers, Bystanders (rescuers)	Death/Serious injury resulting from toxic gas/oxygen deprivation	■■■■■	■□□□□	☠☠☠☠☠ (3,5)	Pump sheds, holding tanks
9. Quad (ATV)	Operators, Passengers	Death/Serious injury resulting from crash, rollovers, falling from	■■■■■	■□□□□	☠☠☠☠☠ (3,5)	Older farmers, young risk takers
10. Hand tools (non-powered & powered) for maintenance e.g. water/feed lines	Workers	Death/Serious injury resulting from contact (e.g. fractures, lacerations, contusions)	■■□□□	■■■■■	☠☠☠☠☠ (3,4,5)	Tool maintenance
11. Water (dams, rivers, creeks, water tanks etc.)	Children	Death/Serious injury resulting from drowning/near drowning	■■■■■	■■■□□	☠☠☠☠☠ (3,5)	High prevalence 0-4 years old, supervision, fencing. Biosecurity requirements reduce presence
12. Pesticide exposure (includes insecticides, herbicides, fungicides etc.)	Workers, Bystanders	Acute toxicity during mixing/spraying/usage depending on specific chemical (e.g. spinosad fumigation for red mite, darkling or paraquat for weed control etc.).	■■□□□	■■■□□	☠☠☠☠☠ (4,5)	Mixing facilities, PPE, application equipment
13. Fuels (diesel, unleaded etc.)	Workers, Bystanders	Death/Serious injury resulting from fire, explosion or leakage (asphyxiation, burns - skin, eyes, internal)	■■■■■	■■■□□	☠☠☠☠☠ (3,4,5)	Dermatitis, grassfire
14. Bending, twisting, lifting	Workers	Musculoskeletal injury resulting from manual handling (e.g. back sprain / strain)	■■□□□	■■■■■	☠☠☠ (4,5)	

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
15. Frequent repetitive tasks	Workers	Repetitive strain injury e.g. depopulation, maintenance drink/feed lines	■■■■■	■■■■■	☠☠☠ (4,5)	
16. Organic dust	Workers, Bystanders	Respiratory effects - asthma, Toxic organic dust syndrome (TODS)	■■■■■	■■■■■	☠☠☠ (4,5)	Impacted by pre-existing conditions, poor quality litter
17. Noise	Operators, Workers, Bystanders	Noise injury resulting in high frequency hearing loss	■■■■■	■■■■■	☠☠☠ (4,5)	
18. Zoonotic infection	Workers	Illness resulting from zoonotic disease (e.g. psittacosis infection)	■■■■■	■■■■■	☠☠ (4,5)	Hygiene diligence
19. Needle stick (breeder farms only)	Workers	Illness or infection resulting from needle stick injury (e.g. Mareks disease)	■■■■■	■■■■■	☠☠ (4,5)	Hygiene diligence, PPE
20. Non-manual euthanasia	Workers	Risks to human safety resulting from CO ² gas used/ captive bolt gun	■■■■■	■■■■■	☠☠ (4,5)	Ventilation
21. Dust, insects, particles (angle grinding etc.)	Workers	Foreign body in eye	■■■■■	■■■■■	☠☠ (4,5)	PPE
22. Machinery fires (bobcats, forklifts, tractors etc.)	Workers	Burns related injury from fire and fire fighting	■■■■■	■■■■■	☠☠ (4,5)	Fire extinguisher availability, maintenance of equipment
23. UV solar radiation	Workers	Sunburn, skin cancer, dehydration	■■■■■	■■■■■	☠☠ (4,5)	
24. Animal husbandry chemicals	Workers	Exposure to agvet medications resulting in skin, eye, respiratory conditions etc.	■■■■■	■■■■■	☠ (4,5)	

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
25. Cleaning agents (e.g. chlorine, disinfectants)	Workers	Exposure to chlorine during washing resulting in skin, eye, respiratory conditions etc.	■ ■ □ □ □	■ ■ □ □ □	☠ (4,5)	
26. Ammonia	Workers	Inhalation and respiratory effect from droppings.	■ ■ □ □ □	■ ■ ■ ■ ■	☠ (4,5)	Litter quality, high protein diet and ventilation
27. Interaction with chickens / roosters	Workers	Injury resulting from chickens/roosters	■ □ □ □ □	■ □ □ □ □	☠ (4,5)	

Appendix 8 - Injury Profile: Cotton

This review assesses existing evidence on human health and safety in the sector.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of how often workers are exposed to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

The first component is the summary of WHS hazards and risks for your sector.

SECTION 1

The **Severity Rating** is based on the human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates a fatality and 1 (■□□□□), the lowest severity.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity of the consequence and frequency of exposure to the hazard ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (⚠⚠⚠⚠⚠). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2017-18
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

COTTON INDUSTRY PROFILE

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Ute, Car, Truck, SSV	Operators, Contractors, Bystanders, Passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, seatbelts
2. Aeroplanes, helicopters and gyrocopters	Operators, Contractors, Passengers	Death/Serious injury resulting from crashes	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,5)	Contact with powerlines, lack of line markings
3. Tractor	Operators, Contractors, Bystanders, Passengers	Death/Serious injury resulting from runovers, rollovers, falling from, entanglement in attachments, hydraulic failures	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
4. Mobile plant and attachments (round balers, spray rigs, grain augers, forklifts, dozers, slashers etc.)	Operators, Contractors, Workers, Bystanders	Death/Serious injury resulting from runovers, rollovers, unguarded PTO/belt drives/pulleys (amputations), falls from, machinery maintenance, clearing blockages	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
5. Water (dams, rivers, creeks, irrigation channels, water tanks etc.)	Children, Workers, Contractors, Passengers	Death/Serious injury resulting from drowning/near drowning (e.g. vehicles in irrigation channels, children in water tanks)	■■■■■	■■■□□	☠☠☠☠☠ (2,3,5)	High prevalence 0-4 years old, supervision, fencing
6. Electrical powerlines and systems	Workers, Contractors, Bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■■■■■□	☠☠☠☠☠ (2,3,4,5)	Moving tall objects, DIY electrical repairs
7. Quad (ATV)	Operators, Contractors, Bystanders, Passengers	Death/Serious injury resulting from crash, rollovers, falling from	■■■■■	■■□□□	☠☠☠☠☠ (2,3,4,5)	Older farmers, young risk takers

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
8. Fixed plant (irrigation / lift pumps etc.)	Workers Contractors	Death/Serious injury resulting from contact with PTO, shaft and belt drives (amputations). Falls from platforms, walkways, stairways and ladders	■■■■■	■□□□	☠☠☠☠☠ (2,3,4,5)	Guarding, electrocution
9. Structures	Workers, Contractors, Bystanders	Death/Serious injury resulting from slips, trips and falls from and/or collapse of structures (e.g. sheds, ladders, platforms, walkways, walls)	■■■■■	■■■■□	☠☠☠☠☠ (2,3,4,5)	Maintenance
10. Confined spaces	Workers, Contractors, Bystanders	Death/Serious injury resulting from toxic gas/oxygen deprivation (e.g. irrigation pump sites)	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	Lack of entry permit planning/rescue procedure
11. Motorbike	Operators, Passengers	Death/Serious injury (head, spinal & lower limb fractures) resulting from crashes	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	Helmets, young risk takers
12. Hand tools (non-powered and powered)	Workers	Death/Serious injury resulting from contact (e.g. fractures, lacerations, contusions)	■■□□□	■■■■□	☠☠☠☠☠ (2,3,4,5)	Guarding, tool maintenance
13. Tyres	Workers, Bystanders	Death/Serious injury resulting from tyre repair	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	Manual handling, tyre cage
14. Pesticide exposure (includes insecticides, herbicides, fungicides etc.)	Workers, Bystanders	Acute toxicity during mixing/spraying/usage depending on specific chemical (e.g. Thimet for thrips control or paraquat for weed control etc).	■■□□□	■■□□□	☠☠☠☠☠ (4,5)	Mixing facilities, PPE, application equipment
15. Round bales	Workers, Contractors, Bystanders	Death/Serious injury resulting from falling bales (loading/unloading)	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Children, stability of stack

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
16. Trees	Workers, Bystanders	Death/Serious injury resulting from felling/lopping trees and chainsaw lacerations	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	
17. Fuels storage - diesel, unleaded	Workers, Contractors Bystanders	Death/Serious injury resulting from fire, explosion or leakage (burns - skin, eyes, internal)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Dermatitis, grassfire, environmental
18. Storage & use of fertilisers (urea, anhydrous ammonia etc.)	Workers, Contractors Bystanders	Death/Serious injury resulting from fire explosion or leakage (asphyxiation, burns - skin, eyes, internal)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Dermatitis, grassfire
19. Silos	Workers, bystanders	Death/Serious injury resulting from falls from height, silo collapse, grain (soy) suffocation	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	Children
20. Firearm	Workers, Bystanders	Death/Serious injury resulting from gunshot wound	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	Storage, pest control
21. Horses	Workers, Bystanders	Death/Serious injury (head, spinal & crush injury) resulting from falls and kicks/trampling	■■■■■	■■■□□	☠☠☠☠☠ (2,3,4,5)	Helmets
22. Zoonotic infection	Workers, bystanders	Illness resulting from Q Fever infection.	■■■□□	■□□□□	☠☠☠☠ (4,5)	Hygiene diligence
23. Bending, twisting, lifting	Workers	Musculoskeletal injury resulting from manual handling/shovelling (e.g. back, shoulder, hand, lower limb sprain / strain)	■■□□□	■■■■■	☠☠☠ (4,5)	
24. Noise	Operators, Contractors, Workers, Bystanders	Noise injury resulting in high frequency hearing loss	■■□□□	■■■■■	☠☠☠ (4,5)	
25. Organic dust	Workers, bystanders	Respiratory effects - asthma, Toxic organic dust syndrome (TODS)	■■□□□	■■■□□	☠☠☠ (4,5)	Impacted by pre-existing conditions

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
26. Heat	Workers	Heat stress, dehydration	■■■■□□	■■■■□□	☠☠☠ (4,5)	
27. Oxy-acetylene	Operators Bystanders	Burns resulting from contact and flash burns	■■■■□□	■□□□□	☠☠☠ (4,5)	Explosion and fire
28. Dust, insects, particles (angle grinding etc.)	Workers	Foreign body in eye	■■□□□	■■■■■	☠☠ (4,5)	
29. UV solar radiation	Workers, bystanders	Sunburn, skin cancer, dehydration	■■□□□	■■■■■□	☠☠ (4,5)	
30. Machinery fires (cotton baler/pickers tractors etc.)	Workers,	Burns related injury from fire and fire fighting	■■□□□	■□□□□	☠☠ (4,5)	Fire extinguisher availability

Appendix 9 - Injury Profile: Dairy

This review assesses existing evidence on human health and safety in the sector.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of how often workers are exposed to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

The first component is the summary of WHS hazards and risks for your sector.

SECTION 1

The **Severity Rating** is based on the human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates a fatality and 1 (■□□□□), the lowest severity.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity of the consequence and frequency of exposure to the hazard ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (⚠⚠⚠⚠⚠). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2017-18
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

DAIRY INDUSTRY PROFILE

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Tractor	Operators, Bystanders, Passengers	Death/Serious injury resulting from runovers, rollovers, falling from, entanglement in attachments, hydraulic failures	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
2. Quad (ATV)	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Older farmers, young risk takers
3. Ute, Car, Truck, SSV	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, seatbelts
4. Motorbike	Operators, Passengers	Death/Serious injury (head, spinal & lower limb fractures) resulting from crashes	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Helmets, young risk takers
5. Livestock (Cattle / Bulls)	Workers, Bystanders	Death/Serious injury resulting from crush, trampling & horn gouging	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Older farmers, yard facilities
6. Mobile plant and attachments (forklifts, grain augers, dozers, bobcats, slashers, mulchers, spreaders etc.)	Operators, Workers, Bystanders	Death/Serious injury resulting from runovers, rollovers, unguarded PTO/belt drives/pulleys (amputations), falls from, machinery maintenance, clearing blockages	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
7. Fixed plant (pumps etc.)	Workers	Death/Serious injury resulting from contact with PTO/belt drives (amputations)	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Guarding, electrocution

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
8. Structures	Workers, Bystanders	Death/Serious injury resulting from slips, trips and falls from and/or collapse of structures (e.g. sheds, ladders, platforms, walkways, walls)	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance
9. Hand tools (non-powered and powered)	Workers	Death/Serious injury resulting from contact (e.g. fractures, lacerations, contusions)	■■■■■	■■■■■	☠☠☠☠☠ (1,3,4,5)	Tool maintenance
10. Electrical powerlines and systems	Workers, Bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■■■■■	☠☠☠☠☠ (2,3,4,5)	Moving tall objects, DIY electrical repairs
11. Water (dams, rivers, creeks, irrigation channels, water tanks, effluent ponds etc.)	Children	Death/Serious injury resulting from drowning/near drowning	■■■■■	■■■■■	☠☠☠☠☠ (2,3,5)	High prevalence 0-4 years old, supervision, fencing
12. Hay bales	Workers, Bystanders	Death/Serious injury resulting from falling bales	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	Children, manual handling, stability of stack
13. Silos	Workers, Bystanders	Death/Serious injury resulting from falls from height, silo collapse, grain suffocation	■■■■■	■■□□□	☠☠☠☠☠ (2,3,4,5)	Children
14. Trees	Workers, Bystanders	Death/Serious injury resulting from felling/lopping trees and chainsaw lacerations	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	
15. Confined spaces	Workers, Bystanders (rescuers)	Death/Serious injury resulting from toxic gas/oxygen deprivation	■■■■■	■■■■■	☠☠☠☠☠ (3,5)	Lack of entry permit planning/rescue procedure

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
16. Firearm	Workers, bystanders	Death/Serious injury resulting from gunshot wound	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Storage, pest control
17. Tyres	Workers, bystanders	Death/Serious injury resulting from tyre repair	■■■■■	■□□□□	☠☠☠☠☠ (3,4)	Manual handling, tyre cage
18. Fuels & fertilisers (diesel, unleaded, urea etc.)	Workers, Bystanders	Death/Serious injury resulting from fire, explosion or leakage (asphyxiation, burns - skin, eyes, internal)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Dermatitis, grassfire
19. Pesticide exposure (includes insecticides, herbicides, fungicides etc.)	Workers, Bystanders	Acute toxicity during mixing/ spraying/usage depending on specific chemical (e.g. paraquat for weed control etc).	■■■■■	■■□□□	☠☠☠☠☠ (4,5)	Mixing facilities, PPE, application equipment
20. Zoonotic infection	Workers, Bystanders	Illness resulting from Q Fever, Leptospirosis, brucellosis infection.	■■■□□	■■■□□	☠☠☠☠ (4,5)	Hygiene diligence, vaccination (QVax, 7 in 1)
21. Needle stick	Workers	Illness or infection resulting from needle stick injury (e.g. 7 in 1)	■■■□□	■■□□□	☠☠☠☠ (4,5)	Hygiene diligence, handling facilities
22. Bending, twisting, lifting	Workers	Musculoskeletal injury resulting from milking and manual handling (e.g. back sprain / strain)	■■□□□	■■■■■	☠☠☠ (4,5)	
23. Noise	Operators, workers, bystanders	Noise injury resulting in high frequency hearing loss	■■□□□	■■■■■	☠☠☠ (4,5)	

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
24. Oxy-acetylene	Operators	Burns resulting from contact and flash burns	■■■■□□	■□□□□	☠☠☠ (4,5)	Explosion and fire
25. Dust, insects, particles (angle grinding etc.)	Workers	Foreign body in eye	■■■■□□	■■■■■	☠☠ (4,5)	
26. Milk vat / line cleaning	Workers	Burns, scalds, skin irritation from hot water and cleaning agents	■■■■□□	■■■■■	☠☠ (4,5)	
27. UV solar radiation	Workers, bystanders	Sunburn, skin cancer, dehydration	■■■■□□	■■■■■	☠☠ (4,5)	
28. Organic dust	Workers, bystanders	Respiratory effects - asthma, Toxic organic dust syndrome (TODS)	■■■■□□	■■■■□□	☠☠ (4,5)	Impacted by pre-existing conditions
29. Animal husbandry chemicals	Workers	Exposure to hazardous substances from footbaths etc. (e.g. formalin is a carcinogen)	■■■■□□	■□□□□	☠☠ (4,5)	
30. Heat	Workers	Heat stress, dehydration	■■■■□□	■■■■□□	☠☠ (4,5)	
31. Machinery fires (tractors, forklifts etc.)	Workers	Burns related injury from fire and fire fighting	■■■■□□	■□□□□	☠ (4,5)	Fire extinguisher availability

Appendix 10 - Injury Profile: Egg Production

This review assesses existing evidence on human health and safety in the sector.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of worker exposure to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

The first component is the summary of WHS hazards and risks for your sector.

SECTION 1

The **Severity Rating** is based on the potential human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates potential for a fatality and 1 (■□□□□), the lowest severity indicates a minor injury.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity and frequency ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (⚠⚠⚠⚠⚠). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2018-19
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

EGG PRODUCTION INDUSTRY PROFILE

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Mobile plant and attachments (bobcats, forklifts etc.)	Operators, workers, bystanders	Death/Serious injury resulting from runovers, rollovers, unguarded PTO/conveyor belt drives/pulleys (amputations), falls from, machinery maintenance	■■■■■	■■■□□	☠☠☠☠☠ (3,4,5)	Maintenance, guarding
2. Fixed plant (conveyor belts, pumps etc.)	Workers	Death/Serious injury resulting from contact with PTO/belt drives (amputations)	■■■■■	■■□□□	☠☠☠☠☠ (3,4,5)	Guarding, electrocution
3. Machinery fires (bobcats, tractors etc.)	Workers	Burns related injury from fire and fire fighting	■■□□□	■□□□□	☠☠ (4,5)	Fire extinguisher availability
4. Electrical powerlines and systems	Workers, bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■■□□□	☠☠☠☠☠ (2,3,4,5)	Moving tall objects, DIY electrical repairs
5. Silos	Workers, bystanders	Death/Serious injury resulting from falls from height, silo collapse, grain suffocation	■■■■■	■■□□□	☠☠☠☠☠ (3,4,5)	Children
6. Hand tools (non-powered and powered)	Workers	Death/Serious injury resulting from contact (e.g. fractures, lacerations, contusions)	■■□□□	■■■■■	☠☠☠☠☠ (3,4,5)	Tool maintenance
7. Tractor	Operators, bystanders, passengers	Death/Serious injury resulting from runovers, rollovers, falling from, entanglement in attachments, hydraulic failures	■■■■■	■■□□□	☠☠☠☠☠ (3,4,5)	Maintenance
8. Structures	Workers, Bystanders	Death/Serious injury resulting from slips, trips and falls from and/or collapse of structures (e.g. sheds, ladders, platforms, walkways, walls)	■■■■■	■■■■■	☠☠☠☠☠ (2,3,4,5)	Maintenance

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
9. Organic dust	Workers, bystanders	Respiratory effects - asthma, Toxic organic dust syndrome (TODS)	■ ■ □ □ □	■ ■ □ □ □	☠ ☠ ☠ (4,5)	Impacted by pre-existing conditions
10. Animal Welfare - Euthanasia	Workers	Risks to human safety resulting from CO ² gas used	■ ■ □ □ □	■ ■ □ □ □	☠ ☠ (4,5)	
11. Ammonia	Workers	Inhalation and respiratory effect from droppings.	■ ■ □ □ □	■ ■ ■ ■ ■	☠ (4,5)	
12. Bending, twisting, lifting	Workers	Musculoskeletal injury resulting from manual handling (e.g. back sprain / strain)	■ ■ □ □ □	■ ■ ■ ■ ■	☠ ☠ ☠ (4,5)	
13. Vaccination & candling	Workers	Repetitive strain injury	■ ■ □ □ □	■ ■ ■ ■ ■	☠ ☠ ☠ (4,5)	
14. Ute, Car, Truck, SSV	Operators, bystanders, passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■ ■ ■ ■ ■	■ ■ ■ ■ ■	☠ ☠ ☠ ☠ ☠ (3,4,5)	Maintenance, seatbelts
15. Water (dams, rivers, creeks, irrigation channels, water tanks etc.)	Children	Death/Serious injury resulting from drowning/near drowning	■ ■ ■ ■ ■	■ ■ ■ □ □	☠ ☠ ☠ ☠ ☠ (3,5)	High prevalence 0-4 years old, supervision, fencing. Biosecurity requirements reduce presence
16. Fuels & fertilisers (diesel, unleaded etc.)	Workers, bystanders	Death/Serious injury resulting from explosion or leakage (asphyxiation, burns - skin, eyes, internal)	■ ■ ■ ■ ■	■ ■ ■ □ □	☠ ☠ ☠ ☠ ☠ (3,4,5)	Dermatitis, grassfire
17. Trees	Workers, bystanders	Death/Serious injury resulting from felling/lopping trees and chainsaw lacerations	■ ■ ■ ■ ■	■ □ □ □ □	☠ ☠ ☠ ☠ ☠ (3,4,5)	

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
18. Quad (ATV)	Operators, bystanders, passengers	Death/Serious injury resulting from crash, rollovers, falling from	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Older farmers, young risk takers
19. Confined spaces	Workers, Bystanders (rescuers)	Death/Serious injury resulting from toxic gas/oxygen deprivation	■■■■■	■□□□□	☠☠☠☠☠ (3,5)	Lack of entry permit planning/rescue procedure
20. Pesticide exposure (includes herbicides, rodenticides etc.)	Workers, Bystanders	Acute toxicity during mixing/spraying/usage depending on specific chemical	■■□□□	■□□□□	☠ (4,5)	Mixing facilities, PPE, application equipment
21. Noise	Operators, workers, bystanders	Noise injury resulting in high frequency hearing loss (grading shed)	■■□□□	■■■■■	☠☠☠ (4,5)	
22. Oxy-acetylene	Operators	Burns resulting from contact and flash burns	■■■□□	■□□□□	☠☠☠ (4,5)	Explosion and fire
23. Zoonotic infection	Workers	Illness resulting from psittacosis infection	■■■□□	■■□□□	☠☠ (4,5)	Hygiene diligence
24. Needle stick	Workers	Illness or infection resulting from needle stick injury (e.g. Marek's disease)	■■■□□	■■■□□	☠☠ (4,5)	Hygiene diligence
25. Dust, insects, particles (angle grinding etc.)	Workers	Foreign body in eye	■■□□□	■■■■■	☠☠ (4,5)	
26. UV solar radiation	Workers	Sunburn, skin cancer, dehydration	■■□□□	■□□□□	☠☠ (4,5)	
27. Animal husbandry chemicals	Workers	Exposure to chlorine during washing resulting in skin, eye, respiratory conditions etc.	■■□□□	■■□□□	☠☠ (4,5)	Handling facilities

Appendix 11 - Injury Profile: Export Fodder

This review assesses existing evidence on human health and safety in the sector.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of worker exposure to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

SCOPE OF WORK

The first component is the summary of WHS hazards and risks for your sector. Please note that due to the way in which the data are reported, it has not been possible to verify if the cases were specifically within the designated “export fodder” sector. For the fatalities, all cases involved fodder production, however this may be for on-farm use or export (we are unable to ascertain precise details on these cases). For the workers compensation data - export fodder is listed under the broader coding of Other Crops (not elsewhere classified), in conjunction with crops such as peanuts, flax, ginger etc. Notwithstanding these limitations, based on industry discussions, the in-field data presented do appear to be relatively valid within the context of on-farm “export fodder” production.

The **Severity Rating** is based on the potential human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates potential for a fatality and 1 (■□□□), the lowest severity indicates a minor injury.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity and frequency ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (⚠⚠⚠⚠⚠). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2018-19
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

EXPORT FODDER INDUSTRY PROFILE

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Tractor	Operators, Bystanders, Passengers	Death/Serious injury resulting from runovers, rollovers, falling from, entanglement in attachments, hydraulic failures	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance
2. Mobile plant and attachments (hay balers, forklifts, telehandlers, mowers, windrowers etc.)	Operators, Workers, Bystanders	Death/Serious injury resulting from runovers, rollovers, unguarded PTO/belt drives/pulleys (amputations), falls from, machinery maintenance, hydraulic ruptures/leaks, clearing blockages	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
3. Hay bales	Workers, Bystanders	Death/Serious injury resulting from falling bales during loading/unloading or stacked	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Children, manual handling, stability of stack
4. Quad (ATV)	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Older farmers, young risk takers
5. Ute, Car, Truck, SSV	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (2,3,4,5)	Maintenance, seatbelts
6. Fixed plant (travelling irrigators, pumps etc.)	Workers	Death/Serious injury resulting from contact with PTO/belt drives (amputations)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Guarding, electrocution

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
7. Electrical powerlines and systems	Workers, Bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Moving tall objects, DIY electrical repairs
8. Silos	Workers, Bystanders	Death/Serious injury resulting from falls from height, silo collapse, grain suffocation	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Children
9. Structures	Workers, Bystanders	Death/Serious injury resulting from slips, trips and falls from and/or collapse of structures (e.g. sheds, ladders, platforms, walkways, walls)	■■■■■	■■■■■□	☠☠☠☠☠ (3,4,5)	Maintenance
10. Water (dams, rivers, creeks, irrigation channels, water tanks, effluent ponds etc.)	Children	Death/Serious injury resulting from drowning/near drowning	■■■■■	■□□□□	☠☠☠☠☠ (3,5)	High prevalence 0-4 years old, supervision, fencing
11. Motorbike	Operators, Passengers	Death/Serious injury (head, spinal & lower limb fractures) resulting from crashes	■■■■■	■■■□□	☠☠☠☠☠ (3,4,5)	Helmets, young risk takers
12. Trees	Workers, Bystanders	Death/Serious injury resulting from felling/lopping trees and chainsaw lacerations	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	
13. Fuels & fertilisers (diesel, unleaded, urea etc.)	Workers, Bystanders	Death/Serious injury resulting from fire, explosion or leakage (asphyxiation, burns - skin, eyes, internal)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Dermatitis, grassfire

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
14. Hand tools (non-powered and powered)	Workers	Death/Serious injury resulting from contact (e.g. fractures, lacerations, contusions)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Tool maintenance
15. Horses	Workers, Bystanders	Death/Serious injury (head, spinal & crush injury) resulting from falls and kicks/trampling	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Helmets, females
16. Pesticide exposure (includes insecticides, herbicides, fungicides etc.)	Workers, Bystanders	Acute toxicity during mixing/spraying/usage depending on specific chemical (e.g. Thiram for mites or paraquat for weed control etc).	■■■■■	■■■■■	☠☠☠☠☠ (4,5)	Mixing facilities, PPE, application equipment
17. Aeroplanes, helicopters and gyrocopters	Operators	Death/Serious injury resulting from crashes	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Contact with powerlines, lack of line markings
18. Firearm	Workers, Bystanders	Death/Serious injury resulting from gunshot wound	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Storage, pest control
19. Tyres	Workers, Bystanders	Death/Serious injury resulting from tyre repair	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Manual handling, tyre cage
20. Confined spaces	Workers, Bystanders (rescuers)	Death/Serious injury resulting from toxic gas/oxygen deprivation in silos, pump sheds etc.	■■■■■	■■■■■	☠☠☠☠☠ (3,5)	Lack of entry permit planning/rescue procedure
21. Zoonotic infection	Workers, Bystanders	Illness resulting from infection e.g. Q Fever infection.	■■■■■	■■■■■	☠☠☠☠☠ (4,5)	Hygiene diligence
22. Bending, twisting, lifting	Workers	Musculoskeletal injury resulting from manual handling (e.g. back sprain / strain)	■■■■■	■■■■■	☠☠☠ (4,5)	

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
23. Noise	Operators, Workers, Bystanders	Noise injury resulting in high frequency hearing loss	■■■■	■■■■■	☠☠☠ (4,5)	
24. Oxy-acetylene	Operators	Burns resulting from contact and flash burns	■■■■	■■■■■	☠☠☠ (4,5)	Explosion and fire
25. Machinery fires (tractors, headers etc.)	Workers	Burns related injury from fire and fire fighting	■■■■	■■■■■	☠☠ (4,5)	Fire extinguisher availability
26. Dust, insects, particles (angle grinding etc.)	Workers	Foreign body in eye	■■■■	■■■■■	☠☠ (4,5)	
27. UV solar radiation	Workers, Bystanders	Sunburn, skin cancer, dehydration	■■■■	■■■■■	☠☠ (4,5)	
28. Organic dust	Workers, Bystanders	Respiratory effects - asthma, Toxic organic dust syndrome (TODS)	■■■■	■■■■■	☠☠ (4,5)	Impacted by pre-existing conditions
29. Heat	Workers	Heat stress, dehydration	■■■■	■■■■■	☠☠ (4,5)	

Appendix 12 - Injury Profile: Grain Production

This review assesses existing evidence on human health and safety in the sector.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of how often workers are exposed to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

The first component is the summary of WHS hazards and risks for your sector.

SECTION 1

The **Severity Rating** is based on the human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates a fatality and 1 (■□□□□), the lowest severity.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity of the consequence and frequency of exposure to the hazard ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (■■■■■). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2017-18
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

GRAINS INDUSTRY PROFILE

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Mobile plant and attachments (headers, spray rigs, forklifts, grain augers, dozers, slashers, spreaders etc.)	Operators, workers, bystanders	Death/Serious injury resulting from runovers, rollovers, unguarded PTO/belt drives/pulleys (amputations), falls from, machinery maintenance, clearing blockages	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
2. Tractor	Operators, bystanders, passengers	Death/Serious injury resulting from runovers, rollovers, falling from, entanglement in attachments, hydraulic failures	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
3. Silos	Workers, bystanders	Death/Serious injury resulting from falls from height, silo collapse, grain suffocation	■■■■■	■■□□□	☠☠☠☠☠ (1,2,3,4,5)	Children
4. Electrical powerlines and systems	Workers, bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■■□□□	☠☠☠☠☠ (1,2,3,4,5)	Moving tall objects, DIY electrical repairs
5. Aeroplanes, helicopters and gyrocopters	Operators	Death/Serious injury resulting from crashes	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,5)	Contact with powerlines, lack of line markings
6. Structures	Workers, Contractors, Bystanders	Death/Serious injury resulting from slips, trips and falls from and/or collapse of structures (e.g. sheds, ladders, platforms, walkways, walls)	■■■■■	■■■■■□	☠☠☠☠☠ (1,2,3,4,5)	Maintenance
7. Ute, Car, Truck, SSV	Operators, bystanders, passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, seatbelts

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
8. Quad (ATV)	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Older farmers, young risk takers
9. Motorbike	Operators, passengers	Death/Serious injury (head, spinal & lower limb fractures) resulting from crashes	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Helmets, young risk takers
10. Horses	Workers, bystanders	Death/Serious injury (head, spinal & crush injury) resulting from falls and kicks/trampling	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Helmets
11. Water (dams, rivers, creeks, irrigation channels, water tanks, effluent ponds etc.)	Children	Death/Serious injury resulting from drowning/near drowning	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,5)	High prevalence 0-4 years old, supervision, fencing
12. Trees	Workers, bystanders	Death/Serious injury resulting from felling/lopping trees and chainsaw lacerations	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	
13. Firearm	Workers, bystanders	Death/Serious injury resulting from gunshot wound	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	Storage, pest control
14. Tyres	Workers, bystanders	Death/Serious injury resulting from tyre repair	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	Manual handling, tyre cage
15. Hay bales	Workers, bystanders	Death/Serious injury resulting from falling bales	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Children, stability of stack
16. Fixed plant (pumps etc.)	Workers	Death/Serious injury resulting from contact with PTO, shaft and belt drives (amputations)	■■■■■	■■□□□	☠☠☠☠☠ (2,3,4,5)	Guarding, electrocution
17. Confined spaces	Workers, bystanders	Death/Serious injury resulting from toxic gas/oxygen deprivation	■■■■■	■□□□□	☠☠☠☠☠ (2,3,5)	Lack of entry permit planning/rescue procedure

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
18. Hand tools (non-powered and powered)	Workers	Deaths /Serious injury resulting from contact (e.g. fractures, lacerations, contusions)	■■■■■	■■■■■	☠☠☠☠☠ (2,4,5)	Guarding, tool maintenance
19. Pesticide exposure (includes insecticides, herbicides, fungicides etc.)	Workers, Bystanders	Acute toxicity during mixing/ spraying/usage depending on specific chemical (e.g. Thiram for mites or paraquat for weed control etc).	■■■■■	■■■■■	☠☠☠☠☠ (4,5)	Mixing facilities, PPE, application equipment
20. Fuels & fertilisers (diesel, unleaded, urea, etc.)	Workers, bystanders	Death/Serious injury resulting from fire, explosion or leakage (asphyxiation, burns - skin, eyes, internal)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Dermatitis, grassfire, environmental
21. Grain fumigation	Workers	Serious injury resulting from inhalation of phosphine (respiratory)	■■■■■	■■■■■	☠☠☠☠☠ (4,5)	PPE
22. Zoonotic infection	Workers, bystanders	Illness resulting from Q Fever infection.	■■■■■	■■■■■	☠☠☠☠☠ (4,5)	Hygiene diligence
23. Bending, twisting, lifting	Workers	Musculoskeletal injury resulting from manual handling (e.g. back, shoulder, hand, lower limb sprain / strain)	■■■■■	■■■■■	☠☠☠☠☠ (4,5)	
24. Noise	Operators, workers, bystanders	Noise injury resulting in high frequency hearing loss	■■■■■	■■■■■	☠☠☠☠☠ (4,5)	
25. Organic dust	Workers, bystanders	Respiratory effects - asthma, Toxic organic dust syndrome (TODS)	■■■■■	■■■■■	☠☠☠☠☠ (4,5)	Impacted by pre-existing conditions
26. Heat	Workers	Heat stress, dehydration	■■■■■	■■■■■	☠☠☠☠☠ (4,5)	
27. Oxy-acetylene	Operators	Burns resulting from contact and flash burns	■■■■■	■■■■■	☠☠☠☠☠ (4,5)	Explosion and fire

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
28. Dust, insects, particles (angle grinding etc.)	Workers	Foreign body in eye	■■□□□	■■■■■	☠☠ (4,5)	
29. UV solar radiation	Workers, bystanders	Sunburn, skin cancer, dehydration	■■□□□	■■■■■	☠☠ (4,5)	
30. Machinery fires (tractors, headers etc.)	Workers,	Burns related injury from fire and fire fighting	■■□□□	■□□□□	☠☠ (4,5)	

Appendix 13 - Injury Profile: Pork Production

This review assesses existing evidence on human health and safety in the sector.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of worker exposure to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

The first component is the summary of WHS hazards and risks for your sector.

SECTION 1

The **Severity Rating** is based on the potential human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates potential for a fatality and 1 (■□□□□), the lowest severity indicates a minor injury.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity and frequency ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (⚠⚠⚠⚠⚠). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2018-19
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

PORK PRODUCTION INDUSTRY PROFILE

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Structures	Workers, Bystanders	Death/Serious injury resulting from slips, trips and falls from and/or collapse of structures (e.g. sheds, ladders, platforms, walkways, walls)	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance
2. Mobile plant and attachments (feed-out cart, bobcats, forklifts, grain augers, pressure washers, etc.)	Operators, Workers, Bystanders	Death/Serious injury resulting from runovers, rollovers, unguarded PTO/belt drives/pulleys (amputations), falls from, machinery maintenance, clearing blockages	■■■■■	■■■■■	☠☠☠☠☠ (2,3,4,5)	Maintenance, guarding
3. Tractor	Operators, Bystanders, Passengers	Death/Serious injury resulting from runovers, rollovers, falling from, entanglement in attachments, hydraulic failures	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	Maintenance
4. Livestock (pigs)	Workers, Bystanders	Serious injury resulting from crushing, trampling & bites	■■■■■	■■■■■	☠☠☠☠☠ (2,3,4,5)	Older farmers, handling facilities
5. Firearm	Workers, Bystanders	Death/Serious injury resulting from gunshot wound/captive bolt guns	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	Storage, pest control
6. Electrical powerlines and systems (feeding systems, temperature control etc.)	Workers, Bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Moving tall objects, DIY electrical repairs

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
7. Ute, Car, Truck, SSV	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Maintenance, seatbelts
8. Fixed plant (pumps, grain mills etc.)	Workers	Death/Serious injury resulting from contact with PTO/belt drives (amputations)	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Guarding, electrocution
9. Hand tools (non-powered and powered)	Workers	Death/Serious injury resulting from contact (e.g. fractures, lacerations, contusions)	■□□□□	■■■■■	☠☠☠☠☠ (3,4,5)	Guarding, tool maintenance
10. Fuels, LPG, biogas& fertilisers (diesel, unleaded, urea etc.)	Workers, Bystanders	Death/Serious injury resulting from fire, explosion or leakage (asphyxiation, burns - skin, eyes, internal)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Dermatitis, grassfire, environmental
11. Trees	Workers, Bystanders	Death/Serious injury resulting from felling/lopping trees and chainsaw lacerations	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	
12. Hay bales	Workers	Death/Serious injury resulting from falling bales	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Children, manual handling, stability of stack
13. Silos	Workers, Bystanders	Death/Serious injury resulting from falls from height, silo collapse, grain suffocation, feed release slot/mechanism	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Children, biosecurity requirements reduce presence
14. Motorbike	Operators, Passengers	Death/Serious injury (head, spinal & lower limb fractures) resulting from crashes	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Helmets, young risk takers
15. Quad (ATV)	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, rollovers, falling from	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Older farmers Free range production systems

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
16. Confined spaces	Workers, Bystanders (rescuers)	Death/Serious injury resulting from toxic gas/oxygen deprivation	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Lack of entry permit planning/rescue procedure
17. Tyres	Workers, bystanders	Death/Serious injury resulting from tyre repair	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Manual handling, tyre cage
18. Water (dams, rivers, creeks, water tanks, effluent ponds etc.)	Children	Death/Serious injury resulting from drowning/near drowning	■■■■■	■■■□□	☠☠☠☠☠ (3,5)	High prevalence 0-4 years old, supervision, fencing. Biosecurity requirements reduce presence
19. Zoonoses	Workers, Bystanders	Illness resulting from, leptospirosis, swine influenza infection, Q Fever.	■■■□□	■■■■□	☠☠☠☠ (4,5)	Hygiene diligence
20. Bending, twisting, lifting	Workers	Musculoskeletal injury resulting from manual handling (e.g. back sprain / strain during carcass removal)	■■■□□	■■■■■	☠☠☠ (4,5)	
21. Frequent repetitive tasks e.g. vaccinating, manual feeding	Workers	Repetitive strain injury	■■■□□	■■■■■	☠☠☠ (4,5)	
22. Needles	Workers	Illness infection or side-effects/reaction to a vaccine/drug as a result of a needle stick injury (eg. Lutalyse, Improvac)	■■■□□	■■■■□	☠☠☠ (4,5)	Hygiene diligence, handling facilities
23. Noise	Operators, workers, bystanders	Noise injury resulting in high frequency hearing loss	■■□□□	■■■■■	☠☠☠ (4,5)	

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
24. Oxy-acetylene	Operators	Burns resulting from contact and flash burns	■■■■□	■□□□□	☠☠☠ (4,5)	Explosion and fire
25. Organic dust	Workers, bystanders	Respiratory effects - asthma, Toxic organic dust syndrome (TODS)	■■■■□	■■■■■□	☠☠ (4,5)	Impacted by pre-existing conditions
26. Dust, insects, particles (angle grinding etc.)	Workers	Foreign body in eye	■■■■□	■■■■■	☠☠ (4,5)	
27. UV solar radiation	Workers, bystanders	Sunburn, skin cancer, dehydration	■■■■□	■■■■■□	☠☠ (4,5)	
28. Pesticide exposure (includes insecticides, herbicides, fungicides etc.)	Workers	Acute toxicity during mixing/spraying/usage depending on specific chemical (e.g. 2,4-D products for weed control, rodenticides etc.).	■■■■□	■□□□□	☠☠☠☠☠ (4,5)	Mixing facilities, PPE, application equipment.
29. Animal husbandry chemicals, disinfectants	Workers	Exposure to substances resulting in eye, skin conditions	■■■■□	■□□□□	☠ (4,5)	Handling facilities, cleaning equipment
30. Heat	Workers	Heat stress, dehydration	■■■■□	■■□□□	☠ (4,5)	
31. Animal/vermin bites	Workers	Human system and/or skin reactions to bites from snakes, spiders, vermin, mosquitoes etc.	■■■■□	■■□□□	☠ (4,5)	
32. Machinery fires (tractors, headers etc.)	Workers,	Burns related injury from fire and fire fighting	■■■■□	■□□□□	☠ (4,5)	Bush and grass fires
33. Ammonia	Workers	Inhalation and respiratory effect from effluent.	■□□□□	■■■■■	☠ (4,5)	

Appendix 14 - Injury Profile: Sheep & Wool Production

This review assesses existing evidence on human health and safety in the sector.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of how often workers are exposed to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

The first component is the summary of WHS hazards and risks for your sector.

SECTION 1

The **Severity Rating** is based on the human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates a fatality and 1 (■□□□□), the lowest severity.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity of the consequence and frequency of exposure to the hazard ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (■■■■■). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2017-18
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

SHEEP & WOOL INDUSTRY PROFILE

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Quad (ATV)	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, rollovers, falling from	■■■■■	■■■■□	☠☠☠☠☠ (1,2,3,4,5)	Older farmers, young risk takers
2. Tractor	Operators, Bystanders, Passengers	Death/Serious injury resulting from runovers, rollovers, falling from, entanglement in attachments, hydraulic failures	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
3. Ute, Car, Truck	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, seatbelts
4. Motorbike	Operators, Passengers	Death/Serious injury (head, spinal & lower limb fractures) resulting from crashes	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Helmets, young risk takers
5. Confined spaces	Workers, Bystanders (rescuers)	Death/Serious injury resulting from toxic gas/oxygen deprivation	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,5)	Lack of entry permit planning/rescue procedure
6. Mobile plant and attachments (forklifts, grain augers, dozers, feed-out carts, slashers, mulchers, spreaders etc.)	Operators, Workers, Bystanders	Death/Serious injury resulting from runovers, rollovers, unguarded PTO/belt drives/pulleys (amputations), falls from, machinery maintenance, clearing blockages	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
7. SSV	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■■■■■	■■□□□	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, seatbelts

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
8. Structures	Workers, Bystanders	Death/Serious injury resulting from slips, trips and falls from and/or collapse of structures (e.g. sheds, ladders, platforms, walkways, walls)	■■■■■	■■■□□	☠☠☠☠☠ (2,3,4,5)	Maintenance
9. Livestock (Rams /Sheep)	Workers	Death/Serious injury resulting from collisions/crush in yards, pens and woolshed, plus lacerations/fractures and musculoskeletal injury during marking, mulesing etc.	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Older farmers, yard & woolshed facilities
10. Aeroplanes, helicopters and gyrocopters	Operators	Death/Serious injury resulting from crashes	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,5)	Contact with powerlines, lack of line markings
11. Water (dams, rivers, creeks, irrigation channels, water tanks etc.)	Children	Death/Serious injury resulting from drowning/near drowning	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,5)	High prevalence 0-4 years old, supervision, fencing
12. Fixed plant (pumps, overhead gear, woolpress etc.)	Workers	Death/Serious injury resulting from contact with PTO, shaft and belt drives (amputations, crush injury, lacerations)	■■■■■	■■□□□	☠☠☠☠☠ (1,2,3,4,5)	Guarding, electrocution
13. Hay bales	Workers, Bystanders	Death/Serious injury resulting from falling bales	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	Children, manual handling, stability of stack
14. Silos	Workers, Bystanders	Death/Serious injury resulting from falls from height, silo collapse, grain suffocation	■■■■■	■■□□□	☠☠☠☠☠ (1,2,3,4,5)	Children
15. Firearm	Workers, Bystanders	Death/Serious injury resulting from gunshot wound	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	Storage, pest control

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
16. Tyres	Workers, Bystanders	Death/Serious injury resulting from tyre repair	■■■■■	■□□□□	☠☠☠☠☠ (1,2,3,4,5)	Manual handling, tyre cage
17. Horses	Workers, Bystanders	Death/Serious injury (head, spinal & crush injury) resulting from falls and kicks/trampling	■■■■■	■■□□□	☠☠☠☠☠ (2,3,4,5)	Helmets, females, handling facilities
18. Trees	Workers, Bystanders	Death/Serious injury resulting from felling/lopping trees and chainsaw lacerations	■■■■■	■□□□□	☠☠☠☠☠ (2,3,4,5)	
19. Electrical powerlines and systems	Workers, Bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■■■□□	☠☠☠☠☠ (2,3,4,5)	Moving tall objects, DIY electrical repairs
20. Hand tools (non-powered and powered)	Workers	Deaths /Serious injury resulting from contact with hand tools (e.g. fractures, lacerations, contusions), including angle grinders, shearing handpiece, hammers etc.	■■□□□	■■■■■□	☠☠☠☠☠ (2,3,4,5)	Guarding, tool maintenance
21. Fuels & fertilisers (diesel, unleaded, urea etc.)	Workers, Bystanders	Death/Serious injury resulting from explosion or leakage (asphyxiation, burns - skin, eyes, internal)	■■■■■	■■■■■	☠☠☠☠☠ (2,3,4,5)	Dermatitis, grassfire
22. Pesticide exposure (includes insecticides, herbicides, fungicides etc.)	Workers (inclusive of shearers/shed hands etc.), Bystanders	Acute toxicity during mixing/ spraying/usage depending on specific chemical (e.g. paraquat for weed control etc). Exposure to hazardous substance resulting from ectoparasite, blowfly control, residues in wool etc.	■■□□□	■■□□□	☠☠☠☠☠ (4,5)	Mixing facilities, PPE, application equipment. Withholding period

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
23. Zoonotic infection	Workers, Bystanders	Illness resulting from Q Fever, Leptospirosis, Orf (scabby mouth) infection.	■■■■□	■■■■■□	☠☠☠☠ (4,5)	Hygiene diligence, vaccination (QVax, 7 in 1)
24. Needle stick	Workers	Illness or infection resulting from needle stick injury (e.g. Gudair)	■■■■■□	■■□□□	☠☠☠☠ (4,5)	Hygiene diligence, handling facilities
25. Shearing	Workers	Repetitive strain and vibration injury	■■□□□	■■■■■	☠☠☠ (4,5)	Handpiece maintenance, woolshed facilities
26. Bending, twisting, lifting	Workers	Musculoskeletal injury resulting from shearing and manual handling (e.g. back, shoulder, hand, lower limb sprain / strain)	■■□□□	■■■■■	☠☠☠ (4,5)	Sheep handling
27. Noise	Operators, Workers, Bystanders	Noise injury resulting in high frequency hearing loss	■■□□□	■■■■■	☠☠☠ (4,5)	
28. Oxy-acetylene	Operators	Burns resulting from contact and flash burns	■■■■□	■□□□□	☠☠☠ (2,4,5)	Explosion and fire
29. Heat	Workers (specifically in shearing sheds)	Heat stress, dehydration	■■■■□	■■□□□	☠☠☠ (4,5)	
30. Skin infections	Workers	Skin rashes, cysts, boils	■■□□□	■■□□□	☠☠ (4,5)	Hygiene diligence
31. Dust, insects, particles (angle grinding, cutters/combs etc.)	Workers	Foreign body in eye	■■□□□	■■■■■	☠☠ (4,5)	
32. UV solar radiation	Workers, Bystanders	Sunburn, skin cancer, dehydration	■■□□□	■■■■■□	☠☠ (4,5)	

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
33. Organic dust	Workers, Bystanders	Respiratory effects - asthma, Toxic organic dust syndrome (TODS)	■■□□□	■■□□□	☠ (4,5)	Impacted by pre-existing conditions
34. Machinery fires (tractors, forklifts etc.)	Workers	Burns related injury from fire and fire fighting	■■□□□	■□□□□	☠ (4,5)	Fire extinguisher availability

Appendix 15 - Injury Profile: Thoroughbreds

This review assesses existing evidence on human health and safety in the thoroughbred (stud) sector.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of how often workers are exposed to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

The first component is the summary of WHS hazards and risks for your sector.

SECTION 1

The **Severity Rating** is based on the human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates a fatality and 1 (■□□□□), the lowest severity.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity of the consequence and frequency of exposure to the hazard ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (☠☠☠☠☠). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2017-18
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

THOROUGHBRED INDUSTRY PROFILE

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Horses	Workers, Bystanders	Death/Serious injury (head, spinal & crush injury) resulting from falls and kicks/trampling e.g. serving barns	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,4,5)	Helmets, handling facilities
2. Mobile plant and attachments (forklifts, grain augers, horse float, bobcats, hay baler etc.)	Operators, Workers, Bystanders	Death/Serious injury resulting from runovers, rollovers, unguarded PTO/belt drives/pulleys (amputations), falls from, machinery maintenance, clearing blockages	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Maintenance, guarding
3. Tractor	Operators, Bystanders, Passengers	Death/Serious injury resulting from runovers, rollovers, falling from, entanglement in attachments, hydraulic failures	■■■■■	■■■□□	☠☠☠☠☠ (1,2,3,4,5)	Maintenance
4. Ute, Car, Truck, SSV	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, runovers, rollovers, falling from	■■■■■	■■■■■	☠☠☠☠☠ (1,3,4,5)	Maintenance, seatbelts
5. Quad (ATV)	Operators, Bystanders, Passengers	Death/Serious injury resulting from crash, rollovers, falling from	■■■■■	■■□□□	☠☠☠☠☠ (2,3,4,5)	Older farmers, young risk takers
6. Motorbike	Operators, Passengers	Death/Serious injury (head, spinal & lower limb fractures) resulting from crashes	■■■■■	■■□□□	☠☠☠☠☠ (2,3,4,5)	Helmets, young risk takers
7. Water (dams, rivers, creeks, irrigation channels, water tanks etc.)	Children	Death/Serious injury resulting from drowning/near drowning	■■■■■	■■■□□	☠☠☠☠☠ (2,3,5)	High prevalence 0-4 years old, supervision, fencing

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
8. Zoonotic infection	Workers, Bystanders	Illness resulting from Q Fever, chlamydia, hendra	■■■□□	■■□□□	☠☠☠☠☠ (2,4,5)	Hygiene diligence, handling facilities
9. Fixed plant (pumps etc.)	Workers	Death/Serious injury resulting from contact with PTO/belt drives (amputations)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Guarding, electrocution
10. Electrical powerlines and systems	Workers, Bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Moving tall objects, DIY electrical repairs
11. Structures	Workers, Bystanders	Death/Serious injury resulting from slips, trips and falls from and/or collapse of structures (e.g. sheds, ladders, platforms, walkways, walls)	■■■■■	■■■■□	☠☠☠☠☠ (3,4,5)	Maintenance
12. Hand tools (non-powered and powered)	Workers	Death/Serious injury resulting from contact (e.g. fractures, lacerations, contusions)	■■□□□	■■■■□	☠☠☠☠☠ (3,4,5)	Tool maintenance, electrocution
13. Hay bales	Workers, Bystanders	Death/Serious injury resulting from falling bales	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Children, manual handling, stability of stack
14. Trees	Workers, Bystanders	Death/Serious injury resulting from felling/lopping trees and chainsaw lacerations	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	
15. Silos	Workers, Bystanders	Death/Serious injury resulting from falls from height, silo collapse, grain suffocation	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Children

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
16. Confined spaces	Workers, Bystanders (rescuers)	Death/Serious injury resulting from toxic gas/oxygen deprivation	■■■■■	■■■□□	☠☠☠☠☠ (3,5)	Lack of entry permit planning/rescue procedure
17. Firearm	Workers, bystanders	Death/Serious injury resulting from gunshot wound	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Storage, pest control
18. Fuels & fertilisers (diesel, unleaded, urea etc.)	Workers, Bystanders	Death/Serious injury resulting from fire, explosion or leakage (asphyxiation, burns - skin, eyes, internal)	■■■■■	■■■■■	☠☠☠☠☠ (3,4,5)	Dermatitis, grassfire, environmental
19. Pesticide exposure (includes insecticides, herbicides, fungicides etc.)	Workers, Bystanders	Acute toxicity during mixing/spraying/usage depending on specific chemical (e.g. spinosad for red mite, or paraquat for weed control etc).	■■□□□	■■□□□	☠☠☠☠☠ (4,5)	Mixing facilities, PPE, application equipment
20. Needle stick	Workers	Illness or infection resulting from needle stick injury (e.g. post foaling care)	■■■□□	■■□□□	☠☠☠☠ (4,5)	Hygiene diligence, handling facilities
21. Bending, twisting, lifting	Workers	Musculoskeletal injury resulting from manual handling (e.g. back sprain / strain)	■■□□□	■■■■■	☠☠☠ (4,5)	
22. Noise	Operators, Workers, Bystanders	Noise injury resulting in high frequency hearing loss	■■□□□	■■■■■	☠☠☠ (4,5)	
23. Oxy-acetylene	Operators	Burns resulting from contact and flash burns	■■■□□	■□□□□	☠☠☠ (2,4,5)	Explosion and fire

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
24. Dust, insects, particles (angle grinding etc.)	Workers	Foreign body in eye	■■■■	■■■■■	☠☠ (4,5)	
25. UV solar radiation	Workers, Bystanders	Sunburn, skin cancer, dehydration	■■■■	■■■■■	☠☠ (4,5)	
26. Organic dust	Workers, Bystanders	Respiratory effects - asthma, Toxic organic dust syndrome (TODS)	■■■■	■■■■	☠☠ (4,5)	Impacted by pre-existing conditions
27. Heat	Workers	Heat stress, dehydration	■■■■	■■■■	☠☠ (4,5)	
28. Machinery fires (bobcats, forklifts, tractors etc.)	Workers	Burns related injury from fire and fire fighting	■■■■	■■■■	☠☠ (4,5)	Fire extinguisher availability
29. Animal husbandry chemicals	Workers	Exposure to agvet medications resulting in skin, eye, respiratory conditions etc.	■■■■	■■■■	☠ (4,5)	Handling facilities

Appendix 16 - Injury Profile: Wild-Catch Fisheries

This review assesses existing evidence on human health and safety in the sector.

The review has taken account of:

- Identified hazards to health and safety
- The severity of injury or illness as indicated by the risk of death and permanent disability
- The frequency of how often workers are exposed to the hazard
- The requirement to meet relevant WHS Regulations in relation to controlling risks

Information has been derived from:

- National Coronial Information System
- Safe Work Australia
- Industry knowledge

The first component is the summary of WHS hazards and risks for your sector.

SECTION 1

The **Severity Rating** is based on the human impact of the most severe injury or illness caused by that hazard. Each identified hazard has a rating ranging from 1 to 5, where 5 (■■■■■) indicates a fatality and 1 (■□□□□), the lowest severity.

The **Frequency Rating** takes into account the typical frequency of exposure for workers and others to the hazard. This is also rated 1 to 5, with 5 (■■■■■) being the highest and 1 (■□□□□), the lowest exposure.

The **Risk Rating** is derived from both the severity of the consequence and frequency of exposure to the hazard ratings. In all cases where deaths have resulted, the highest rating has been applied, i.e. 5 (⚠⚠⚠⚠⚠). Evidence to support the ratings are based on the following items and are listed in the Risk Rating column (Reference). The order of priority is broadly representative of the magnitude of cases in your sector.

Risk rating key reference

- 1 = Fatalities registered in sector during current study period 2014-15 to 2018-19
- 2 = Fatalities registered in sector during earlier period 2001-2013
- 3 = Fatalities registered in other sectors during current study period 2013-14 to 2018-19
- 4 = Injuries/illness registered in workers compensation data for sector during current study period 2013-14 to 2017-18
- 5 = Industry knowledge

The **associated risk factors** identify just some of the more pertinent issues that may impact on injury occurrence and/or severity and is meant as a guide only. Factors such as fatigue, weather/ocean conditions, alcohol and other drug use, plus a number of behavioural factors (e.g. age, skill level, risk taking), can impact universally on the issues identified.

WILD CATCH INDUSTRY PROFILE

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
1. Open waters	Fishers	Death/Serious injury resulting from boat capsize, falls from boat, entanglement, diving/scuba (drowning/near drowning)	■■■■■	■■■■■	☠☠☠☠☠ (1,2,3,5)	Environmental conditions
2. Fish / seafood	Fishers, bystanders	Death/Injury resulting from stings, bites, puncture wounds, infection	■■■■■	■■■■■	☠☠☠☠☠ (1,2,4,5)	Envenomation & sepsis
3. Mobile plant (e.g. forklifts, tractor)	Operators, Fishers, Bystanders	Death/Serious injury resulting from runovers, rollovers, falls from, machinery maintenance	■■■■■	■■■□□	☠☠☠☠☠ (2,3,4,5)	Maintenance, guarding
4. Fixed boat plant (motors, pumps, pulleys, winches, conveyor belts, crane)	Fishers	Death/Serious injury resulting from contact with winches etc. (amputations)	■■■■■	■■■□□	☠☠☠☠☠ (2,3,4,5)	Guarding, electrocution
5. Electrical systems (boat)	Fishers, Bystanders	Death/Serious injury resulting from contact with non-compliant electrical systems	■■■■■	■■□□□	☠☠☠☠☠ (2,3,4,5)	DIY electrical repairs
6. Electrical powerlines and systems (land based)	Fishers, Bystanders	Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems	■■■■■	■■□□□	☠☠☠☠☠ (2,3,4,5)	DIY electrical repairs
7. Hand tools (powered)	Fishers	Death/Serious injury resulting from contact with angle grinders, drills etc. (e.g. fractures, lacerations, contusions)	■■■■■	■■■□□	☠☠☠☠☠ (3,4,5)	Guarding, tool maintenance
8. Firearm	Fishers, Bystanders	Death/Serious injury resulting from gunshot wound	■■■■■	■□□□□	☠☠☠☠☠ (3,4,5)	Storage

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
9. Confined spaces - boats	Fishers, Bystanders	Death/Serious injury resulting from toxic gas/oxygen deprivation (e.g. engine room, snap freezers)	■■■■■	■□□□	☠☠☠☠ (3,5)	Lack of entry permit planning/rescue procedure
10. Fuels (diesel)	Fishers, bystanders	Death/Serious injury resulting from fire, explosion or leakage (e.g. burns)	■■■■■	■■■■■	☠☠☠☠ (3,4,5)	Dermatitis, environmental
11. Zoonotic infection	Fishers	Illness resulting from <i>Erysipelothrix rhusiopathiae</i> (crayfish poisoning).	■■■□□	■□□□	☠☠☠☠ (4,5)	Hygiene diligence
12. Hand tools (non-powered)	Fishers	Injury resulting from contact with knives, hooks etc. (e.g. fractures, lacerations, contusions)	■□□□	■■■■■	☠☠☠ (3,4,5)	Boat stability/swell etc.
13. Bending, twisting, lifting	Fishers	Musculoskeletal injury resulting from lifting bait boxes and manual handling (e.g. back sprain / strain)	■□□□	■■■■■	☠☠☠ (4,5)	
14. Repetitive tasks - net hauling/ cutting bait/retrieving gear	Workers	Repetitive strain injury	■□□□	■■■■■	☠☠☠ (4,5)	
15. Structures	Fishers	Death/Serious injury resulting from slips, trips and falls (e.g. deck, ladders, platforms, walkways)	■■■■■	■■■■■	☠☠☠☠ (2,3,4,5)	Boat stability/swell etc.
16. Noise	Fishers	Noise injury resulting in high frequency hearing loss (engine rooms, forklifts)	■□□□	■■■■■	☠☠☠ (4,5)	Aging
17. Oxy-acetylene	Operators, Bystanders	Burns resulting from contact and flash burns	■■■□□	■□□□	☠☠☠ (2,4,5)	Fire

Hazard	Who is at risk	Nature of risk	Severity rating	Frequency rating	Risk rating (Reference)	Associated risk factors
18. Insects, particles (angle grinding etc.)	Fishers	Foreign body in eye	■■■■■	■■■■■	☠☠ (4,5)	
19. UV solar radiation	Fishers	Sunburn, skin cancer, dehydration	■■■■■	■■■■■	☠☠ (4,5)	
20. Chemicals	Fishers, Bystanders	Skin, eye and respiratory reactions resulting from use of disinfectants (sodium metabisulphite)	■■■■■	■■■■■	☠ (4,5)	
21. Heat	Fishers	Heat stress, dehydration	■■■■■	■■■■■	☠☠ (4,5)	Water intake

Appendix 17 - WHS Matrix

This matrix provides a graphic illustration of the crossover of hazards and risks across the range of industry sectors represented. The final two columns for agriculture (Agric.) & fisheries/aquaculture (F&A.), denote the aggregated summary for each of these broader sectors. Please note - the order of hazards presented is broadly indicative of the total number of fatal incidents across all of the participating sectors in this project and may not reflect the priority order to your sector.

HAZARD & RISK																
1. Hazard - Quad (ATV)																
Risk - Death/Serious injury resulting from crash, rollovers, falling from																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓
2. Hazard - Tractor																
Risk - Death/Serious injury resulting from runovers, rollovers, falling from, entanglement in attachments, hydraulic failures																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
3. Hazard - Mobile plant & attachments (forklifts, dozers, bobcat, slasher, grain auger etc.)																
Risk - Death/Serious injury resulting from runovers, rollovers, unguarded PTO/belt drives/pulleys (amputations), falls from, machinery maintenance, clearing blockages																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
4. Hazard - Ute, Car, Truck, SSV																
Risk - Death/Serious injury resulting from crash, runovers, rollovers, falling from																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

5. Hazard - Aeroplanes, Helicopters and Gyrocopters																
Risk - Death/Serious injury resulting from crashes																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
	✓		✓				✓		✓	✓			✓	✓	✓	✓
6. Hazard - Motorbikes																
Risk - Death/Serious injury resulting from crashes																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓		✓	✓		✓	✓	✓	✓	✓	✓		✓		✓	✓
7. Hazard - Water (dams, rivers, creeks, irrigation channels, water tanks, effluent ponds etc.)																
Risk - Death/Serious injury resulting from drowning/near drowning																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8. Hazard - Open waters																
Risk - Death resulting from drowning																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓														✓		✓
9. Hazard - Horses																
Risk - Death/Serious injury resulting from falls and kicks/trampling																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
	✓		✓			✓	✓	✓	✓	✓			✓		✓	

10. Hazard - Livestock & Fish																
Risk - Death/Serious injury resulting from falls, crush injury, bites, stings, kicks, lifting/moving																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓
11. Hazard - Trees																
Risk - Death/Serious injury resulting from felling/lopping trees and chainsaw lacerations																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	
12. Hazard - Structures																
Risk - Death/Serious injury resulting from slips, trips and falls from and/or collapse of structures (e.g. sheds, workshops, ladders, platforms, walkways, walls)																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
13. Hazard - Hay / Cotton / Wool Bales																
Risk - Death/Serious injury resulting from falling bales																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓	
14. Hazard - Confined Spaces (silos, water tanks, vats etc.)																
Risk - Death/Serious injury resulting from toxic gas/oxygen deprivation																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓

15. Hazard - Electrical powerlines and systems																	
Risk - Death/Serious injury resulting from contact with electricity - powerlines, non-compliant electrical systems																	
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
16. Hazard - Firearms																	
Risk - Death/Serious injury resulting from gunshot wound on																	
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.	
✓	✓		✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
17. Hazard - Fixed plant (pumps, overhead gear etc.)																	
Risk - Death/Serious injury resulting from contact with PTO/belt drives (amputations)																	
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
18. Hazard - Silos																	
Risk - Death/Serious injury resulting from falls from height, silo collapse, grain suffocation																	
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		
19. Hazard - Tyres																	
Risk - Death/Serious injury resulting from tyre repair																	
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.	
	✓		✓	✓		✓	✓		✓	✓	✓		✓		✓		

20. Hazard - Pesticide exposure (insecticides, herbicides, fungicides etc.)																	
Risk - Death/Serious injury resulting from acute toxicity during mixing/spraying depending on specific chemical																	
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.	
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
21. Hazard - Fuels & fertilisers (diesel, unleaded, anhydrous ammonia etc.)																	
Risk - Death/Serious injury resulting from explosion or leakage (asphyxiation, burns - skin, eyes, internal)																	
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
22. Hazard - Zoonotic infection																	
Risk - Illness resulting from Q Fever, Leptospirosis, brucellosis infection etc.																	
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
23. Hazard - Needle stick injury																	
Risk - Illness or infection resulting from needle stick injury																	
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.	
	✓	✓		✓	✓			✓	✓	✓	✓		✓			✓	
24. Hazard - Bending, twisting, lifting																	
Risk - Musculoskeletal injury resulting from manual handling (back sprain / strain)																	
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

25. Hazard - Repetitive tasks																
Risk - Repetitive strain injury resulting from tasks (e.g. shearing, vaccination in some sectors)																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓		✓	✓	✓	✓		✓				✓	✓	✓	✓	✓	✓
26. Hazard - Hand tools (non-powered and powered)																
Risk - Death/Serious injury including fractures, lacerations, contusions & burns resulting from contact																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
27. Hazard - Noise																
Risk - Noise injury resulting in high frequency hearing loss																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
28. Hazard - Oxy-acetylene																
Risk - Burns resulting from contact																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
29. Hazard - Dust, insects, particles (angle grinding etc.)																
Risk - Foreign body in eye																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

30. Hazard - UV solar radiation																
Risk - Sunburn, skin cancer, dehydration																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
31. Hazard - Organic dust																
Risk - Respiratory effects																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
32. Hazard - Machinery fires (tractors, bobcats, headers etc.)																
Risk - Burns related injury resulting from fire and fire fighting																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓
33. Hazard - Animal husbandry chemicals																
Risk - Exposure to substances resulting in skin, eye, respiratory conditions etc.																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓		✓	✓			✓	✓	✓	✓	✓	✓		✓	✓
34. Hazard - Heat																
Risk - Heat stress, dehydration																
Aquaculture	Beef	Chicken	Cotton	Dairy	Eggs	Export Fodder	Grain	Horse	Mixed Farming	Mixed Livestock	Pork	Shearing	Sheep	Wild Catch	Agric.	F&A.
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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